

JOINT VALIDATION & VERIFICATION REPORT FOR GRID CONNECTED SOLAR ENERGY PROJECT



Document Prepared By LGAI Technological Center, S.A. (Applus+ Certification)

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Summary:

LGAI Technological Center, S.A. (hereafter referred to as Applus+ Certification) has been contracted by SE Solar Limited (one of Project proponent) to conduct the validation and verification of the project - "Grid Connected Solar Energy Project", with regard to the relevant requirements of VCS programme guidelines and standard (VCS standard version 3.7, & VCS program guide version 3.7). Relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting has been applied for validation and verification.

The monitoring period covers under this verification are from 07/08/2017 to 31/03/2019.

The verification includes confirming the implementation of the monitoring plan of the validated VCS joint PD and MR (Project pipeline ID 1890) and the application of the monitoring methodology as per ACM0002 version 19.0: "Grid-connected electricity generation from renewable sources". A site visit was conducted to verify the data submitted in the monitoring report.

The project activity involves generation of electricity by using the renewable energy source (solar) supplying to the Indian electricity grid. Thus, the project aims to displace electricity produced by fossil fuel power plants harnessing solar energy. Therefore, the project reduces greenhouse gas emissions and thereby contributes to sustainable development. The project being a renewable energy generation activity, leads to reduction in fossil fuel dominated electricity generation. The project activity results in reductions of greenhouse gas (GHG) emissions that are real, measurable, and verifiable and also plays beneficial role in the mitigation of climate change.

The project proponent has applied the baseline and monitoring methodology ACM0002, Version 19.0.0 "Grid-connected electricity generation from renewable sources".

The project activity involves installation of 170 MW_{AC} solar projects in the states of Telangana and Maharashtra of India. There are 3 project developers involved in the project activity, details of the same is provided in below table:

Project Developer	Installed capacity	Location	Commissioning date
SE Solar Limited	100 MWAC	Mahbubnagar dist. in the state of Telangana, India	07/08/2017
Gale Solarfarms Private Limited	50 MWAC	Dhule district of Maharashtra, India	08/02/2018
Tornado Solarfarms Private Limited	20 MWAC		09/11/2017

First phase of the project activity was commissioned on 07/08/2017 and considered as start date of project. The same was verified against the commissioning certificates/07/. Start date of crediting period is selected as 07/08/2017 and the first crediting period is from 07/08/2017 to 06/08/2027.

The proposed project activity is a Green field project which results in an estimated GHG emission reduction of 289,503 tCO₂ annually and a total of 2,895,035 tCO_{2e} over 10 years of the crediting period. The power generated by the project will be replacing the equivalent amount of electricity from the Grid system of India, which is dominated by fossil fuel based grid connected power plants.

A risk based approach has been followed to perform this combined validation & verification. In the course of validation & verification, 04 Corrective Action request (CARs) and 02 Clarification request (CLs) were raised and successfully closed.

The review of the project design documentation, monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and stakeholders have provided Applus+ Certification with sufficient evidence to validate the fulfillment of the stated criteria.

In detail the conclusions can be summarized as follows:

- The project is in line with all relevant host country criteria (India) and all relevant VCS and UNFCCC requirements for CDM
- The project additionality is sufficiently justified in the VCS joint PD & MR.
- The monitoring plan is transparent and adequate.
- The calculation of the emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 2,895,035 tCO₂e are most likely to be achieved within the 10 years crediting period.

Validation & Verification Conclusion:

The conclusions of this report show, that the project, as it was described in the project documentation and monitoring report, is in line with all criteria applicable for the validation and verification. This validation and verification is based on the information made available to Applus+ Certification and the engagement conditions are detailed in this report. No restrictions or uncertainties were identified related to the validation and verification.

Applus+ Certification confirms that the project is implemented in accordance with the validated VCS joint PD & MR. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the projects GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 417,018 tCO₂e during period 07/08/2017 to 31/03/2019.

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1 INTRODUCTION

1.1 Objective

Applus+ Certification has been contracted by SE Solar Limited (project proponent), to undertake the validation and verification of the renewable energy project titled “Grid Connected Solar Energy Project” The verifiers have reviewed the GHG data collected to date for the monitoring period from 07/08/2017 to 31/03/2019 (both days included) covered in this verification.

The purpose of this validation and verification is to have an independent third party assessment of whether the project activity conforms to the qualification criteria set out in the VCS Version 3.7 standard to attain real, measurable, additional and permanent emission reductions. The validation/verification statement/opinion is a written assurance that:

- The project complies with all the applicable VCS requirements and has the ability to generate the emission reductions stated over the project's crediting period.
- The validation followed the requirements of the current version of the VCS Standard Version 3.7 and VCS program guide 3.7 to ensure the quality and consistency of the validation work and the report.
- The project has resulted in emission reductions as declared by the organisation or GHG project's GHG assertion;
- The data reported is accurate, complete, consistent, transparent and free of material error or omission.

1.2 Scope and Criteria

For validation:

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan which is included in the VCS joint PD & MR and other relevant supporting documents.

The scope of work covered in the validation is described below:

- To validate whether the project activity meets the requirements of VCS Standard Version 3.7, VCS Validation and VCS program guide 3.7 including additionality, proof of title and compliance with local laws.
- To evaluate whether the baseline and monitoring plan are in conformance with the applied methodology from the VCS approved GHG program
- To confirm that the information presented are completed, consistent, transparent and free of omission or material error
- Background investigation and follow up interviews
- Issuance of draft validation report with CARs, CRs & FARs, if any

➤ Final validation opinion

The information in the VCS joint PD & MR is reviewed against the criteria of VCS Standard 3.7, the VCS program guide 3.7 and the approved baseline and monitoring CDM methodology ACM0002, version 19.0.

Applus+ Certification has performed validation based on a risk based approach focusing mainly on the significant risks to meet the qualification criteria and the ability to generate Verified Carbon Units (VCUs).

For Verification:

The scope of the verification was the independent and objective review and ex-post determination of the monitored reductions in GHG emissions from “Grid Connected Solar Energy Project” The verification of this project was based on the validated VCS joint project description & monitoring report /01/ and supporting documents submitted by the project proponent to the verification team. The documents were reviewed against the following guidance and protocols:

- VCS Standard: Version 3.7, dated 21 June 2017
- Approved baseline and monitoring methodology ACM0002 version 19.0, “Grid-connected electricity generation from renewable sources”.
- Validated VCS joint Project Description & monitoring report version 03 dated 06/08/2019
- VCS Program Guide, Version 3.7, dated 21 June 2017
- ISO 14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions, 2006

The validation & verification is not meant to provide any consulting towards the client. However, stated request for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 Level of Assurance

The validation has been planned and organized to achieve a

- ☒ Reasonable level of assurance
- ☐ Limited level of assurance.

1.4 Summary Description of the Project

The project activity comprises installation of a grid connected solar photovoltaic based power project with a total capacity of 170 MW_{AC}. The proposed project activity is a renewable solar electricity generation project and supplying power to the Indian Grid. The power generated by the project will be replacing the equivalent amount of electricity from the Indian Grid system of India, which is dominated by fossil fuel based grid connected power plants. The project activity is located at Dwarakanagar, Ammapur and Muthyalampalle villages in Mahbubnagar dist. in the state of Telangana and at Saltek and Bhamer villages in Dhule district of Maharashtra, India. The first phase of project activity was commissioned on 07/08/2017, second on 09/11/2017 and last phase on 08/02/2018.

The commissioning certificate/07/ and power purchase agreements/08/ are reviewed by the verification team and found to be appropriate. The verification team has also conducted onsite observation and physically verified the project equipment's and monitoring arrangements. The project activity was found to be implemented as it has been defined in the joint VCS PD&MR.

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

For Validation:

The validation process is undertaken by validation team that involves the following:

- The desk review of documents and evidences submitted by the project proponent in context of the reference VCS rules and guidelines,
- Undertaking site visit, interview or interactions with the representative of the project proponent,
- Reporting audit findings with respect to clarifications and non-conformities and the closure of the findings, as appropriate and
- Preparing a draft validation report
- Resolution of outstanding issues and the issuance of final verification report and opinion

In order to ensure transparency, a validation protocol was prepared for the project according to the VVS for PAs version 02.0 verification requirements and VCS Standard version 3.7.

The Clarification Requests (CR) were issued where additional information was needed to clarify issues, and Forward Action Requests (FAR) for issues relating to project implementation that required review during the first verification of the project activity.

For Verification:

The verification approach consists two phases.

- In the first phase, the assessment team completed a strategic review and risk assessment of the projects activities and processes in order to gain a full understanding of:
- Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;
- Means of verifying reported data; and
- Compilation of the Monitoring Report.

At the end of this phase, Applus+ Certification produced a Verification Checklist which, based on the risk assessment of the parameters and data collection and handling processes for each of those parameters, describes the verification approach and the sampling plan.

Using the Verification checklist, Applus+ Certification verified the implementation of the monitoring plan and the data presented in the Monitoring Report for the period in question. This involved a site visit and a desk review of the Monitoring Report. This verification report describes the findings of this assessment.

2.2 Document Review

For Validation:

The validation team has conducted the validation using the VCS Standard and the ACM0002 version 19.0 methodology as the reference criteria. The validation team had done the completeness check of VCS joint PD & MR submitted by the PP as per the VCS standard Version 3.7 requirements was reviewed. Furthermore, a desk review was also carried out to assess the following:

- Information of project details in compliance with VCS joint PD & MR template
- Appropriateness of methodology ACM0002 version 19.0 applied to the project activity
- Compliance with relevant laws and regulations
- Correctness of application of baseline and monitoring methodology
- Demonstration of additionality
- Monitoring plan described in the VCS joint PD & MR
- Stakeholder consultation

- Proof of listing of project under pipeline
- Calculation of grid emission factor, etc. where applicable.

The VCS joint PD&MR version 01 dated 22/04/2019 was initially reviewed and the PP requested to submit the revised documents along with the supporting information and documents. The revised documents and additional supporting documents were further assessed by the validation team. During the validation process, the revised VCS joint PD & MR/1/ and the supporting documents were assessed to confirm the actions taken by the PP to the CARs and CLs issued.

The validation team has reviewed the final version of the VCS joint PD and MR Version 03 dated 06/08/2019 to confirm that all changes agreed have been incorporated.

Further, prior to the onsite visit, it was verified by the validation team that the project was listed in the VCS pipeline in line with the requirements (Section 3, Registration and Issuance process, version 3.8) Ref: https://www.vcsprojectdatabase.org/#/pipeline_details/PL1890

For Verification:

The validated VCS joint PD & MR /01/ (version 03 dated 06/08/2019) and additional supporting documents related to the project performance submitted by the client were reviewed.

The details of the documentation reviewed during the validation & verification are provided under Appendix 1 of this report.

2.3 Interviews

The assessment team has carried out interviews in order to verify the information included in the project documentation and to gain additional information regarding the compliance of the project with the VCS requirements. Before and during the on-site visit, the assessment team has interviewed the representatives of the PP to confirm selected information and to clarify issues identified during the document review. Representatives of the PP and O&M contractor were also interviewed. The names and designations of the personnel interviewed are mentioned in section 2.4 below.

The main topics covered during the interview are as follows:

- General Aspects of the project
- Project Implementation
- Equipment and operation
- Staff Training procedures
- Calibration procedures
- Monitoring & Measuring System
- Data collection, recording and archiving procedure

- QA/QC procedures
- VCS documentation
- Emission reduction calculations

2.4 Site Inspections

As part of the validation & verification, an on-site inspection has been performed by the assessment team. The site visit was carried out on 25/07/2019 and 30/07/2019. During the site visit representatives of the PP and O&M contractors were interviewed; i.e. personnel responsible for monitoring of the project activity, data collection and management, and QA/QC procedure. The details of the people interviewed and the topics discussed are mentioned in the table below:

Location: Mahbubnagar dist. in the state of Telangana, India	Date: 25/07/2019
Location: Dhule district of Maharashtra, India	Date: 30/07/2019
Coverage	Source of Information / Persons Interviewed
- Project implementation, start date as per the VCS requirements. - Electricity Generation Records (monthly energy statements, Invoices) - Reliability & accuracy of readings considered for emission reduction calculations, Calibration procedure	Mr. Sandip Saha (CLPWF) Mr. Himanshubhai Patel (CLPWF)
Monitoring and measuring system - Collection of measurements - Observations of established practices - Data Verification of monitoring parameters	Mr. V Shyam Kumar (SGUPL) Mr. Himanshubhai Patel (CLPWF)
- QA/QC procedures, data management, internal audits to maintain data quality & reliability, maintenance Practices - Consideration of monitoring period, monitoring methodology, project documentation and emission reduction calculations	Mr. Sandip Saha (CLPWF) Mr. Himanshubhai Patel (CLPWF) Mr. Arvind Sonavane (Suzlon Global Services Limited)

2.5 Resolution of Findings

As an outcome of the validation & verification process, the team can raise different types of findings:

A Clarification Request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met

Where a non-conformance arises the team leader shall raise a Corrective Action Request (CAR).

A CAR is issued, where:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- The VCS requirements have not been met;
- There is a risk that emission reductions cannot be monitored or calculated.
- The validation process may be halted until this information has been made available to the team leader's satisfaction. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR. No CL has been raised during the validation of the project activity.

During the validation and verification process, total 04 CARs and 02 CL were raised and resolved satisfactorily. The list of CARs/CLs/FARs raised and the response provided, the mean of validation, reasons for their closure and references to correction in the relevant documents are provided in Appendix 2 of this report

2.5.1 Forward Action Requests

A Forward Action Request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the VCS requirements for registration.

No FAR has been raised during the validation and verification of the project activity.

3 VALIDATION FINDINGS

3.1 Project Details

Project type, technologies and measures implemented, and eligibility of the project:

As per the project type defined by the UNFCCC and VCS standard version 3.7 Guidelines, the project activity is falls under type-I (Renewable energy projects) and the list of Sectoral the sectoral scope 1 - Energy Industries (renewable/ non-renewable sources).

The project activity consists of the installation of 170 MW_{AC} Solar Photovoltaic Project in the state of Telangana and Maharashtra. The project activity was commissioned in three phases as mentioned in section 1.4 of this report and it is found to be running satisfactorily. This is checked and confirmed from the commissioning certificates/07/ of the project activity.

The proposed project activity is a Green field project which results in an estimated GHG emission reduction of 289,503 tCO₂ annually and a total of 2,895,035 tCO₂e over 10 years of the crediting period.

The technology employed by project activity involves, generation of electrical energy using solar power. The technology used in the project does not generate any GHG emissions, hence considered as an environment friendly. The project activity is a Greenfield project and there was no electricity generation at the project site prior to the implementation of project activity. The technical lifetime of the project activity is mentioned as 25 years. The equipment's are based on manufacturer's specifications and as per industry standards. Technical specifications are as follows:

1. SE Solar Limited (100 MW_{AC})

Solar Module:

Module Model	Canadian Solar CS6X-310P
Maximum Power (P _{max})	310 Wp
Module technology	Poly-Crystalline
Orientation	1-axis horizontal East-West tracker with backtracking
Inverter: PVS800-57-1000kW-C	
Model	ABB
No. of Inverters	100 Nos.

2. Gale Solarfarms Private Limited (50 MW_{AC})

Solar Module:

Module Model	Canadian Solar CS6U - 320P	Canadian Solar CS6U - 325P	Canadian Solar CS6U - 330P
Maximum Power (Pmax)	320 Wp	325 Wp	330 Wp
Module technology	Poly-Crystalline		
Orientation	Fixed		
Invertor: TMIEC			
Model	PVL-L1000E		
Rated AC power	1000 kW		
No. of Inverters	50 Nos.		

3. Tornado Solarfarms Private Limited (20 MW_{AC})

Solar Module:

Module Model	Canadian Solar CS6U - 320P	Canadian Solar CS6U - 325P	Canadian Solar CS6U - 330P
Maximum Power (Pmax)	320 Wp	325 Wp	330 Wp
Module technology	Poly-Crystalline		
Orientation	Fixed		
Inverter: TMIEC			
Model	PVL-L1000E		
Rated AC power	1000 kW		
No. of Inverters	50 Nos.		

The purpose of the project activity is to generate the electricity by the utilization of solar power and is being supplied to Indian grid. The project activity will generate greenhouse gas (GHG) emission reductions by avoiding GHG emissions which otherwise would have been generated by the operation of grid connected power plants and by the addition of new sources. Hence the project accomplishes VCS conditions.

Project proponent and other entities involved in the project-

The project activity is developed by CLP Wind Farms (India) Private Limited.

CLP Wind Farms (India) Private Limited is the project proponent and SE Solar Limited, Gale Solar farms Private Limited & Tornado solar farms Private Limited is other entity involved in the project activity.

It is to be noted that other entities involved in the project activity are 100% subsidiaries of CLP Wind Farms (India) Private Limited (CLPWF).

Project start date-

The project start date is 07/08/2017/07/. This was commissioning date of first phase of the project activity.

Project crediting period-

The crediting period of the project activity is for 10 years (renewable). The first crediting period is from 07/08/2017 to 06/08/2027.

Project scale and estimated GHG emission reductions or removals-

The estimated annual emission reductions for the project activity are 289,503 tCO₂e which is less than 300,000 tCO₂e. Hence the category is applicable under "Project".

Project location-

The solar power project is located in following locations:

1. Dwarakanagar, Ammapur and Muthyalampalle villages in Mahbubnagar dist. in the state of Telangana, India
2. Saltek and Bhamer villages in Dhule district of Maharashtra, India

Geo-coordinates of the project location are verified as:

Site: Mahbubnagar district. Telangana

Latitude- 16°26' 38.98" N,

Longitude- 77° 52' 3.83" E

Site: Dhule, Maharashtra

Latitude- 21.1° N,

Longitude- 74.3° E

Conditions prior to project initiation-

The project activity is set up to produce clean power from solar power. The project is Greenfield project. There was no project installed prior to commissioning of this project.

Project compliance with applicable laws, statutes and other regulatory frameworks:

The project is a voluntary initiative by the project proponent and has not been implemented to meet any local / national laws or regulatory compliances. The project activity is in compliance with current laws and regulations and there are no legal and/or regulatory requirements that prevent the project implementation. Also the validation team has confirmed that there is no such compliance requirement with an emission trading program or any binding limits on GHG emissions for the project activity in India (host country) as it is a non-annex 1 country. The project has obtained valid consents/17/, for the installation and operation from the state nodal agencies and is in compliance with local laws and regulations.

Ownership and other programs-**Right of use**

The project activity is owned by CLP Wind Farms (India) Private Limited. The ownership of the project activity is verified through the following documents:

- Commissioning certificate /07/
- Power purchase agreements signed with the concerned state utility/8/
- Purchase order issued by the PP to technology suppliers /16/

Emissions trading programs and other binding limits

The project is not participating in other emission trading programs. The letter of undertaking/29/ has been furnished by project participant confirming that net GHG emission reductions or removals generated by the project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions.

Other forms of environmental credit sought or received and eligible to be sought or received:

The project seeking registration under the VCS (Pipeline ID-1890) and not listed under REC mechanism/26/ as verified from <https://recregistryindia.nic.in/index.php/publics/index> .

Participation under other GHG programs:

Project is seeking registration under VCS only (Pipeline ID-1890). The PP has submitted the declaration/29/ which states that the net GHG emission reductions generated by the project activity will not be used for compliance with any other emissions trading program or to meet binding limits on GHG emissions for the same monitoring period.

Rejection by other GHG programs:

The project has not been rejected by other GHG programs.

Additional information relevant to the project, including:

- **Eligibility criteria for grouped projects**

The project activity is not a grouped project, hence not applicable to the project activity.

- **Leakage management for AFOLU projects**

Not applicable to the project activity.

- **Commercially sensitive information**

No commercially sensitive information has been excluded from the public version of the project description.

Conclusion:

In view of the assessment of VCS joint PD & MR/01/ and supporting documents as listed in Appendix 1 of this report, the validation team is able to confirm that the description contained in the VCS joint PD & MR of the project activity provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation. Consequently, **Applus+ Certification** confirm that the project description of the project contained in the joint VCS PD& MR/01/ to be complete and accurate. The VCS joint PD & MR complies with the relevant forms and guidance for completing the VCS joint PD & MR.

3.2 Participation under Other GHG Programs

The project activity is seeking registration under VCS programme only.

The start date of the proposed project activity is 07/08/2017 which is date of commissioning of the first phase of project activity. Hence it can be confirmed that the project is complying with all the applicable VCS rules, including project start date and project crediting period requirements.

During the verification process, the verification team has reviewed the declaration submitted by the project proponent confirming that GHG emission reduction credits from the Project have not been registered under another GHG program.

It can be concluded that the project is eligible to participate under the VCS Program.

3.3 Application of Methodology

3.3.1 Title and Reference

The project activity has applied CDM approved methodology ACM0002 version 19.0.

Title: Grid-connected electricity generation from renewable sources

Tools referenced in the applied methodology:

- Tool to calculate the emission factor for an electricity system - Version 07.0 (EB 100, Annex 04)

Following guidelines/tools are also referred while assessing the additionally and applicability of the particular guidelines/tool is justified under 3.3.5 of this report:

- Methodological Tool- Tool for the demonstration and assessment of additionality - Version 07.0.0 (EB 70, Annex 08)

- Guidance on the Assessment of Investment Analysis, version 05 (EB 62 Annex 05)
(To determine default value of benchmark, for sub-project 100 MW_{AC} at Veltoor, Telengna)
- Methodological tool for Investment analysis, Version-06.0(EB 85, Annex-12)
(To determine default value of benchmark, for sub-projects 50 MW_{AC} and 20 MW_{AC} in Dhule, Maharashtra)
- Methodological tool for Investment analysis, Version-09.0 (EB 101, Annex 11)

3.3.2 Applicability

All applicability conditions of the updated version of the methodology (ACM0002 version 19.0) are met. Thus, the methodology is deemed fully applicable for the new crediting period and no request for deviation with regards to the applicability of the methodology is required. All applicability conditions are completely and correctly included in the joint VCS PD&MR.

Criteria-1.

This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).

Validation assessment:

- Project activity is Greenfield solar power project, supplying electricity to national grid. This is verified thorough the Power purchase Agreements /08/ and commissioning certificates/07/.

Thus the criterion is fulfilled by the proposed project activity.

Criteria-2:

The methodology is applicable under the following conditions:

(a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;

(b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.

Validation assessment:

The project activity is the installation of a new solar power plant. This is confirmed through the purchase order/16/ and commissioning certificates/07/.

Thus, the criterion (a) is applicable and (b) is not applicable for the proposed project activity.

Criteria-3:

The methodology is not applicable to:

(a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;

(b) Biomass fired power plants/units.

Validation assessment:

The project activity is the installation of a new solar power plant and does not involve switching from fossil fuels to renewable energy sources at the site of the project activity. This is confirmed through the purchase order/16/ and commissioning certificates/07/.

Thus, the criterion is not applicable for the proposed project activity.

Criteria-4:

In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance."

Validation assessment:

The project activity does not involve any capacity additions, retrofits or replacements of an existing facility because it is a Greenfield solar power generation project activity; same has been confirmed from physical inspection during the validation site visit.

Thus, the criterion is not applicable for the proposed project activity.

The project activity is the installation of a Solar based Power Generation project; it is not a hydro project, thus all conditions related to hydro plants are not applicable to the project activity (and not included in this section).

Thus, it can be concluded that the applied methodology ACM0002, version 19.0 is applicable to the project activity.

Further, the applied methodology refers to latest available versions of the following tools;

1. Tool to calculate the emission factor for an electricity system

The joint VCS PD&MR/01/ refers and correctly applies the latest version of tool to calculate the emission factor for an electricity system, version 07.0 /05/. Also the PP has referred the CEA Baseline CO₂ Emission Database version 14 dated December 2018 which was the latest available database at the time of PDD submission for validation of the project activity. The locations of the project in the state of Telangana and Maharashtra in India. As per CEA Baseline CO₂ Emission Database/10/, the state of Telangana and Maharashtra comes under the Indian grid, the geographic and system boundaries of which are clearly identified; information on the characteristics of the grid is available. Thus, the tool is applicable for the project activity.

2. Tool for the demonstration and assessment of additionality

The latest version 7.0.0 of the “Tool for the demonstration and assessment of additionality”/19/ has been used by the PP. Since the additionally tool is included in an approved methodology, additionality tool needs to be applied for the project activity. Also PP is neither proposing new methodology nor proposing alternative methods to demonstrate additionality for consideration by the Executive Board. This it is concluded that the Tool for the demonstration and assessment of additionality is applicable for the project activity.

3. Combined tool to identify the baseline scenario and demonstrate additionality

The PP has used the “Tool to demonstration and assessment of additionality” in demonstration of additionality and the baseline has been developed in accordance with the applied baseline methodology. Hence, the combined tool is not used by the project participant.

4. Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion

Since there is no fossil fuel combustion involved in the project site or in the project boundary, this tool is not applicable to the proposed project activity and not used/applied by the project participant.

3.3.3 Project Boundary

The project boundary is given by the applied methodology, ACM0002, version 19.0.0:

“The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.”

The purpose of this project activity is to generate electricity using renewable sources (Solar) and export it to state grid of Telangana and Maharashtra which part of Indian grid, thereby displacing the grid generated electricity. The project boundary includes the solar project, sub-stations, grid and all power plants connected to grid, which has been illustrated in the Section 2.3 of the joint VCS PD&MR/01/ and gives clear understanding of the project boundary; thus, it is acceptable. The same has been confirmed during the site visit and is found to be appropriate.

The consideration, by the PP, of only CO₂ gas for the baseline emissions is conservative and also in line with the methodology. The exclusion of CH₄ & N₂O in the baseline scenario is appropriate. The project activity involves the generation of electricity using solar energy. Hence, there are no project emissions associated with this project activity. Hence, the exclusion of CO₂, CH₄ & N₂O in the project scenario are appropriate. There are no other sources of project emissions. Hence, the project participant has considered the project emissions as zero for project activity; this is in line with the methodology.

The assessment team is able to conclude that the project boundary and selected sources are applied as per the methodology and the applicable VCS criteria.

3.3.4 Baseline Scenario

The project activity involves the installation of a newly built and grid-connected renewable power plant and supplying the generated electricity to Indian grid, hence, according to the applied methodology ACM0002, version 19.0.0, the baseline scenario is determined properly as:

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

The latest available version for “Tool to calculate the emission factor for an electricity system” is version 07.0 /05/ and the PP has correctly referred to the same in the section 3.1 of the final VCS joint PD & MR /1/ for determining baseline grid emission factor and it is found to be correct.

The calculation for the operating margin and combined margin for the Indian Grid is readily available and published by the Central Electricity Authority, Government of India/19/. The CEA power sector data is referred by all CDM project in India in the ER calculation and it is yearly updated with recent data. The project activity has referred the CEA Baseline Carbon Dioxide Emission Database is version 14/18/ dated December 2018, which was the latest version available during submission of the PD.

The PP has used the simple operating margin calculation. The simple operating margin is calculated as an average of the latest available three years (at the time of PD submission for validation) i.e. 2015-16, 2016-17 and 2017-18. The value for weighted average operating margin has been validated and used as 0.9610 tCO₂/MWh. The Build margin for the Indian grid is considered as 0.8644 tCO₂/MWh. The weighted average combined margin has been calculated by the PP, considering the 75% weighted for operating margin and 25% for build margin; this is in accordance with the tool. The weighted average combined margin emission factor for the project activity comes to 0.9368 tCO₂/MWh. The PP has provided the calculation for the same in the ER calculation sheet and it was validated by the validation team. The baseline emission factor for the electricity system has been calculated on ex-ante basis and will remain fixed for the entire project crediting period.

The discussion on baseline is comprehensive in the VCS joint PD & MR section 3.1 and it is in line with the applied baseline and monitoring methodology ACM0002 version 19.0.0. Also, the identified baseline for the project activity is the most likely scenario of what would have occurred in the absence of the project activity and is confirmed by TA expert on the team; thus it is accepted. The project participant has included all sources and references used for baseline determination for the project activity in the PD/1/ and the identified baseline is justified appropriately by the project participant. The Baseline scenario and baseline emission calculations are found as per ACM0002 version 19.0.0/4/. The combined margin approach is the ex-ante approach as per tool to calculate the emission factor for an electricity system. Based on the requirements of paragraph 83 of the VVS version 02.0 /11/, the validation team confirm that:

- a) All the assumptions and data used by the PP are listed in the VCS joint PD & MR, including their references and sources;
- b) All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PD;
- c) Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;
- d) Relevant national and/or sectoral policies and circumstances are considered and listed in the PD;
- e) The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed project activity.

3.3.5 *Additionality*

The proposed project activity is a large scale project and the additionality of the project activity was demonstrated on the basis of the "Tool for the demonstration and assessment of the additionality", Version 07.0.0, approved by the CDM EB 70 and required by the methodology ACM0002, Version 19.0.0.

PP has adopted the step-wise approach for demonstrating and assessing the additionality of the project activity as follows:

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

This step is optional and not used for this project.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

As the project activity involves the installation of a newly built and grid-connected renewable power plant that exports the generated electricity to the Indian grid system in India, hence, according to the methodology ACM0002 version 19.0, the baseline scenario is determined properly as:

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

The approved methodology that is applied prescribes the baseline scenario, and the same has been opted in this project, therefore, no further analysis on baseline is required. The relevant National Acts/17/ and regulations pertaining to generation of energy in India are:

- Electricity Act 2003
- National Electricity Policy 2005
- Tariff Policy 2006

The above mentioned National Acts and regulations pertaining to generation of energy in India does not influence the choice of fuel used for power generation. There is no legal requirement on the choice of a particular technology for power generation.

Step 2: Investment analysis

For the proposed project activity, the PP has demonstrated investment barrier through step 2 of “Tool for the demonstration and assessment of additionality” (version 07.0.0).

Sub-step 2a: Determine appropriate analysis method:

The project activity generates revenues from the sale of electricity which is supplied to grid; therefore, the Simple Cost Analysis (Option I) and Option-II (Apply investment comparison analysis) cannot be applied. Instead, the Benchmark Analysis (Option III) is selected as the appropriate analysis method to demonstrate the investment barrier.

Financial Indicator (Project IRR):

The PP has selected equity IRR (post-tax) as the financial indicator for the Benchmark Analysis. The appropriateness of the financial indicator has been verified by the assessment team, it was confirmed that the equity IRR is a widely accepted financial metric used by many corporations and financial institutions for investment decision-making and is a long-established benchmark for investment decisions in the Indian power sector. The PP has selected Return on equity as the benchmark which is in line with Guidance on the Assessment of Investment Analysis (EB 62 Annex 05) /27/(For 100 MW_{AC}) and Methodological tool-Investment Analysis version 06 (for 50 MW_{AC} and 20 MW_{AC}) , which was the latest version available at the time of decision making for particular project developer.

The equity IRR for the sub projects involved in the project activity at the time of investment decision was as follows:

Project Developer	Equity IRR
SE Solar Limited	10.09 %
Gale Solar farms Private Limited	9.16 %
Tornado Solar farms Private Limited	9.16 %

The data, rationales, assumptions and justifications mentioned in the joint VCS PD&MR/01/ and investment analysis excel sheets/03/ were checked against the local knowledge of the validation team, sectoral scope expertise, regulatory and applicable legal requirements in the Host country India. The documents were also verified by the financial expert.

The input parameters in the financial analysis have been taken as per the values and assumptions applicable and available at the time of decision to invest in the project activity in line with Paragraph 10, investment analysis tool version 09.0 /27/.

The approach used in the joint VCS PD &MR/01/ has been assessed based on a document review, whilst the following relevant documents have been reviewed:

- Board resolution for 100 MW_{AC} at Veltoor, Telengna, dated 04/05/2015/14/
- Board resolution for 50 MW_{AC} and 20 MW_{AC} in Dhule, Maharashtra, dated 17/09/2015/14/
- Project IRR and Benchmark Analysis calculation sheets for all three sub projects/3/
- Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 31/03/2015/19/

On site, the additionality of the project activity has been discussed with representatives of the PP and finally the data, rationales, assumptions; justifications and documentation provided have been checked using local knowledge and sectoral and financial expertise of the Assessment Team, and cross checked by:

- Power Purchase Agreements /8/
- Purchase orders /16/
- Commissioning Certificates/7/

The individual financial parameters used for calculations of equity IRR of the project activity have been discussed as below in detail;

1. Project Cost:

Project Developer	Project cost (INR Million)
SE Solar Limited	6,149.38

Project Developer	Project cost (INR Million)
Gale Solar farms Private Limited	3,074.69
Tornado Solar farms Private Limited	1,229.88

The Project cost for the project activity has been considered on the basis of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, dated 31/03/2015, latest available document at the time of decision making. The project cost includes cost of materials and equipment, labour and services, identification, selection and allocation of land, cost for obtaining all government permissions and infrastructure development charges. This is found to be appropriate and it is accepted.

The appropriateness of the same is further cross-checked against the actual purchase orders/16/ placed for the project activity. The actual project for the project activity is higher than the same as considered at the time of decision making as verified through the purchase orders/16/. However the variation is well covered in sensitivity analysis considering +/- 10% variation in the project cost and results are summarized in this report.

2. Operation and Maintenance Cost and its escalation:

Operation and maintenance cost considered is INR 1.3 million/MW for the project activity and service tax as 12.36% on O&M and an escalation of 5.72% per year as per Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, dated 31/03/2015, latest available document at the time of decision making. The appropriateness of same has been crosschecked with the O&M contracts signed and found to be consistent and it is accepted.

3. Plant Load Factor:

Project Developer	Plant Load Factor	Source/10/
SE Solar Limited	20.70%	Energy Assessment Report prepared by Vaisala
Gale Solar farms Private Limited	21.97%	Energy Yield Estimation report prepared by TUV Sud South Aisa Pvt Ltd
Tornado Solar farms Private Limited	21.97%	Energy Yield Estimation report prepared by TUV Sud South Aisa Pvt Ltd

The Plant Load Factor is considered as indicated in the above table as per the third party assessment reports. This is found to be in line with paragraph 3 (b) of Annex 11 of EB 48 and it is accepted. To further crosscheck appropriateness of PLF considered for the project activity, CERC tariff order dated 31/03/2015 is checked which is the latest available document at the time of decision making and on page 14 of the order indicates PLF of 19%. Thus it is concluded that project specific PLF considered by the PP is appropriate and conservative; and the same has been considered in IRR calculations for the project activity. This is found to be appropriate and it is accepted. Also, this parameter is considered under +/-10% sensitivity.

4. Electricity Tariff:

Project Developer	Tariff Rate (INR/kWh)	Source/14/
SE Solar Limited	6.32	Request for Selection document for selection of Solar PV developers dated 01/04/2015
Gale Solar farms Private Limited	5.79	Request for Selection document for selection of Solar PV developers dated 27/08/2015
Tornado Solar farms Private Limited	5.79	

The Project participant had considered the tariff rate specific to each sub project in line with the data available at the time of decision making (as indicated in the above table), the electricity tariff fixed for 25 years of project's lifetime. Since the source documents referred for, tariff rate were the latest available and applicable documents at the time of conceptualization of the project activity, paragraph 10 of investment analysis tool version 09.0 is followed and it is accepted. Thus, it is concluded that electricity tariff considered for the project activity is found to be appropriate and it is accepted. Tariff rate is further verified CERC tariff order dated 31/03/2015 that indicate the tariff rate as INR 6.35/kWh hence found to be appropriate.

The Electricity Act, 2003, the policies framed under the Act, as also the National Action Plan on Climate Change (NAPCC) provide for a roadmap for increasing the share of renewable energy in the total generation capacity in the country. Central Electricity Regulatory Commission (CERC) has notified Regulation on Renewable Energy Certificate (REC) in fulfilment of its mandate to promote renewable sources of energy and development of market in electricity. Thus, the project applicability for these benefits under REC mechanism has been checked. Detailed procedure on REC mechanism dated 01/06/2010 published by Central Electricity Regulatory Commission/26/ (<https://recregistryindia.nic.in/>) is checked for REC eligibility of the project activity and it is confirmed that the procedure was applicable at the time of projects investment decision. It is confirmed that REC is not applicable for the projects taking benefits of preferential tariff, hence it is concluded that REC benefits are not applicable to the project activity. Also, in the actual scenario, PP will not be claiming REC benefits for the project activity and it is confirmed during the site visit while interviewing the PPs representative and further checked from the official web site of REC registry/28/ hence it is accepted.

5. Debt to Equity Ratio:

The project activity is funded by 30% equity and 70% debt. This is in line with the Paragraph 10, investment analysis tool version 09.0, which talks about typical debt/equity finance structure in the sector in the country. Typical debt-equity ratio is 70:30 in solar energy sector and this is checked from CERC tariff order dated 31/03/2015 /19/ which is latest available at the time of investment decision.

6. Insurance Premium/MW:

Insurance premium/MW for each subproject involved in the project activity is considered as 0.50% of total project cost. This is checked from CERC tariff order dated 31/03/2015 /19/ which is latest available at the time of investment decision.

7. Life Time of project activity: 25 years

The lifetime of the project activity is 25 years which has been considered from the CERC tariff order dated 31/03/2015 /19/. This is consistent with the lifetime of solar power projects and has been confirmed by the technical expert. The crediting period of the proposed project activity is 10 years (renewable) as mentioned in the joint VCS PD&MR/01/. However, the period of assessment considered for the investment analysis is 25 years. This has been confirmed from the IRR-benchmark spread sheet submitted by the PP. Hence the considered assessment period of 25 years meets the requirement of paragraph 6 of investment analysis tool version 09.0.

8. Interest rate on term loan: 13%

The interest on term loan considered for the investment analysis as per CERC tariff order dated 31/03/2015 /19/. This was available to the PP at the time of the investment decision. Hence the considered rate is appropriate and in line with applicable guidance in paragraph 10 of investment analysis tool version 09.0.

9. Loan tenure, Repayment period and Moratorium period:

The PP has considered loan tenure and debt repayment period as 12 years, with no moratorium period of as per the CERC tariff order; dated 31/03/2015/19/. The considered repayment schedule was available to the PP at the time of investment decision and hence found to be acceptable.

10. Book Depreciation Rate and Income Tax Depreciation Rate:

The Depreciation on plant and machinery is calculated at 4.75% as per the Straight Line Method (SLM) as per the Companies Act, Schedule XIV, Item II (i) (a) published by the Government of India/23/. Furthermore, the PP has considered 10% as salvage value and 90% as depreciable component on plant and machinery as per publically available source (CERC tariff order, dated 31/03/2015 and Schedule XIV, The Companies Act 1956/22/), which is found justified. The income tax depreciation rate of 7.69% has been considered as per the Income Tax, depreciation rates for power generating units published by the Government of India.

(Source: <https://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm>)

As the Income tax India website is official data, it eliminates any ambiguity that there could have been in this regard.

11. Income Tax and MAT:

PP has considered Income Tax as 33.06% (inclusive of Surcharge 12%, Education Cess 3%) and MAT 20.39% respectively (Including surcharge and education cess) in investment analysis for the project activity and values are sourced from Detailed Project Report/08/. This is as per tax rates applicable to a domestic company in India/21/.

The appropriateness of the same has been checked and confirmed by financial expert involved in the project activity. This is found to be appropriate and it is accepted.

12. Deration in generation: The PP had considered Deration in generation as 0.5% per year from the second year of commissioning of the project activity. This is as per the report on "Performance of Solar Power Plants in India" dated Feb 2011 submitted to CERC/36/, was available to the PP at the time of investment decision and hence found to be acceptable.

13. Residual (Salvage) Value:

Salvage value is considered as 10% of the total project cost (excluding cost of land lease, erection and commissioning charges as well as transportation charges) as per the CERC tariff order, dated 31/03/2015. These have been added back to the cash flow. As the land is purchase and it is being non-depreciable item, it is added back to the cash flow. However, PP considered 10% of cost of plant and machinery and 100% land cost as residual (salvage) value for the project activity conservatively). This is further validated as per the accounting practises and same has been also cross checked from Section 205 (2b and c) of Companies Act 1956 on the publically available web-link(<http://www.indiankanoon.org/doc/1422372/>) which allows a depreciable cost of ninety five per cent which implies a consideration of 5% of salvage value as a standard accounting practice. Thus, the consideration by the PP of 10% salvage value is conservative and hence appropriate for the purpose. The appropriateness of this is confirmed by the financial expert involved in the project activity; thus it is accepted.

Conclusion:

The values considered for all the above discussed parameters were available at the time of investment decision and hence are valid and applicable to the project activity. All input values have been be consistently mentioned and applied in all calculations. This meets the requirement of paragraph 10 of investment analysis tool version 09.0. The assessment team confirms that in the calculation of equity IRR only the portion of investment costs which is financed by equity has been considered as the net cash outflow and the portion of the investment costs which is financed by debt has not been considered a cash outflow. This meets the requirement of paragraph 14 of investment analysis tool version 09.0.

Based on the above parameters, the post-tax Equity IRR for the each sub-project of the project activity is calculated.

Project Developer	IRR	Benchmark
SE Solar Limited	10.09 %	17.34 %
Gale Solar farms Private Limited	9.16 %	16.54 %
Tornado Solar farms Private Limited	9.16 %	16.54 %

It can be confirmed that the equity IRR for each sub-project is lower than the respective benchmark. This signifies that the proposed project activity is not financially attractive and is therefore additional.

Sub-step 2a: Determine appropriate analysis method:

The project activity identified in Step 1 generates revenues from the sale of electricity; therefore, the Simple Cost Analysis (Option I) cannot be applied. Instead, the Benchmark Analysis (Option III) is selected as the appropriate analysis method.

Sub-step 2b: Apply benchmark analysis (Option III)

The proposed VCS project activity is a solar power project which could be developed by an entity other than the PP. Hence the benchmark has been based on parameters that are standard in the market, which is suitable in the context of the underlying project activity. This meets the requirement of paragraph 13 of EB 62 Annex 05(latest version of the investment analysis tool available at the time of decision making).

Benchmark determination for SE Solar Limited:

The PP has provided the calculation of the benchmark in the VCS joint PD & MR /01/ and investment analysis spread sheets. The benchmark has been calculated in line with paragraph 13 and 15 of EB 62 Annex 05. Based on the option in paragraph 15, the PP has selected the default value for the expected return on equity (in real terms) from Appendix (EB 62 Annex 05). The default value has been obtained as 11.75% for India corresponding to Group 1 (Energy Industries).

The IRR calculation has been carried out on in nominal terms. Hence as per the requirement of paragraph 7 Appendix of EB 62 Annex 05, the PP has converted the default value (i.e. 11.75 %) which is in real terms to nominal terms by adding an inflation rate. The inflation rate has been sourced from the Reserve Bank of India's (RBI) Survey of Professional Forecasters: Results of 33rd Round (Q1:2015-16) dated 07/04/2015/24/. It was verified that the inflation rate is expected to be 5% over the next 10 years. The RBI is the Central Bank of India and hence the source for the inflation rate is appropriate. The assessment team has confirmed that the default value was available at the time of decision making and has been appropriately applied by the PP.

Accordingly, PP converted the default benchmark which is in real terms into nominal terms by using the following equation:

$$\text{Nominal Benchmark} = (1 + \text{Benchmark real}) * (1 + \text{Inflation rate}) - 1$$

Where,

Default value for Real Benchmark = 11.75% (as per Appendix of EB62, Annex 05)

Inflation Rate= forecast for by Reserve Bank of India (RBI) (i.e. Central Bank of India) for India.

Therefore the Nominal Benchmark estimated = $(1 + 11.75\%) * (1 + 5\%) - 1 = 17.34\%$

The assessment team referred the book 'Corporate Finance' 2nd edition, by Aswath Damodaran /37/. In page 320 of the book, the same equation is mentioned for converting real into nominal values. Hence the assessment team considers the above equation as appropriate for converting real benchmark into nominal benchmark.

Benchmark determination for Gale Solar farms Private Limited and Tornado Solar farms Private Limited

The proposed VCS project activity is a solar power project which could be developed by an entity other than the PP. Hence the benchmark has been based on parameters that are standard in the market, which is suitable in the context of the underlying project activity.

This meets the requirement of paragraph 19 of EB 85 Annex 12 (latest version of the investment analysis tool available at the time of decision making).

The PP has provided the calculation of the benchmark in the VCS joint PD & MR /01/ and investment analysis spread sheets. The benchmark has been calculated in line with paragraph 19 and 21 of EB 85 Annex 12. Based on the option in paragraph 21, the PP has selected the default value for the expected return on equity (in real terms) from Appendix (EB 85 Annex 12). The default value has been obtained as 11.06% for India corresponding to Group 1 (Energy Industries).

The IRR calculation has been carried out on in nominal terms. Hence as per the requirement of paragraph 19 of EB 85 Annex 12, the PP has converted the default value (i.e. 11.06 %) which is in real terms to nominal terms by adding an inflation rate. The inflation rate has been sourced from the Reserve Bank of India's (RBI) Survey of Professional Forecasters: Results of 35th Round (Q2:2015-16) dated 04/08/2015/24/. It was verified that the inflation rate is expected to be 4.9% over the next 10 years. The RBI is the Central Bank of India and hence the source for the inflation rate is appropriate. The assessment team has confirmed that the default value was available at the time of decision making and has been appropriately applied by the PP.

Accordingly, PP converted the default benchmark which is in real terms into nominal terms by using the following equation:

$$\text{Nominal Benchmark} = (1 + \text{Benchmark real}) * (1 + \text{Inflation rate}) - 1$$

Where,

Default value for Real Benchmark = 11.10% (as per Appendix of EB85, Annex 12)

Inflation Rate= forecast for by Reserve Bank of India (RBI) (i.e. Central Bank of India) for India.

$$\text{Therefore the Nominal Benchmark estimated} = (1 + 11.06\%) * (1 + 4.9\%) - 1 = 16.54\%$$

The validation team is of the opinion that the above benchmark, which is based on the parameters that are standard in the market, is suitable in the context of the project activity. Since the benchmark is based on parameters that are standard in market, the ROE is calculated by using best financial practices and data sources have been clearly validated by validation team.

The suitability of the benchmark considered for the project activity is confirmed in line with paragraph 100 of VVS for PAs version 2.0 as follows:

- a. The financial indicator used for the project investment analysis is post-tax Equity IRR, and the benchmark has been calculated as ROE which is suitable to the type of financial indicator chosen by the PP.
- b. Since this is a solar energy generation project, and RBI's WPI minimum inflation rate for host country i.e. India is applied as per the EB 85 Annex 12 and hence no risk premiums are applied.
- c. The financial analysis of the project at the time of investment decision as well as with actual parameters, along with the respective sensitivity analysis, shows that the Equity IRR of the project, under no scenario crosses the benchmark returns. Therefore it can be concluded that the project is not financially viable and hence it can be assumed that no investment would be made at a rate lower than the benchmark return.

Sub-step 2d: Sensitivity analysis:

The sensitivity analysis has been carried out by the project participant for a reasonable range of variations i.e. +/-10% of major parameters, and this was found to be as per paragraph 27 of Investment Analysis tool version 09.0. At the time of decision, the PP had considered the project cost and O&M cost for project activity, as per DPR. The PLF is nature dependent and varies depending on availability of sunlight. Also electricity tariff is assessed under sensitivity analysis though tariff considered for the project activity is average electricity tariff for 25 years period of the project activity conservatively. These parameters have material impact on the investment analysis.

The project participant has considered all the variables that constitute more than 20% of either total project costs or total project revenue i.e. PLF, Project Cost, tariff and O&M cost in the sensitivity analysis and hence this is found to be in line with paragraph 27 of Investment Analysis tool version 09.0.

For 100 MW_{AC} Solar Project by SE Solar Limited:

Percentage Variation	+10%	0%	-10%
Parameter	Plant Load Factor (Energy generation)		
Equity IRR (%)	13.57	10.09	6.71
Parameter	Project Capital Cost		
Equity IRR (%)	7.66	10.09	13.24
Parameter	Electricity Tariff		
Equity IRR (%)	13.57	10.09	6.71
Parameter	Operation and Maintenance Cost		
Equity IRR (%)	9.33	10.09	10.83

Threshold limits for variations:

It is verified that the Equity IRR crosses the benchmark if:

1. Project cost reduced by 19.75%: This is not a likely scenario as actual project is 17.98% higher than the same as considered in the investment analysis. This is verified through the purchase order/16/, hence no more variation is possible.
2. PLF increases by 20.42%: PLF considered by the project participant is appropriate in line with paragraph 3 (b) of EB 48 Annex 11. Equity IRR is crossing the benchmark if PLF is increased by more than 20.42% and it is very unlikely as the average PLF considered in the assessment is already higher than the same mentioned in the CERC tariff order. Also, the assessment team has verified actual PLF achieved in the current monitoring period (24.06%) and confirmed that the variation is well under the threshold limit.
3. Tariff increases by 20.42% Further increase in tariff rate is highly unlikely scenario as the tariff rate is fixed for 25 years as verified through the "Request for Selection document for selection of Solar PV developers in the State of Telangana" for tariff based competitive

bidding process dated 01/04/2015 and actual tariff rate(INR 5.59/kWh) for the project is lesser than the same considered in the investment analysis as further confirmed with the PPA signed/8/ with state electricity board.

4. 100% reduction in O&M cost, the IRR does not cross the benchmark.

For 50 MW_{AC} Solar Project by Gale Solar farms Private Limited:

Percentage Variation	+10%	0%	-10%
Parameter	Plant Load Factor(Energy generation)		
Equity IRR (%)	12.51	9.16	5.89
Parameter	Project Capital Cost		
Equity IRR (%)	6.84	9.16	12.16
Parameter	Electricity Tariff		
Equity IRR (%)	12.51	9.16	5.89
Parameter	Operation and Maintenance Cost		
Equity IRR (%)	8.39	9.16	9.91

Threshold limits for variations:

It is verified that the Equity IRR crosses the benchmark if:

1. Project cost reduced by 20.78%: This is not a likely scenario as actual project is 2.03 % (for 50 MW_{AC}) higher than the same as considered in the investment analysis. This is verified through the purchase order/16/, hence no more variation is possible.
2. PLF increases by 21.56%: PLF considered by the project participant is appropriate in line with paragraph 3 (b) of EB 48 Annex 11. Equity IRR is crossing the benchmark if PLF is increased by more than 21.56% and it is very unlikely as the average PLF considered in the assessment is already higher than the same mentioned in the CERC tariff order.
3. Tariff increases by 21.56% Further increase in tariff rate is highly unlikely scenario as the tariff rate is fixed for 25 years as verified through the "Request for Selection" (RfS) document for selection of Solar PV developers for tariff based competitive bidding process dated 27/08/2015" for tariff based competitive bidding process dated 27/08/2015 and actual tariff rate for the project is lesser than the same considered in the investment analysis as further confirmed with the PPA signed/8/ with state electricity board.
4. 100% reduction in O&M cost, the IRR does not cross the benchmark.

In view of the above discussion the assessment team has concluded that the project activity is additional and it is found to be financially not viable.

For 20 MW_{AC} Tornado Solar Project by Tornado Solar farms Private Limited:

Percentage Variation	+10%	0%	-10%
Parameter	Plant Load Factor(Energy generation)		
Equity IRR (%)	12.51	9.16	5.89
Parameter	Project Capital Cost		
Equity IRR (%)	6.83	9.16	12.16
Parameter	Electricity Tariff		
Equity IRR (%)	12.51	9.16	5.89
Parameter	Operation and Maintenance Cost		
Equity IRR (%)	8.39	9.16	9.91

Threshold limits for variations:

It is verified that the Equity IRR crosses the benchmark if:

1. Project cost reduced by 20.78%: This is not a likely scenario as actual project is 0.82% higher than the same as considered in the investment analysis. This is verified through the purchase order/16/, hence no more variation is possible.
2. PLF increases by 21.57%: PLF considered by the project participant is appropriate in line with paragraph 3 (b) of EB 48 Annex 11. Equity IRR is crossing the benchmark if PLF is increased by more than 21.57% and it is very unlikely as the average PLF considered in the assessment is already higher than the same mentioned in the CERC tariff order.
3. Tariff increases by 21.57% Further increase in tariff rate is highly unlikely scenario as the tariff rate is fixed for 25 years as verified through the "Request for Selection" (RfS) document for selection of Solar PV developers for tariff based competitive bidding process dated 27/08/2015" for tariff based competitive bidding process dated 27/08/2015 and actual tariff rate for the project is lesser than the same considered in the investment analysis as further confirmed with the PPA signed/8/ with state electricity board.
4. 100% reduction in O&M cost, the IRR does not cross the benchmark.

In view of the above discussion the assessment team has concluded that the project activity is additional and it is found to be financially not viable.

Outcome of Step 2:

In view of the above discussion the assessment team has concluded that the project activity is additional and it is found to be financially not viable.

Step 3: Barrier analysis:

This option is not opted for the project activity.

Step 4: Common practice analysis

PP has demonstrated common practice analysis as per “Common practice tool” version 03.1. The stepwise approach to validate common practice analysis for the project activity is discussed as below;

As per paragraph 13 of “Tool for the demonstration and assessment of additionality” – Version 7.0.0, project activity belong to measure “Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies”; hence sub-step 4a) of the tool is applicable for the project activity.

Sub-step 4a): The proposed CDM project activity (ies) applies measure(s) that are listed in the definitions section above

As per sub-step 4a), paragraph 58 of the “Tool for the demonstration and assessment of additionality” – Version 7.0.0, latest version of the “Guidelines on common practice” available on the UNFCCC website shall be applied.

The PP applied latest version 03.1 of “common practice tool” and same has been as below;

Applicable Geographical Area: As per section 4 clause 9 of common practice tool version 03.1

“Applicable geographical area should be the entire host country. If the project participants opt to limit the applicable geographical area to a specific geographical area (such as province, region, etc.) within the host country, then they shall provide justification on the essential distinction between the identified specific geographical area and rest of the host country.”

The applicable geographical area has been considered as the host country, India, as default as defined in section 4 under paragraph 9 of the tool.

The PP has submitted the excel spread sheet of common practise analysis/03/ as per steps below for projects identification for similar and different projects and found to be appropriate.

Step 1: *calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.*

The capacity of the project activity is 170 MW; hence applicable output range is 86 – 255 MW.

Step 2: *identify similar projects (both CDM and non-CDM) which fulfill all of the following conditions:*

- a. *The projects are located in the applicable geographical area;*
- b. *The projects apply the same measure as the proposed project activity;*
- c. *The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;*
- d. *The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;*

- e. The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
- f. The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

PP had considered 9 solar power generation projects in applicable geo-graphical area in applicable output range of +/-50% of the total design capacity of 170 MW i.e. output range of 86–255 MW. The assessment team has checked and confirmed that all these 9 projects have started their commercial operation before start date of the project activity i.e 07/08/2017. This data has been sourced from official website of Bloomberg NEF, UNFCCC & VERRA and found to be appropriate, thus it is accepted.

Step 3: within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all}

All the 9 projects identified above are found to be either registered, submitted for registration or undergoing validations. It is checked and confirmed from UNFCCC project database and VERRA Pipeline. After exclusion of the projects, registered, submitted for registration or undergoing validations, the number of similar projects identified are $N_{all} = 0$.

Step 4: within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff}

The PP has considered the projects implemented in different investment climate as different technology. The solar projects developed under different phases and different batches of National Solar Mission (NSM) can be considered as different technology projects.

All the projects are allotted through reverse bidding option under “The Jawaharlal Nehru National Solar Mission” (JNNSM). A reverse bidding is a type of **auction** in which sellers **bid** for the prices at which they are willing to sell their goods and services, then place **bids** for the amount they are willing to be paid for the good or service, and at the end of the **auction** the seller with the lowest amount wins. Therefore the tariff rate is different for all the allotted projects. The Jawaharlal Nehru National Solar Mission (**JNNSM**), or the National Solar Mission, is an initiative of the Government of India and State Governments to promote solar power in India.

Since $N_{all} = 0$, hence, different project is $N_{diff} = 0$

Step 5: calculate factor $F=1-N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

Factor $F=1-N_{diff}/N_{all}$

Hence, $F = 1 - 0/0 = \text{undefined}$

Also $N_{all}-N_{diff} = 0$

As per paragraph 18 of the “Common practice tool” v.03.1 “*The proposed project activity is a “common practice” within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all}-N_{diff}$ is greater than 3*”.

Conclusion:

Thus assessment team had concluded that the project activity is not a common practice in the host country India, as F is less than 0.2(not defined) and $N_{all} - N_{diff}$ is lesser than 3. This is found to be appropriate and it is accepted.

Conclusion:

- i. The project analysis complies with requirements of the latest version of VVS.
- ii. All the parameters and assumptions used in the investment analysis have been assessed thoroughly and found appropriate. The information with regard to how the input values was validated, cross-checked is included under relevant parameter.
- iii. The sources used have been reviewed by the assessment team found to be authentic as referenced under relevant parameter.
- iv. The benchmark was found suitable and has been thoroughly explained in detail.
- v. All the assumptions and calculations for investment analysis area have been checked by the financial expert and technical expert and found to be correct and reasonable.
- vi. The financial returns from the project activity area insufficient to meet the required investment against the selected benchmark under reasonable variations (sensitivity) conducted on key parameters.
- vii. The project activity complies with the latest version of “Tool for demonstration and assessment of additionality” and “Investment analysis tool”.

3.3.6 Quantification of GHG Emission Reductions and Removals

The proposed project activity has applied baseline methodology as mentioned in the methodology ACM0002 version 19.0.0. As per the paragraph 42 of the methodology:

“Baseline emissions include only CO₂ emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants”.

The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid, CM, y} \dots\dots\dots(1)$$

Where:

BE_y = Baseline emissions in year y (t CO₂)

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

$EG_{PJ,y} = EG_{PJ, facility, y}$ (for Greenfield projects paragraph 44 ACM0002)

$EF_{grid, CM, y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (t CO₂/MWh)

The Project proponent has adopted the combined margin approach for determination of the grid emission factor as per Tool to calculate the emission factor of an electricity system’ Version 7.0. The PP opted for combined margin emission factor ($EF_{grid, CM, y}$) for the project activity and it has been estimated ex-ante as 0.9368 tCO₂/MWh (National electricity grid in India). It will remain fixed throughout the crediting period for the project activity as opted by PP. The combined margin emission factor is obtained from the three years generation weighed average of the operating margin emission factor and the latest year build margin emission factors by applying suitable weights (i.e. 75% to operating margin emission factor ($EF_{grid, OM, y}$) and 25% to build margin emission factor ($EF_{grid, BM, y}$) as referred to the EF tool version 7.0.

The weighted operating margin value of 0.9610 tCO₂/MWh and build margin value of 0.8644 tCO₂/MWh for Indian electricity grid have been referred from CO₂ baseline database published by Central Electricity Authority, Govt. Of India, version 14 dated December 2018/18/. This is the latest available CO₂ baseline database at the time of the VCS PD submission for validation of the project activity. This is found to be appropriate and it is accepted.

Determination of $EG_{PJ, y}$ (Quantity of net electricity generation supplied by the project plant/unit to the grid in year y):

The PP has considered the value of $EG_{PJ,y}$ as 3,090,231 MWh/year for the project activity as per the third party PLF assessment reports/10/ and the estimated annual average of emission reductions is arrived as 289,503 tCO₂e and total 2,895,035 tCO₂e over the 10 year crediting period. The validation team confirms that the estimates of baseline emissions can be replicated using the information provided in the final Joint VCS PD& MR/1/. It can also be verified using the emission reduction calculation spread sheet/02/. Hence, it is concluded that the approach to calculate emission reductions is clearly demonstrated in the Joint VCS PD& MR /01/ is appropriate.

Baseline emissions as per the equation (1) above:

$$BE_y = 309,023 \text{ MWh} \times 0.9368 \text{ tCO}_2/\text{MWh}$$

$$BE_y = 289,503 \text{ tCO}_2$$

Estimation of Project Emissions (PE_y):

As per paragraph 34 of the applied methodology, for most renewable power generation project activities, PE_y = 0. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for, by using the following equation:

$$PE_y = PE_{EF,y} + PE_{GP,y} + PE_{HP,y}$$

Where,

PE_y = Project emissions in year y (tCO₂e)

PE_{EF,y} = Project emissions from fossil fuel consumption in year y (tCO₂)

PE_{GP,y} = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO₂e)

PE_{HP,y} = Project emissions from reservoirs of hydro power plants in year y (tCO₂e)

As per para 37 of ACM0002 version 19,

"For all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected"

Proposed project activity is solar power project; hence the project emissions are not applicable to the project activity. Hence, PE_y = 0

Estimation of Leakage Emissions (LE_y):

As per the paragraph 56 of ACM0002 version 19.0, No other leakage emissions are considered, thus leakage emissions are zero (LE_y = 0).

Estimation of GHG emission reductions:

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y,$$

Where

ER_y = Emission reductions in year y (tCO₂)

BE_y = Baseline Emissions in year y (tCO₂)

PE_y = Leakage emissions in year y (tCO₂)

$$ER_y = 289,503 - 0 - 0$$

$$= 289,503 \text{ tCO}_2 \text{ per year}$$

Hence total emission reductions estimated for the entire crediting period would be as 2,895,035 tCO₂.

Conclusion:

In line with the paragraph 113 of VVS for PAs version 02.0, validation team confirms that the project activity complies with the specified requirements of algorithms and/or formulae used to determine emission reductions and discussed above. The assessment team also confirms that:

- All assumptions and data used by the project participants are listed in the joint VCS PD&MR, including their references and sources;
- All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the joint VCS PD&MR;
- All values used in the joint VCS PD&MR are considered reasonable in the context of the proposed project activity;
- The baseline methodology and corresponding tool(s) have been applied correctly to calculate project emissions, leakage emissions, baseline emissions and emission reductions;
- All estimates of the baseline emissions can be replicated using the data and parameter values provided in the joint VCS PD&MR.

3.3.7 Methodology Deviations

No methodology deviations identified.

3.3.8 Monitoring Plan

According to the applied methodology, ACM0002, version 19.0, the only parameter to be monitored is the “Quantity of net electricity generation supplied by the project plant/unit to the grid in year y”. This parameter is directly monitored through the dedicated metering system installed at project site.

This parameter “Quantity of net electricity generation supplied by the project plant/unit to the grid in year y ” ($EG_{PJ, y}$) is being calculated as difference of Electricity exported to the state electricity board by the project activity (EG_{export}) and Electricity imported from the grid by the project activity (EG_{import}) and those are being measured by energy meters of accuracy class 0.2s located at project site. These export and import parameters are measured continuously and at least monthly recording. This is in line with methodology and is accepted.

The project proponent has included the following parameters in the monitoring plan:

- Quantity of net electricity generation supplied by the project Veltor plant to the grid in year y ($EG_{PJ, \text{Veltor}, y}$)
- Quantity of net electricity generation supplied by the project Gale plant to the grid in year y ($EG_{PJ, \text{Gale}, y}$)
- Quantity of net electricity generation supplied by the project Tornado plant to the grid in year y ($EG_{PJ, \text{Tornado}, y}$)

Also, the PP is continuously measuring electricity generation of solar plant by main and check meters. Thus this parameter is considered in emission reduction calculations.

Joint Meter Reading is being taken jointly by the officials of state utility and project participant's representative and accordingly JMR Report is being prepared. The monitoring methodology applies consistently the choice of the option selected for monitoring of baseline emissions. The monitoring plan provide procedures for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period.

The project participant has ability to implement the monitoring plan. This is checked through discussion with consultant, the project participant and EPC contractors of the project activity during the actual physical site inspection to the project activity.

The solar plant supplier is involved in the operation, maintenance and data monitoring. The PD has been reviewed to check that the procedure for data uncertainty, emergency preparedness, roles and responsibility, operational and management structure are mention in the PD. The monitoring plan completely describes all measures to be implemented for monitoring all parameters required. The monitoring plan described the positioning of the equipment. Calibration frequency for Energy meters is once in 5 years. Also CEA Notification No. 502/70/CEA/DP&D dated 17/03/2006 which is considered as national standard mentions that “All interface meters shall be tested at least once in five years.” Hence calibration frequency once in 5 years considered for the project activity is found to be appropriate. O&M team will ensure joint monthly reading with state authorities which has been verified during the site visit by validation team. From the above discussion, it has been concluded that the PP got sufficient ability to implement the monitoring plan

Values of the parameter “Quantity of net electricity generation supplied by the project plant/unit to the grid in year y ” by particular sub-project is directly sourced from the monthly JMR issued by respective state utility /31/.

The JMRs are prepared and endorsed by state utility, an external government agency and the PP has no influence in the entire procedure. Hence, the data issued by the state electricity board through the JMR is deemed authentic.

During the site visit, it was observed that, the project activity is connected to the grid through an appropriate power evacuation system. Appropriate metering system and calculation procedures are transparently described in the monitoring plan to enable accurate determination of emission reductions achieved by the project activity.

Conclusion:

The monitoring methodology applies consistently the choice of the option selected for monitoring of baseline emissions. The monitoring plan provide procedures for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period.

The project participant has the ability to implement the monitoring plan. This is checked through discussion with consultant, the project participant and O&M contractors of the project activity during the physical site inspection. The staffs at the sub-station and the representative of the technology providers were also interviewed to verify the accuracy in the documents. This has been checked during the site visit and is found to be acceptable.

The final joint VCSPD&MR/01/ has been reviewed to check that the procedure for data uncertainty, emergency preparedness, roles and responsibility, operational and management structure are mention in the PD. The monitoring plan completely describes all measures to be implemented for monitoring all parameters required. Based on the above discussion and the requirements of paragraphs 117 and 119 of the VVS for PAs version 02.0/11/, the validation team confirm that:

1. The monitoring plan included in the joint VCS PD&MR is based on the baseline methodology ACM0002 version 19.0.0 which has been applied to the proposed VCS project activity
2. The monitoring arrangements described in the monitoring plan are feasible within the project design.
3. The PP has the ability to implement the monitoring plan as per the joint VCS PD&MR.

3.4 Non-Permanence Risk Analysis

The project activity does not require a non-permanence risk analysis. Hence this is not applicable.

4 SAFEGUARDS

4.1 No Net Harm

There is no negative impact to any socio economic conditions of the region due to the project activity. As per the notifications issued by Ministry of Environment and Forest dated 01/12/2009 (ref: <http://moef.nic.in/downloads/rules-and-regulations/3067.pdf>) , Environmental Impact Assessment for the solar projects is not required to be done.

This project activity will not involve any negative environmental or socio-economic impacts, as the project activity involves generation of power using solar energy which is a clean source of energy. Hence no mitigation measures are required.

4.2 Environmental Impact

The project proponent has mentioned in the PD/01/ that the present project activity does not require EIA to be carried out because as per the schedule 1 of Ministry of Environment and Forest notification dated 14/09/2006/27/ <http://envfor.nic.in/legis/eia/so1533.pdf> and further notification number 3067 from MoEF dated 01/12/2009/25/ <http://moef.nic.in/downloads/rules-and-regulations/3067.pdf> , activities are required to undertake environmental impact assessment studies. The proposed project activity does not fall under the listed categories and hence not required an EIA to be done. The project participant has nevertheless submitted a No Objection Certificates from state nodal agency/17/. Thus, the adequacy of the analysis carried out by the project participant for the impact of the implementation of the project activity on the environment has been validated as per paragraphs 126 and 129 of VVS for PAs version 02.0.

The validation team is of the opinion that the project complies with environmental regulations in India.

4.3 Local Stakeholder Consultation

The local stakeholder consultation process has been described in detail, by the PP, in section 5.3 of the joint VCS PD&MR. The project participant identified the relevant stakeholder like the local village head, suppliers, vendors and the villagers (from the villages listed in the PD), as local stakeholders for the project activity. Thus, the validation team is of the opinion that the relevant stakeholders have been consulted appropriately and adequately.

For 100 MW_{AC} Solar Power Plant by SE Solar Limited at Veltoor Site, Telangana:

The stakeholder consultation meeting was conducted on 18/07/2018 at local Site office at Veltoor Site, Mehboobnagar district, Telangana. Stakeholders were invited through personal invitation letters and public notices, given by the PP. The documentary evidence provided as proof of date of the invitation, meeting; and mode of invitation/9/ has been checked by the assessment team and found to be appropriate.

After sharing information with the local stakeholders about the company and the purpose of proposed activity, the stakeholders were briefed about non-conventional energy sources and their importance. The PP also informed the stakeholders about their intention of securing carbon credit benefits for the proposed project activity. The Minutes of the meeting of the stakeholder meeting and attendance sheet/9/ have been submitted by the PP.

For 50 MW_{AC} Solar Project by Gale Solar farms Private Limited and 20 MW_{AC} Tornado Solar Project by Tornado Solar farms Private Limited:

The stakeholder consultation meeting was conducted on 17/06/2018 at local Site office in Dhule district, Maharashtra. Stakeholders were invited through personal invitation letters and public notices, given by the PP. The documentary evidence provided as proof of date of the invitation, meeting; and mode of invitation/9/ has been checked by the assessment team and found to be appropriate.

After sharing information with the local stakeholders about the company and the purpose of proposed activity, the stakeholders were briefed about non-conventional energy sources and their importance. The PP also informed the stakeholders about their intention of securing carbon credit benefits for the proposed project activity. The Minutes of the meeting of the stakeholder meeting and attendance sheet/9/ have been submitted by the PP.

During the site visit the assessment team interviewed some of the local villagers. Based on the replies of the villagers, the validation team was convinced that the process of stakeholder consultation was carried out as described in the joint VCS PD&MR/10/. The villagers also confirmed that they were invited for the meeting through public notice. This was found to be consistent with the invitation process mentioned in the joint VCS PD&MR /01/.

Overall, there was agreement among the stakeholders that the proposed project activity would lead to the overall development of the area, mainly by generating employment opportunities and improving the infrastructure leading to an improved life for the villagers. The local stakeholders interviewed during the site visit endorsed this view.

It is also confirmed that local stakeholders were invited by the project proponent to comment on the proposed project activity prior to the submission of the PD for validation.

4.4 Public Comments

In accordance with the requirement in clause 3.17.5 of the VCS standard version 3.7 “All VCS projects are subject to a 30-day public comment period. The date on which the project is listed on the project pipeline marks the beginning of the project’s 30-day public comment period”.

The PP listed their project activity in the VCS pipeline for 30 days from 05/05/2019 to 04/06/2019 (https://www.vcsprojectdatabase.org/#/pipeline_details/PL1890). Comments received during the commenting period are assessed in Appendix-4 of this report (CAR #4).

5 VERIFICATION FINDINGS

5.1 Accuracy of GHG Emission Reduction and Removal Calculations

The calculation of the emission reductions is found to be correct. The details of the reported and the verified values for all parameters are listed in section 5.2 of this report.

The parameter “Quantity of net electricity generation supplied by the project to the grid in year y” by each sub-project is directly sourced from JMRs issued by relevant state utility. The PP has provided the complete set of data for all the monitored parameters in the ER spreadsheet/02/. This data has been verified as described in section 5.2 below. The formulae & method used to calculate the baseline emissions, project emissions and leakage are appropriate and in line with the approved methodology ACM0002 version 19.0/4/.

The PP has calculated the grid emission factor as per the combined margin approach described in the 'Tool to calculate the emission factor for an electricity system', version 07.0/5/. The grid emission factor has been calculated as the weighted average of OM & BM; and has been fixed ex-ante for the entire crediting period.

The OM and BM have been obtained from a publicly available source i.e. "CO2 Baseline Database for Indian Power sector", version 14/18/ published by Central Electricity Authority, Ministry of Power, and Government of India. The OM has been determined as the average of the previous 3 years values obtained from the CEA database/19/. The value of BM has been identified directly from the CEA database. The combined margin emission factor was arrived at by applying weights of 75% for OM and 25% for BM, as specified in the tool. The OM and BM have been calculated to be 0.9610 tCO2/MWh and 0.8644 tCO2/MWh respectively. Applying the weights, the grid emission factor has been calculated to be 0.9368 t CO2/MWh.

As per CER excel spreadsheet/02/ submitted by the PP, the net emission reductions for the current monitoring period was verified as 417,018 tCO2e for the current monitoring period.

The assessment team able to confirm that the GHG emission reductions and removals have been quantified correctly in accordance with the project description and applied methodology.

5.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

All the data recorded is in compliance with the VCS joint PD & Monitoring Report/1/.The assessment team has checked the monthly JMRs for electricity generated and supplied by project activity/31/ in the current monitoring period to verify the values of monitoring parameter reported in ER calculation sheet and found to be consistent. Since the monthly JMRs prepared and issued by state utility, they are found to be reliable and authentic.

As per the validated joint VCS PD & MR /01/, the operations, maintenance and monitoring of the project activity is being carried out by the Suzlon Global Services Limited (SGSL), whose operation and maintenance activities are ISO 9001:2008 certified. Hence it is confirmed that the management system of the VCS project is in place; with the responsibilities properly identified. The same was also verified during the on-site verification.

The monitoring of the project activity is found to be in accordance with the monitoring methodology described in ACM0002, Version 19.0.0/4/. The monitoring mechanism is effective and reliable. During the site visit, personnel involved at various levels of the operation of the project activity have been interviewed to confirm that the plant personnel are conscious of the importance of the monitoring activities. The on-site verification of the plant records also substantiate consistency in recording and reporting of monitored data.

The required monitoring systems have been installed and are operational. The meters comply with appropriate quality standards applicable for the used technology. The accuracy class of the meters installed for the project activity was verified against the validated VCS joint PD & MR /01/ and cross-checked against the Power Purchase Agreements /08/ signed for the project activity.

The supporting records of monthly JMRs /31/ for the entire monitoring period were checked and found to be sufficient to enable verification of emission reductions.

The following parameter has been verified for current monitoring period:

1. Quantity of net electricity generation supplied by the project Veltoor plant to the grid in year y, $EG_{PJ, Veltoor, y}$ (MWh):

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The parameter is calculated as the difference of electricity exported to the grid and electricity imported from the grid obtained from joint meter reading report notes issued by state utility as per below formula: $EG_{PJ, Veltoor, y} = EG_{Export, Veltoor} - EG_{Import, Veltoor}$ and recorded on monthly basis. The input values used to calculate the value of $EG_{PJ, Veltoor, y}$ i.e $EG_{Export, Veltoor}$ and $EG_{Import, Veltoor}$ are continuously monitored, hourly measured and monthly recorded.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The reporting frequency is in line with the monitoring plan as outlined in the joint VCS PD&MR/01/ and monitoring methodology/04/.
	Monitoring equipment	There are one set energy meters (Main and Chcek meter) installed at grid interconnection point for monitoring of power generation.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy of the monitoring equipment used to measure the input values used to calculate $EG_{PJ, Veltoor, y}$ is 0.2s as verified from the physical inspection of the project activity, which is as per the joint VCS PD&MR/01/ which is as per the norm defined in the Power Purchase agreement /08/.

	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes. Calibration certificates/33/ are verified and confirmed that accuracy of monitoring instruments is valid for the entire range.
	Calibration frequency /interval:	Calibration frequency of the meters is once in 5 years/01/.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes. The calibration frequency is in line with the monitoring plan as outlined in the joint VCS PD&MR/01/.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes the calibration is conducted by state utility which NABL Accredited Government institution/32/.
	Is(are) calibration(s) valid for the whole reporting period?	Yes, the calibrations of meters is valid for the whole monitoring period/32/.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes. The calibration is carried out appropriately/32/.
	How were the values in the monitoring report verified?	Cumulative value of EG _{PJ, Velloor, y} for entire monitoring period is reported in the monitoring report, however monthly values are reported in the ER calculation sheet. The monthly values were verified from the JMRs issued by state utility and found to be consistent.

		Value of this parameter for the current monitoring period was verified as 313,137.20 MWh.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the adequate QA/QC procedures were implemented by all the stakeholders, namely, the Grid Authority, the PP and the Suzlon Global Services Limited (SGSL) (O&M Contractor). The data transfer process for the said parameter is as follows: The Joint meter reading at grid interconnection points and is taken by the representatives of state utility in the presence of O&M officials in the form of JMRs. Based on the data recorded in the JMRs, electricity supplied to the grid by the project activity is calculated by state utility. Monthly JMR issued by state utility provides the value of $EG_{PJ, Velloor, y}$ that is directly used for emission reduction calculations.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CL #1, CL #2 & CAR #1 to CAR #4 was raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the frequency in the monitoring plan.	

2. Quantity of net electricity generation supplied by the project Gale plant to the grid in year y, $EG_{PJ, Gale, y}$ (MWh):

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The parameter is calculated as the difference of electricity exported to the grid and electricity imported from the grid obtained from joint meter reading report notes issued by state utility as per below formula: $EG_{PJ, Gale, y} = EG_{Export, Gale} - EG_{Import, Gale}$ and recorded on monthly basis. The input values used to calculate the value of $EG_{PJ, Veltor, y}$ i.e $EG_{Export, Gale}$ and $EG_{Import, Gale}$ are continuously monitored, hourly measured and monthly recorded.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The reporting frequency is in line with the monitoring plan as outlined in the joint VCS PD&MR/01/ and monitoring methodology/04/.
	Monitoring equipment	There are one set energy meters (Main and Chcek meter) installed at grid interconnection point for monitoring of power generation.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy of the monitoring equipment used to measure the input values used to calculate $EG_{PJ, Gale, y}$ is 0.2s as verified from the physical inspection of the project activity, which is as per the joint VCS PD&MR/01/ which is as per the norm defined in the Power Purchase agreement /08/.

	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes. Calibration certificates/33/ are verified and confirmed that accuracy of monitoring instruments is valid for the entire range.
	Calibration frequency /interval:	Calibration frequency of the meters is once in 5 years/01/.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes. The calibration frequency is in line with the monitoring plan as outlined in the joint VCS PD&MR/01/.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes the calibration is conducted by state utility which NABL Accredited Government institution/32/.
	Is(are) calibration(s) valid for the whole reporting period?	Yes, the calibrations of meters is valid for the whole monitoring period/32/.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes. The calibration is carried out appropriately/32/.
	How were the values in the monitoring report verified?	Cumulative value of $EG_{PJ,Gale,y}$ for entire monitoring period is reported in the monitoring report, however monthly values are reported in the ER calculation sheet. The monthly values were verified from the JMRs issued by state utility and found to be consistent.

		Value of this parameter for the current monitoring period was verified as 78,241.35 MWh.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the adequate QA/QC procedures were implemented by all the stakeholders, namely, the Grid Authority, the PP and the Suzlon Global Services Limited (SGSL) (O&M Contractor). The data transfer process for the said parameter is as follows: The Joint meter reading at grid interconnection points and is taken by the representatives of state utility in the presence of O&M officials in the form of JMRs. Based on the data recorded in the JMRs, electricity supplied to the grid by the project activity is calculated by state utility. Monthly JMR issued by state utility provides the value of $EG_{PJ, \text{Gale}, y}$ that is directly used for emission reduction calculations.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CL #1, CL #2 & CAR #1 to CAR #4 was raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the frequency in the monitoring plan.	

3. Quantity of net electricity generation supplied by the project Tornado plant to the grid in year y, $EG_{PJ, Tornado, y}$ (MWh):

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The parameter is calculated as the difference of electricity exported to the grid and electricity imported from the grid obtained from joint meter reading report notes issued by state utility as per below formula: $EG_{PJ, Tornado, y} = EG_{Export, Tornado} - EG_{Import, Tornado}$ and recorded on monthly basis. The input values used to calculate the value of $EG_{PJ, Tornado, y}$ i.e $EG_{Export, Tornado}$ and $EG_{Import, Tornado}$ are continuously monitored, hourly measured and monthly recorded.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The reporting frequency is in line with the monitoring plan as outlined in the joint VCS PD&MR/01/ and monitoring methodology/04/.
	Monitoring equipment	There are one set energy meters (Main and Chcek meter) installed at grid interconnection point for monitoring of power generation.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy of the monitoring equipment used to measure the input values used to calculate $EG_{PJ, Tornado, y}$ is 0.2s as verified from the physical inspection of the project activity, which is as per the joint VCS PD&MR/01/ which is as per the norm defined in the Power Purchase agreement /08/.

	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes. Calibration certificates/33/ are verified and confirmed that accuracy of monitoring instruments is valid for the entire range.
	Calibration frequency /interval:	Calibration frequency of the meters is once in 5 years/01/.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes. The calibration frequency is in line with the monitoring plan as outlined in the joint VCS PD&MR/01/.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes the calibration is conducted by state utility which NABL Accredited Government institution/32/.
	Is(are) calibration(s) valid for the whole reporting period?	Yes, the calibrations of meters is valid for the whole monitoring period/32/.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes. The calibration is carried out appropriately/32/.
	How were the values in the monitoring report verified?	Cumulative value of $EG_{PJ,Tornado,y}$ for entire monitoring period is reported in the monitoring report, however monthly values are reported in the ER calculation sheet. The monthly values were verified from the JMRs issued by state utility and found to be consistent. Value of this parameter for the current monitoring period was verified as 53,774.28

		MWh.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the adequate QA/QC procedures were implemented by all the stakeholders, namely, the Grid Authority, the PP and the Suzlon Global Services Limited (SGSL) (O&M Contractor). The data transfer process for the said parameter is as follows: The Joint meter reading at grid interconnection points and is taken by the representatives of state utility in the presence of O&M officials in the form of JMRs. Based on the data recorded in the JMRs, electricity supplied to the grid by the project activity is calculated by state utility. Monthly JMR issued by state utility provides the value of $EG_{PJ, Tornado, y}$ that is directly used for emission reduction calculations.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
Findings	CL #1, CL #2 & CAR #1 to CAR #4 was raised and resolved	
Conclusion	The parameter has been monitored appropriately, in accordance with the monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the frequency in the monitoring plan.	

Parameters fixed ex ante:

$EF_{grid,OM,y}$; tCO_{2e}/MWh : it is the operating margin emission factor of Indian grid fixed for the entire crediting period and the value is considered as 0.9610 tCO_{2e}/MWh , that is consistent with the joint VCS PD&MR/01/.

$EF_{grid,BM,y}$; tCO_{2e}/MWh : it is build margin emission factor of Indian grid fixed for the entire crediting period and the value is considered as 0.8644 tCO_{2e}/MWh , that is consistent with the joint VCS PD&MR/01/

$EF_{grid,CM,y}$; tCO_{2e}/MWh : it is the combined margin emission factor of Indian grid fixed for the entire crediting period and the value is considered as 0.9368 tCO_{2e}/MWh , that is consistent with the joint VCS PD&MR/01/

Calibration of meters:

During the verification assessment of the project activity, accuracy of all the metering have been checked and found appropriate. The installation and working conditions of the meters were checked during the on-site inspection and were found to be satisfactory. Details of meters are provided in below table:

Meters at 100 MW_{AC} Veltoor Solar Project in Telengana

Meter type	Meter Sr.No.	Calibration Date	Calibration due date	Calibration delay (Y/N)
Main Meter	XD551230	05/01/2017	04/01/2022	N
		14/12/2018	13/12/2023	
Check Meter	XD551231	05/01/2017	04/01/2022	N
		14/12/2018	13/12/2023	
Standby Meter	XD551232	05/01/2017	04/01/2022	N
		14/12/2018	13/12/2023	

Meters at 50 MW_{AC} Gale Solar Project in Dhule, Maharashtra:

Meter type	Meter Sr.No.	Calibration Date	Calibration due date	Calibration delay (Y/N)
Main Meter	Old: 2832489	10/07/2017	09/07/2022	N
	New: XD462713	22/03/2018	21/03/2023	
		31/01/2019	30/01/2024	
Check Meter	XD462714	22/03/2018	21/03/2023	N
		31/01/2019	30/01/2024	
Standby Meter	XD462712	22/03/2018	21/03/2023	N
		31/01/2019	30/01/2024	

Meters at 20 MW_{AC} Gale Solar Project in Dhule, Maharashtra:

Meter type	Meter Sr.No.	Calibration Date	Calibration due date	Calibration delay (Y/N)
Main Meter	02832488	10/07/2017	09/07/2022	N
		31/01/2019	30/01/2024	
Check Meter	02832490	10/07/2017	09/07/2022	N
		31/01/2019	30/01/2024	
Standby Meter	02832501	10/07/2017	09/07/2022	N
		31/01/2019	30/01/2024	

Meters used to measure the parameters are of accuracy class 0.2s, as verified through calibration certificates/06/ and also physical inspection during the site visit. The CEA Notification No. 502/70/CEA/DP&D dated 17/03/2006 and its amendments Notified on 26/06/2010 No. 502/6/2009/DP&D/D-I /25/ which is considered as national standard, mentions that for voltage of 650 V up to 33 Kv, 0.5s accuracy class or above is recommended. Hence, the accuracy classes of 0.2s for the energy meters installed at the project activity site are found to be appropriate.

The details of monitoring equipment are involved in the project activity and their calibration details/32/ are mentioned in the table under Appendix -1 of the joint VCSPD& MR/01/.

The meters have been physically inspected during the site visit and the meter details are found to be consistent with that observed during the site visit. The CEA Notification No. 502/70/CEA/DP&D dated 17/03/2006/25/ which is considered as national standard mentions that "All interface meters shall be tested at least once in five years." Hence, the stipulated calibration frequency once in 5 years is appropriate.

The assessment team has verified the monthly JMRs issued by respective state utility and confirmed that only the data recorded through main meters is used to calculate net electricity supplied to the grid and consequently for ER calculations. The joint VCS PD&MR /01/ and site visit observations confirm that the metering equipment are sealed and maintained by the state utility.

In view of the above discussion the assessment team able to confirm that evidence used to determine the GHG reductions and removals are sufficient and appropriate with respect to quality and quantity.

GHG Calculations

The emission reduction as per the applied methodology equals the baseline emissions (project emissions and leakage emissions for such project activities is considered zero). The formula provided for the calculation of baseline emissions is:

$$BE_y = EG_{PJ,y} * EF_{CO_2,grid,y}$$

Where:

BE_y : Baseline emissions in year y (tCO₂e/yr)

$EG_{PJ,y}$: Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{CO_2,grid,y}$: CO₂ emission factor of the grid in year y (tCO₂/MWh)

Thus,

$$BE_y = EG_{PJ,y} * EF_{CO_2,grid,y}$$

$$\text{Thus, } BE_y = 445,152.83 \text{ MWh} * 0.9368 \text{ tCO}_2/\text{MWh}$$

$$= 417,018 \text{ tCO}_2 \text{ (rounded down value)}$$

As per the applied methodology, emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

$$ER_y = 417,018 - 0 - 0 \text{ tCO}_2$$

$$ER_y = 417,018 \text{ tCO}_2$$

The verification team confirms that appropriate methods and formulae for calculating baseline emissions have been followed. The assumptions, emission factors and default values that were applied in the calculations are justified. The actual emission reduction achieved during the current monitoring period are 12.66 % lesser than the estimated amount of emission reductions as determined in the joint VCS PD&MR, which is due to the low PLF achieved by the project activity during the monitoring period.

It is to be noted that PLF is completely governed by the availability of sunlight, which is natural phenomenon and same is beyond the control of PP, hence the assessment team has concluded the decrease in emission reduction of the project activity is justified and acceptable. All the data were made available and have monitored as per required monitoring frequency. The means of verification for the values of parameters, used for baseline emission calculation, is described above.

6 VALIDATION AND VERIFICATION CONCLUSION

M/s. SE Solar Limited has contracted the LGAI Technological Center, S.A. (also referred to as Applus+ Certification) to validate and verify the project: “Grid Connected Solar Energy Project” with regard to VCS Version 3 requirements and the information provided by the project proponent related to the project design, operation, monitoring and reporting. The monitoring period considered for current verification is from 07/08/2017 to 31/03/2019 in the VCS joint project description & Monitoring Report Version 03 dated 06/08/2019 are eligible for issuance as Verified Carbon Units.

A risk-based approach has been followed to perform this validation and verification. In the course of the joint validation & verification 04 Corrective Action Requests (CARs), 02 Clarification requests (CLs) were raised and successfully closed.

No limitations or doubts were identified related to the validation and verification.

Validation conclusion:

Applus+ Certification has reviewed the project description documents and subsequently carried out site visit interviews to confirm the fulfilment of stated criteria.

The purpose of this project activity is to generate electricity using renewable sources (solar) and being supplied to the Indian Grid, thereby displacing the grid generated electricity.

The project activity has applied the baseline and monitoring methodology, ACM0002: Grid-connected electricity generation from renewable sources, Version 19.0.0, which is an approved methodology under the CDM programme and is acceptable under VCS Version 3. The baseline has been determined in accordance with the stated approved baseline methodology.

As summary the validation team able to conclude that:

- The project is in line with all relevant host country criteria (India) and all relevant VCS version 3 program guidelines requirements.
- The project additionality is sufficiently justified in the joint VCS PD&MR.
- The monitoring plan is transparent and adequate and in line with applied baseline and monitoring methodology of ACM0002, version 19.0.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 289,503 tCO₂e/year is most likely to be achieved within the 10 years (renewable) crediting period.
- The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation as outlined under VCS version 3.

Verification conclusion:

This engagement covers the verification of emission reductions from anthropogenic sources of greenhouse gases included within the project boundary of the project “Grid Connected Solar Energy Project” (Project pipeline ID-1890), as well as an additional confirmation of the compliance of the joint VCS PD&MR with the requirements of VCS Standard version 3.7.

Applus+ Certification is an entity accredited by the United Nations Framework Convention on Climate Change (UNFCCC) to undertake certification and verification services in the sectoral scope in which the Project is undertaken.

The VCS joint project description & Monitoring Report, together with other information examined, was prepared as per the VCS joint project description & Monitoring Report Template, Version 3.1.

The information in the VCS joint project description & Monitoring Report together with other information examined by the assessment team, including all the information necessary to determine that the emission reductions achieved have been determined correctly.

In view of the information provided in the VCS joint project description & Monitoring Report and other relevant information, it can be concluded that the project meets all the requirements of the VCS Standard Version 3.7/28/.Also on the basis of our examination of the VCS joint project description & Monitoring Report and other relevant information, the emission reductions during the monitoring period from 07/08/2017 to 31/03/2019 (both the days included) are verified as 417,018 tCO₂e.

The management of CLP Wind Farms (India) Private Limited (CLPWF) is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions. Applus+ Certification is responsible for verification and confirming emission estimates for the project, as described in the VCS joint project description & Monitoring Report.

The certification approach followed by Applus+ Certification draws on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. Our examination includes an assessment of evidence, through desk review, and where necessary, interviews, stakeholder discussions and site visits, relevant to certifying the rightfulness of the amounts and disclosures in relation to the Project's GHG emission reductions.

We planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that the amount of GHG emission reductions for the given period, prepared on the basis of the VCS Joint project description & Monitoring Report, are fairly stated.

Based on process and procedures conducted, in our opinion, CLP Wind Farms (India) Private Limited (CLPWF) assertion on GHG emission reductions for the “Grid Connected Solar Energy Project” (Project pipeline ID- 1890) project during the reporting period 07/08/2017 to 31/03/2019 is materially correct and is a fair representation of the GHG data and information and the emission reductions are fairly stated. The GHG emission reductions were calculated correctly on the basis of approved monitoring methodology ACM0002 version 19.0. The verification team also confirms that the project is implemented as described in the validated VCS joint PD & MR.

Therefore, Applus+ Certification is able to certify that the project is in full compliance with the VCS Standard Version 3.7, and the quantity of the reported emission reductions during below reporting period are completely, comparably, accurately and correctly reported.

Verification period: From [7th –August-2017] to [31st -March-2019]

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2017 (from 07/08/2017 to 31/12/2017)	42,648	0	0	42,648
2018 (from 01/01/2018 to 31/12/2018)	275,132	0	0	275,132
2019 (from 01/01/2019 to 31/03/2019)	99,238	0	0	99,238
Total	417,018	0	0	417,018

APPENDIX 1: Document Reference

Ref. No	Title of Document	Version	Date
1	Joint Project Description & Monitoring Report	01	22/04/2019
		02	31/07/2019
		03	06/08/2019
2	Emission Reductions Calculation Spread sheet (Validation) Emission Reductions Calculation Spread sheet (verification)	01	22/04/2019
		02	31/07/2019
		03	06/08/2019
3	Financial Analysis Spread sheet _Veltoor project Financial Analysis Spread sheet _Gale project Financial Analysis Spread sheet _Tornado project	01	17/04/2019
		02	30/07/2019
4	Baseline and monitoring methodology ACM0002	19	-
5	Tool to calculate the emission factor for an electricity system	07.0	EB 100 Annex 4
6	VCS pipeline https://www.vcsprojectdatabase.org/#/pipeline_details/PL1890	-	-
7	Commissioning Certificates for 100 MW _{AC} by SE Solar Limited	-	17/08/2017
	Commissioning Certificates for 50 MW _{AC} by Gale Solar Farms Limited		27/03/2018
	Commissioning Certificates for 20 MW _{AC} by Tornado Solar Farms Limited		13/12/2017
8	Power Purchase Agreement (PPA) for 100 MW _{AC} by SE Solar Limited	-	29/02/2016
	Power Purchase Agreement (PPA) for 50 MW _{AC} by Gale Solar Farms Limited		11/04/2016
	Power Purchase Agreement (PPA) for 20 MW _{AC} by Tornado Solar Farms Limited		11/04/2016
9	Veltoor Site: Local stakeholder documents – Minutes of meeting, attendance sheet, invitation letters, public notice	-	18/07/2018
	Dhule Site: Local stakeholder documents – Minutes of meeting, attendance sheet, invitation letters, public notice		17/06/2018
10	Energy Yield Assessment Report for 100 MW _{AC} by SE Solar Limited	-	22/04/2016
	Energy Yield Assessment Report for 50 MW _{AC} by Gale Solar Farms Limited		May 2017
	Energy Yield Assessment Report for 20 MW _{AC} by Tornado Solar Farms Limited		May 2017
11	Clean Development Mechanism Validation and Verification Standard	02.0	29/11/2018
12	Tool for the demonstration and assessment of additionality	07.0.0	EB 70, Annex 8

Ref. No	Title of Document	Version	Date
13	Technical specifications of solar panels ,invertors provided by supplier	-	-
14	Request for Selection document for selection of Solar PV developers in the State of Telangana” for tariff based competitive bidding process	-	01/04/2015
	Request for Selection” (RfS) document for selection of Solar PV developers for tariff based competitive bidding process		27/08/2015
15	Copy of Board resolution for 100 MW _{AC} by SE Solar Limited	-	04/05/2015
	Copy of Board resolution for 50 MW _{AC} by Gale Solar Farms Limited and 20 MW _{AC} by Tornado Solar Farms Limited		17/09/2015
16	Purchase Orders for different equipment's and services raised by PP to suppliers	-	-
17	Approval of Gram Panchayat(Village-Konnur) for 100 MW _{AC} by SE Solar Limited	-	08/02/2017
	Land development agreement for 100 MW _{AC} by SE Solar Limited		14/06/2016
	Approval of Gram Panchayat(Village-Bhamer) for 50 MW _{AC} by Gale Solar Farms Limited and 20 MW _{AC} by Tornado Solar Farms Limited		02/10/2016
	Approval of Gram Panchayat(Village-Saltek) for 50 MW _{AC} by Gale Solar Farms Limited and 20 MW _{AC} by Tornado Solar Farms Limited		02/03/2017
	Synchronization approval for 50 MW _{AC} by Gale Solar Farms Limited and 20 MW _{AC} by Tornado Solar Farms Limited issued by MSEDCL		21/03/2018
	Regular Evacuation Approval for 50 MW _{AC} by Gale Solar Farms Limited and 20 MW _{AC} by Tornado Solar Farms Limited from chief engineer ,planning and coordination		19/06/2018
18	CO ₂ baseline database published (in December 2018) by Central Electricity Authority, Govt. Of India	14	December 2018
19	CERC tariff order (http://www.cercind.gov.in/2015/orders/SO4.pdf)	-	31/03/2015
20	Evidence of tariff reductions for 50 MW _{AC} by Gale Solar Farms Limited and 20 MW _{AC} by Tornado Solar Farms Limited		12/04/2018 and 04/01/2018
21	Income Tax Act 1961 (Source: Appendix IA of Income Tax Rules) https://www.taxmann.com/emailer/images/pdf/incometaxratesf_or_17-03-2016.pdf https://cleartax.in/s/income-tax-slabs#next	-	-
22	IT depreciation rate http://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm	-	-
23	Income tax rate and Minimum Alternate Tax (MAT) rate http://www.incometaxindia.gov.in/Tutorials/2%20Tax%20Rates.pdf	-	-

Ref. No	Title of Document	Version	Date
	Service tax rate: http://www.taxdose.com/service-tax-rate-chart-for-fy-2016-17-with-service-tax-rate-15-from-1st-june-2016/ Surcharge and Education cess: http://www.incometaxindia.gov.in/Tutorials/2%20Tax%20Rates.pdf		
24	Reserve Bank of India's Survey of Professional Forecasters: Results of 33 rd Round (Q1:2015-16) https://m.rbi.org.in/scripts/PublicationsView.aspx?id=16217	-	07/04/2015
	Reserve Bank of India's Survey of Professional Forecasters: Results of 35 th Round (Q2:2015-16) https://m.rbi.org.in/Scripts/PublicationsView.aspx?id=16422		04/08/2015
25	- SCHEDULE (Page no 10) of the notification S.O. 1533 (E) dated 14/09/2006 published by the Ministry of Environment and Forests (MoEF), Government of India - Schedule of the notification S.O. 3067 dated 01/12/2009 published by the Ministry of Environment and Forests (MoEF), Government of India http://www.moef.nic.in/legis/env_clr.htm	-	-
26	Detailed procedure on REC mechanism dated 01/06/2010 by Central Electricity Regulatory Commission (http://www.nerlrc.org/Docs/Order_for_Detailed_Procedure_01-06-2010.pdf) REC registry (Source : https://recregistryindia.nic.in/)		
27	Investment Analysis tool , EB 85, Annex 12	06.0	-
	Investment Analysis tool , EB 101, Annex 11	09.0	-
28	VCS Standard	Version 3.7	21/06/2017
	VCS Program Guide	Version 3.7	21/06/2017
29	Letter of declaration dated from PP regarding not having created or sought any other form of environmental credit for the same period	-	31/07/2019
30	Electricity Act 2003 http://www.cercind.gov.in/08022007/Act-with-amendment.pdf dated 26/05/2003	-	-
31	Monthly JMRs issued by respective state utility for the current monitoring period	-	-
32	Calibration Certificates of all the energy meters for current monitoring period	-	-

Ref. No	Title of Document	Version	Date
33	Site visit attendance sheet ,photographs	-	25/07/2019 and 30/07/2019
34	List of commissioned solar projects available at Official website	-	-
35	Monthly invoices raised by project developers to relevant state utility for current monitoring period	-	-
36	Performance of Solar Power Plants in India	-	Feb 2011
37	Corporate Finance" 2nd edition, by Aswath Damodaran	-	-

APPENDIX 2: Abbreviations

ABT	Availability Based Tariff
ACM	Approved Consolidated Methodology
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CL	Clarification Request
CLPWFL	CLP Wind Farm (India) Private Limited
DISCOM	Distribution company
EB	Executive Board
EPC	Engineering and Procurement Contractor
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse Gases
ISO	International Organization for Standardization
JMR	Joint Meter Report
LCS	Local Controller System
MERC	Maharashtra Electricity Regulatory Commission
MSEDCL	Maharashtra State Electricity Distribution Company Limited
MP	Monitoring Period
MR	Monitoring Report
MW	Mega Watt
MWh	MegaWatt hour
OM	Operating Margin
O&M	Operation & Maintenance
PD	Project Description
PP	Project proponent
PPA	Power Purchase Agreement
QA/QC	Quality Assurance/Quality Control
REC	Renewable Energy Certificates
SGUPL	Solaris Gensol Utilities Private Limited
tCO ₂	Tonnes of Carbon Dioxide
TSSPDCL	Telangana State Southern Power Distribution Company Limited
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit

APPENDIX 3: Competency Statement

According to the sectoral scope / technical area and experience in the sectoral or national business environment, Applus+ Certification has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of Applus+ Certification.

The composition of audit team shall be approved by the Applus+ Certification ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as presented below:

- Lead Auditor (LA).
- Auditor (A) / Auditor in Training (AiT).
- Technical Expert (TE).
- Technical Reviewer (TR).

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by the assessment team.

Name	Qualification	Coverage of scope	Coverage of technical Area	Financial aspect	Host country Experience	Attendance to the On-Site Assessment
Ravi Kant Soni	Lead Auditor (LA)	Yes (1)	Yes (1.2)	Yes	Yes	Yes
Ravi Kant Soni	Technical Expert (TE)	Yes (1)	Yes (1.2)	Yes	Yes	Yes
Simon Shen	Technical Reviewer (TR)	Yes (1)	Yes (1.2)	Yes	N/A	N/A

The curricula vitae of the DOE's team members are provided below:

Ravi Kant Soni is a certified lead auditor for Lead Auditor ISO 14001:2004&Lead Auditor ISO 14064:2006 GHG Inventory and verification. He has more than 10 years of work experience across Climate Change, Environmental Management & Monitoring, Health & Safety Management, and Statutory Compliance. He was involved in more than 100 CDM validation and verifications activities and Gold Standard, VER projects as a team leader/technical reviewer / validator / verifier covering the sectoral scope 1 technical area 1.2. He has done Master in Technology (Energy Management) from a premier institute, School of Energy & Environmental Studies, DAVV, Indore (M.P.), India and Bachelor of Engineering (Mechanical Engineering) from M.I.T.S Gwalior Jiwaji University Gwalior, India.

Meng (Simon) Shen (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ Certification for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he

joined Applus+ Certification, he had been worked for TÜV SÜD as a GHG Validator/Verifier and ISO 9001/14001 Lead Auditor for 5.5 years.

APPENDIX 4: Findings Overview

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	Section no.	NA	Date :DD/MM/YYYY
Description of FAR			
N/A			
Project participant response			Date :DD/MM/YYYY
N/A			
Documentation provided by project participant			
N/A			
DOE assessment			Date: DD/MM/YYYY

Table 2. CL from this verification

CL ID	01	Section no.	4.3	Date : 30/07/2019
Description of CL				
Commissioning dates for sub projects 50 MW _{AC} and 20 MW _{AC} as reported in section 1.1 of the joint VCS PD&MR are not consistent with the commissioning certificates.				
Project participant response				Date : 31/07/2019
In line with signed PPA for 50 MW _{AC} Gale solar projects and 20 MW _{AC} Tornado solar projects, commercial date of operation (COD) shall be 30 days subsequent to the actual date of commissioning of full capacity. Gale Solar project was commissioned on 09/01/2018 and Tornado Solar project was commissioned on 10/10/2017. Thus, in line with signed PPA, Gale Solar project was commercially operational from 08/02/2018 and Tornado Solar project was commercially operational from 10/11/2017 and from these dates respective projects have started generating GHG emission reductions. Further same is also confirmed my email communication by Solar Energy Corporation of India Limited, Govt. of India.				
Further, in line with para 3.7.1 of VCS Standard 3.7, "The project start date is the date on which the project began generating GHG emission reductions or removals". Thus, these commercial dates of operation have been used to estimate project start date and calculation of emission reductions.				
Documentation provided by project participant				
Commission certificates and PPA for 50 MW _{AC} Gale solar projects and 20 MW _{AC} Tornado solar projects				
DOE assessment				Date: 31/07/2019
The project proponent has updated the commissioning dates for for 50 MW _{AC} Gale solar projects and 20 MW _{AC} Tornado solar projects in section 1.1 of the joint VCS PD&MR in line with the requirements of para 3.7.1 of VCS Standard 3.7, found appropriate, hence accepted.				
CL #1 is closed.				

CL ID	02	Section no.	2.2	Date : 30/07/2019
Description of CL				
Please submit the following documents:				
1. Power Purchase agreements 2. JMRs and invoices for the current monitoring period 3. Calibration certificates of billing meters				

CL ID	02	Section no.	2.2	Date : 30/07/2019
4. NoC issued by state nodal agencies regarding commissioning and operation of the project activity Please submit declaration confirming that the GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions.				
Project participant response				Date : 31/07/2019
1) Power Purchase agreements, JMRs and invoices for the current monitoring period, Calibration certificates of billing meters, commissioning certificates and NoC issued by gram panchayat are now enclosed with this submission. 2) Declaration pertaining to confirmation of GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions is now enclosed with this submission				
Documentation provided by project participant				
1. Power Purchase agreements 2. JMRs and invoices 3. Calibration certificates of billing meters 4. NoC from Gram Panchayat 5. Declaration pertain to GHG Emission reductions or removals generated by the project activity				
DOE assessment				Date: 31/07/2019
The PP has submitted the requested documents and declaration confirming that the GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions. Same are checked and found to be satisfactory. CL #2 is closed.				

Table 3. CAR from this verification

CAR ID	01	Section no.	3.3.5	Date : 30/07/2019
Description of CAR				
Section 2.5 of joint VCS PD&MR: - Please clarify why the input values used in the investment analysis are not mentioned. - Please clarify why latest version of the investment analysis guidelines/tool is available at the time of decision is not referred. - Please submit the relevant evidences for each input parameters considered in the investment analysis. - Please submit the relevant evidences with reference to the actual project cost invested in the project activity.				
Project participant response				Date : 31/07/2019
- Input values used in the investment analysis are now mentioned in the revised joint PD & MR - Latest version of the investment analysis guidelines/tool available at the time of decision is now referred appropriately in the revised joint PD & MR - Relevant evidences for each input parameters considered in the investment analysis for Veltoor, Gale and Tornado solar are now attached with this submission - EPC contracts and relevant Purchase Orders pertain to calculate the actual project cost of the project are now attached with this submission				

Documentation provided by project participant	
Revised joint PD & MR Revised IRR sheet for Veltoor, Gale and Tornado solar projects Purchase orders and EPC contracts	
DOE assessment	Date: 31/07/2019
Input values used in the investment analysis are reported in section 2.5 of the joint VCS PD&MR. closed Latest version of the investment analysis guidelines/tool is available at the time of decision is referred in the revised PD and IRR sheets, found to be acceptable. Project proponent has submitted the relevant evidences for each input parameters considered in the investment analysis and found to be satisfactory, hence accepted. Closed Purchase orders and EPC contracts for all the sub projects are submitted and found satisfactory. CAR #1 is closed.	

CAR ID	02	Section no.	4.3	Date : 30/07/2019
Description of CAR				
Section 5.3 of joint VCS PD&MR:				
1. Please clarify why the procedures or methods used for engaging local stakeholders e.g dates of announcements or meetings, periods during which input was sought and location of stakeholder meeting not mentioned. 2. Please submit the attendance sheet and MoM of the local stakeholder meeting conducted for the project activity.				
Project participant response				Date : 31/07/2019
1) Stakeholders' were invited by personal invitation letter and by public notice mentioned on notice board at respective site offices. Dates of announcements or meetings for Telangana and Maharashtra locations are now incorporated in the revised joint PD & MR. 2) Attendance sheet, public notice and personal invitation letters of the local stakeholder meetings are now attached with this submission.				
Documentation provided by project participant				
Revised joint PD & MR ,version 02 Attendance sheet Public notice and meeting invitation letters of the local stakeholder meetings				
DOE assessment				Date: 31/07/2019
The project proponent has provided the relevant details regarding local stakeholder including announcements or meetings, periods during which input was sought and location of stakeholder meeting, in section 5.3 of the revised joint VCS PD&MR, found satisfactory. The project proponent has submitted the attendance sheet and MoM of the local stakeholder meeting conducted for the project activity, found to be appropriate, hence accepted. CAR #2 is closed.				

CAR ID	03	Section no.	5.2	Date : 30/07/2019
Description of CAR				
1. Complete identification of the substation to which the project is connected is not provided in the joint VCS PD&MR. 2. Please submit ER calculation sheet for the current monitoring period.				

3. Please clarify why the calibration details of the energy meters involved in the project activity are not provided in the joint VCS PD&MR.	
Project participant response	Date : 31/07/2019
1) 100 MW_{AC} solar project is connected to 400/220 kV Veltoor substation and 50 MW_{AC} Gale solar project and 20 MW_{AC} Tornado solar projects are connected to 220/33 kV Jamde substation. Same are mentioned in section 1.8 of revised PD. 2) ER calculation sheet for the current monitoring period are now submitted with this attachment 3) Calibration details of the energy meters involved in the project activity are now mentioned in Appendix-1 of the revised joint PD & MR	
Documentation provided by project participant	
<i>Revised PD</i> <i>Revised ER sheet</i> <i>Calibration certificates</i>	
DOE assessment	Date: 31/07/2019
The project proponent has provided the complete identification of the substation to which the project is connected in the joint VCS PD&MR and found to be in line with information provided in the JMRs and verified during the site visit. The PP has submitted ER calculations sheet for validation and verification, found to be satisfactory, hence accepted. Calibration details of the energy meters involved in the project activity is provided in Appendix-1 of the revised joint PD & MR, same is verified through calibration certificates and found consistent. CAR #3 is closed.	
CAR #3 is re-opened	Date: 06/08/2019
Description of CAR	
Commissioning dates mentioned in the joint VCS PD&MR are not consistent with ER sheet. Value of estimated annual average GHG emission reductions or removal per year is not consistent with ER calculation sheet. Kindly clarify the relevance of investment analysis tool version used for the particular sub-project. CAR #3 is open	
Project participant response	Date: 06/08/2019
Commissioning dates are corrected in the joint VCS PD&MR, now consistent with ER sheet. Estimated annual average GHG emission reductions per year is corrected in the PD and made consistent with ER calculation sheet. Justification regarding the investment analysis tool version used for the particular sub-project, is provided in relevant sections of the joint PD&MR.	
Documentation provided by project participant	
Joint PD &MR version 03, dated 06/08/2019 ER Sheet_Estimated_Veltoor Gale Tornado, Version 03, dated 06/08/2019	
DOE assessment	Date: 06/08/2019
The project proponent has corrected the commissioning dates in the joint VCS PD&MR and found consistent with ER sheet. Value of estimated annual average GHG emission reductions per year is corrected in the ER calculation sheet and in the joint PD&MR. closed The project proponent has appropriately justified the investment analysis tool version used for the particular sub-project in the joint PD&MR, found satisfactory, hence accepted. CAR #3 is closed.	

CAR ID	04	Section no.	4.4	Date : 30/07/2019																														
Description of CAR																																		
Please address the below comments received during 30 days listing period:																																		
They say that "At the time of decision making for the project activities, 'Guidelines on The Assessment Of Investment Analysis" (EB 62 Annex 05) was the latest available tool, hence same has been considered for default value of return on equity. In line with the same the default value of Return on Equity for Group-1 projects in India is 11.75%.' No cannot do that. The EB62 Annex 05 document they say is from 15 July 2011 and has been replaced four times over by what is today the CDM document "Investment Analysis, v9.0". They use EB62 Annex 5 to claim default value for expected return on equity of 11.75 for India, as appendix of those guidelines say. Today, the CDM document "Investment Analysis, v9.0" puts this default value at 9.79. Big difference. Also. Common practice analysis uses combined capacity of the three sites even though three separate investments. Cannot do that. There may be more issues but all financial assumptions in Appendix that is not included so cannot see. Why is that not posted?																																		
Project participant response				Date : 31/07/2019																														
1) At the time of decision making, SE Solar Limited, Gale Solarfarms Pvt. Limited and Tornado Solarfarms Pvt. Limited considered prevailing investment guidelines to ascertain the benchmark for the project and financial viabilities of the projects were evaluated considering that value. It is not possible for the management of SE Solar Limited, Gale Solarfarms Pvt. Limited and Tornado Solarfarms Pvt. Limited to envisage future value of Return on Equity for India. Management of SE Solar Pvt. Ltd decided to consider carbon revenue for 100 MW solar project on 04/05/2015 and 'Guidelines on The Assessment Of Investment Analysis" (EB 62 Annex 05) was the prevailing guidelines issued by UNFCCC. Further, Management of Gale Solarfarms Pvt. Ltd. and Tornado Solarfarms Pvt. Ltd, decided to considered carbon revenue for 50 MW and 20 MW solar projects on 17/09/2015 and "Guidelines on The Assessment of Investment Analysis (version 6.0)", EB 85, Annex 12 was the prevailing guidelines issued by UNFCCC. Thus, default values of Return on Equity for SE Solar Limited, Gale Solarfarms Pvt. Limited and Tornado Solarfarms Pvt. Limited are justified. Considering latest Investment Analysis, v9.0, benchmark, benchmark for SE Solar Limited, Gale Solarfarms Pvt. Limited and Tornado Solarfarms Pvt. Limited are coming out 15.28% and 15.17% respectively. Thus, considering these benchmark values, sensitivity analysis is mentioned below: <u>Sensitivity Analysis for SE Solar Limited:</u> <table> <tr> <th>Variation</th><th>-10%</th><th>Normal Equity IRR</th><th>10%</th><th>Benchmark</th></tr> <tr> <td>Tariff Rate</td><td>6.71%</td><td>10.09%</td><td>13.57%</td><td>15.28%</td></tr> <tr> <td>Net Generation</td><td>6.71%</td><td>10.09%</td><td>13.57%</td><td>15.28%</td></tr> <tr> <td>Project Cost</td><td>13.24%</td><td>10.09%</td><td>7.66%</td><td>15.28%</td></tr> <tr> <td>O&M Cost</td><td>10.83%</td><td>10.09%</td><td>9.33%</td><td>15.28%</td></tr> </table> <u>Sensitivity Analysis for Gale Solarfarms Pvt. Ltd:</u> <table> <tr> <th>Variation</th><th>-10%</th><th>Normal Equity IRR</th><th>10%</th><th>Benchmark</th></tr> </table>					Variation	-10%	Normal Equity IRR	10%	Benchmark	Tariff Rate	6.71%	10.09%	13.57%	15.28%	Net Generation	6.71%	10.09%	13.57%	15.28%	Project Cost	13.24%	10.09%	7.66%	15.28%	O&M Cost	10.83%	10.09%	9.33%	15.28%	Variation	-10%	Normal Equity IRR	10%	Benchmark
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Variation	-10%	Normal Equity IRR	10%	Benchmark																														

Tariff Rate	5.89 %	9.16%	12.51%	15.17%
Net Generation	5.89 %	9.16%	12.51%	15.17%
Project Cost	12.16%	9.16%	6.84 %	15.17%
O&M Cost	9.91%	9.16%	8.39 %	15.17%

Sensitivity Analysis for Tornado Solarfarms Pvt. Ltd:

Variation	-10%	Normal Equity IRR	10%	Benchmark
Tariff Rate	5.89 %	9.16%	12.51%	15.17%
Net Generation	5.89 %	9.16%	12.51%	15.17%
Project Cost	12.16%	9.16%	6.83 %	15.17%
O&M Cost	9.91%	9.16%	8.39 %	15.17%

The above analysis shows that all the projects are still additional considering latest version of investment guidelines.

2) Inline with Step-1 of “Common Practice” analysis (version 03.1 EB84, Annex 7”), calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.

Thus, total output of the proposed project activity is 170 MW. Thus, + 50% range of 170 MW has been considered for common practice analysis and same is justified.

3) All the input parameters of investment analysis (except 3rd party energy assessment data) are considered from Terms and Conditions for Tariff determination by Central Electricity Regulatory Commission dt. 31/03/2015. Same are publicly available data which are the authentic value applicable for any solar projects in India. Further, all the input parameters along with respective supportive documents are submitted to DoE for assessment.

Documentation provided by project participant

Revised joint PD&MR

Revised IRR sheet for Veltoor, Gale and Tornado solar projects

DOE assessment

Date: 31/07/2019

The PP has referred the latest version of investment analysis guidelines available at the time of decision making while calculating the benchmark for particular sub-project, this approach is found to be appropriate, and hence accepted. Additionality does not have any negative impact even if latest version of investment analysis referred for determination of benchmark.

All the steps of latest version of “Common Practice” analysis (version 03.1 EB84, Annex 7”) is appropriately followed in order to demonstrate common practice for project activity, hence accepted.

The PP has provided the input values in the joint PD&MR, the assessment team has verified the same with the source documents and confirmed that the data source was publically available and authentic with reference to the solar power projects in India, hence accepted.

CAR #4 is closed.

Table 4. FAR from this verification

FAR ID	NA	Section No.	NA	Date :DD/MM/YYYY
Description of FAR				
No FAR rose during the verification.				
Project participant response				Date :DD/MM/YYYY
NA				
Documentation provided by project participant				
NA				
DOE assessment				Date: DD/MM/YYYY
NA				