

BUNDLED SOLAR POWER PROJECT BY VECTOR GREEN SUNSHINE PRIVATE LIMITED AND POLEPALLY SOLAR PARKS PRIVATE LIMITED



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Summary:

Validation purpose: The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited are the promoters of the proposed project activity. The project is a bundled project activity which involves installation of 20 MW solar project by Vector Green Sunshine Private Limited at Mansa district, Punjab and 25 MW solar power project by Polepally Solar Parks Private Limited at Mahabubnagar district, Telangana. The project has been commissioned on 24/03/2016 and 27/06/2016 respectively. The estimated emission reduction is to be approximately 70,073 tCO₂e per year by displacing 74,429 MWh/year of electricity from the generation-mix of power plants connected to the Indian grid.

The project activity is the installation of an environmentally safe and sound technology since there are no GHG emissions associated with the electricity generation. The project is located at is in the two states of India i.e. Punjab & Telangana. Installed capacity which is checked by the assessment team during the validation site visit. The same is checked by the clearances received from state nodal agencies.

Verification purpose: The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited are the promoters of the proposed project activity. The project is a bundled project activity which involves installation of 20 MW solar project by Vector Green Sunshine Private Limited at Mansa district, Punjab and 25 MW solar power project by Polepally Solar Parks Private Limited at Mahabubnagar district, Telangana. The electricity generated will be sold to state electricity board.

Start date of the project activity is the 24/03/2016. The monitoring period for this VCS verification is chosen from 24/03/2016 - 31/01/2018 (including both days) and the project activity achieved 130024 tCO₂e emission reductions during this monitoring period displacing 134,699 MWh amount of electricity from the generation-mix of power plants connected to the INDIAN grid, which is mainly dominated by thermal/fossil fuel based power plant.

A risk based approach has been followed to perform this joint validation and verification activity. In the course of joint validation and verification, 07 Corrective Action request (CAR), 00 Clarification Requests (CLs) and No Forward Action Request (FAR) were raised and successfully closed. The review of the Project description, Monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and PP have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

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1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (hereafter referred as Applus+ Certification) has been appointed by “Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited” to perform the validation and verification of the “Bundled Solar Power Project by Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited” under VCS standard and guideline version 3.7. The objective of this validation and verification activity is to have an independent third party for the assessment of the project design and Monitoring report, and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- The project's baseline is assessed against “ACM0002 - Version 17.0”
- The project's monitoring plan is assessed against “ACM0002 - Version 17.0”
- The project's additionality justification is assessed against “Tool for the demonstration and assessment of additionality”, Version 07.0.0.
- The projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7
- CDM project standard for project activities Version 01.0
- CDM project cycle procedure for project activities Version 01.0
- VCS standard v3.7
- VCS guideline v3.7

Validation and verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of verified emission reductions (VERs).

1.2 Scope and Criteria

The scope of the validation and verification is the independent and objective review of the Project Document (PD) and Monitoring report (MR). The PD and MR are reviewed against the relevant criteria (see 1.1) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The validation and verification was based on the guidance given in the CDM validation and verification standard for project activities Version 01.0 and VCS guideline and standard version 3.7.

The assessment team has employed a risk based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the PD and MR. The main focus of the assessment team is to identify the significant risks for the project implementation and the generation of VERs. The validation and verification is not meant to provide any consulting towards the project

participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design and monitoring report combined. The only purpose of the validation and verification is its usage during the registration /issuance process as part of the VCS project cycle. Therefore, Applus+ Certification can't be held liable by any party for decisions made or not made based on the validation and verification opinion, which will go beyond that purpose.

Joint VCS PD & MR has been made publicly available from 21/02/2018 – 23/03/2018 on the VCS website, which initiates a 30 days global stakeholder consultation (GSC) process. No comments received during GSC.

1.3 Level of Assurance

The verification and validation has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS.

1.4 Summary Description of the Project

The purpose of the project activity is to generate power using renewable energy source (Solar power) and sell the power generated to the state grid. The project activity generates electricity by harnessing solar energy through installation of PV. The generated electricity is exported to the regional grid system which is under the purview of the INDIAN grid of India.

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited are the promoters of the proposed project activity. The project is a bundled project activity which involves installation of 20 MW solar project by Vector Green Sunshine Private Limited at Mansa district, Punjab and 25 MW solar power project by Polepally Solar Parks Private Limited at Mahabubnagar district, Telangana. The project has been commissioned on 24/03/2016 and 27/06/2016 respectively. The estimated emission reduction is to be approximately 70,073 tCO₂e per year by displacing 74,429 MWh/year of electricity from the generation-mix of power plants connected to the Indian grid.

The project activity is the installation of an environmentally safe and sound technology since there are no GHG emissions associated with the electricity generation. The project is located at is in the two states of India i.e. Punjab & Telangana. Installed capacity which is checked by the assessment team during the validation site visit i.e. 20 MW of Vector Green Sunshine Private Limited and 25 MW of Polepally Solar Parks Private Limited. The same is checked by the clearances received from state nodal agencies.

Verification purpose: The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited are the promoters of the proposed project activity. The project is a bundled project activity which involves installation of 20 MW solar project by Vector Green Sunshine Private Limited at Mansa district, Punjab and 25 MW solar power project by Polepally Solar Parks Private Limited at Mahabubnagar district, Telangana. The electricity generated will be sold to state electricity board.

Start date of the project activity is the 24/03/2016. The monitoring period for this VCS verification is chosen from 24/03/2016 - 31/01/2018 (including both days) and the project activity achieved 130024tCO₂e emission reductions during this monitoring period displacing 134,699 MWh amount of electricity from the generation-mix of power plants connected to the INDIAN grid, which is mainly dominated by thermal/fossil fuel based power plant. Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited are the promoters of the proposed project activity (project proponent). EKI

Energy Services Limited (hereafter referred as “EKIESL”) is acting as the other party for this project activity. They are acting as Project consultant for the project activity.

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

Validation and Verification Scope: The scope is defined as an independent and objective review of the project design document (PD) and Monitoring report (MR). The PD and MR is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board and VCS standard and guideline version 3.7, including the approved baseline and monitoring methodology “ACM0002 - Version 17.0”. The validation and verification was based on the requirements in the CDM validation and verification standard for project activities Version 01.0 and VCS guideline and standard version 3.7. The validation and verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the joint VCS PD & MR.

Validation and Verification Process: The project assessment is based on the CDM validation and verification standard for project activities Version 01.0 and VCS guideline and standard version 3.7 and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the VCS project activity are appointed.

Once the project is received by the assessment team, the members of the assessment team carried out:

- i. A desk review of the Joint Project Description & Monitoring Report;
- ii. Follow-up interviews with project participant and other stakeholders;
- iii. The resolution of outstanding issues and the issuance of the final Joint Validation & Verification Report and opinion.

The prepared combined validation and verification report and other supporting documents then undergo an internal quality control at the HQ (Accredited office) before being submitted to the VCS executive board. In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. Applus+ LGAI has developed a specific checklist customized for the project. The checklist demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from validating the identified criteria. The validation and verification checklist consists of three tables. The different columns in these tables are described in the tables below

Validation/Verification Checklist Table 1: Mandatory Requirements			
Requirement	Reference	Conclusion	Cross reference
The requirements which the	Gives reference to the	This is either acceptable based on evidence provided (OK), or a Corrective Action Request	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement

project must meet.	legislation or agreement where the requirement is found.	(CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the draft joint validation & verification report.	is verified. This is to ensure a transparent joint validation & verification process.
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Validation/Verification Checklist Table 2: Requirement checklist				
Checklist Question	Reference	Comment	Draft Conclusion	Final Conclusion
The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organized in several different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	The section is used to elaborate and discuss the question and/or the conformance to the question. It is further used to explain the conclusions reached.	Conclusions are presented based on the assessment of the first Joint PD & MR version. This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). Clarification is used when the assessment team has identified a need for further clarification. Forward action request to highlight issues related to project implementation that requires review during the first verification.	Conclusions are presented in the same manner based on the assessment of the final Joint PD & MR version and further documents including assumptions presented in the documentation.

Verification Checklist Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 1&2	Summary of project owner response	Validation/Verification conclusion
If the conclusions from the draft Validation & Verification are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 1&2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the assessment team should be summarized in this section.	This section should summarize the assessment team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

Appointment of the assessment team

According to the sectoral scopes / technical area and experiences in the sectoral or national business environment, Applus+ Certification has composed a project assessment team in accordance with the appointment rules in Applus+ Certification. The composition of assessment team has to 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 as below:

- Leader Auditor (LA)
- Auditor (A)
- Technical Experts (E)
- Internal Technical Review (ITR)

It is required that the sectoral scope / technical area related to the methodology has to be covered by the assessment team.

The detail regarding the assessment team is provided below in this report as Appendix 3

Document review

The Project Document and Monitoring report submitted by the Client was reviewed against the approved methodology and other relevant criteria to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done. A complete list of all documents and evidence material reviewed is included in this report below in appendix 1.

Follow-up interviews

A site visit is conducted by Applus+ Certification performed interviews, telephone conferences, and physical site inspection with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in this report.

Resolution of Clarification and Corrective Action Request

The objective of this phase of the Joint Validation & Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for Applus+ Certification's positive conclusion on the Joint PD & MR. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the joint Validation & verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final Joint PD & MR Version 03 submitted by PP on 21/03/2018 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Internal quality control

As final step of a joint validation & verification of the final documentation including the joint validation & verification report and the checklist have to undergo an internal quality control by the technical review committee, i.e. each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

After confirmation of the PP the positive joint validation & verification opinion and relevant documents are submitted to the VCS board through the VCS web-platform.

2.2 Document Review

The details of the document observed during the verification process are listed below in Appendix 1 of this report.

2.3 Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Srivastava	Ankit Kumar	Asst. Manager Projects (Vector Green)	09/03/2018 & 10/03/2018	Implementation of the project, monitoring and emission reduction calculations	Mr. Sukanta Das
2.	Das	Kingshuk	GMAst. Manager-Operations EKI Energy	09/03/2018 & 10/03/2018		
3.	-	Mukund	Villager	09/03/2018	Local stake holder meeting consultation	Mr. Sukanta Das
4.	Rao	J.P.	Villager	10/03/2018		

2.4 Site Inspections

Duration of on-site inspection: 09/03/2018 & 10/03/2018				
No.	Activity performed on-site	Site location	Date	Team member
1.	Assessment team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and Monitoring.	Punjab & Telangana	09/03/2018 & 10/03/2018	Mr. Sukanta Das
2.	Assessment team meet with the local stakeholder and confirmed that there is no grievance resulted from the project activity in and out of the project location. The stakeholder confirmed that the project resulted in employment and improves lifestyles of the personal/families in the nearby villages.	Punjab & Telangana	09/03/2018 & 10/03/2018	Mr. Sukanta Das

2.5 Resolution of Findings

The objective of this phase of the joint validation and Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for Applus+ Certification's positive conclusion on the project design and Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the validation/verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final combined PD and MR Version 03 submitted by PP on 21/03/2018 serves as the basis for the final assessment presented. Additional changes to the project during the validation and verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Areas of validation and verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	00	00	00
Description of project activity	00	02	00
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	00	00	00
- Deviation from methodology	00	00	00
- Clarification on applicability of methodology, tool and/or standardized baseline	00	00	00
- Project boundary	00	00	00
- Establishment and description of baseline scenario	00	00	00
- Demonstration of additionality	00	01	00
- Emission reductions	00	02	00
- Calibration details	00	00	00
- Monitoring plan	00	01	00
- Local Stakeholders consultation	00	01	00
Others (please specify)	00	00	00
Total	00	07	00

The list of findings and there resolution is presented in Appendix 2 of this report.

2.5.1 Forward Action Requests

No FAR was raised during this combined validation and verification process.

3 VALIDATION FINDINGS

3.1 Project Details

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited are the promoters of the proposed project activity. The project is a bundled project activity which involves installation of 20 MW solar project by Vector Green Sunshine Private Limited at Mansa district, Punjab and 25 MW solar power project by Polepally Solar Parks Private Limited at Mahabubnagar district, Telangana. The project has been commissioned on 24/03/2016 and 27/06/2016 respectively. The estimated emission reduction is to be approximately 70,073 tCO₂e per year by displacing 74,429 MWh/year of electricity from the generation-mix of power plants connected to the Indian grid. The Project Proponent plans to avail the VCS benefits for the Project.

In the Pre- project scenario the entire 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.

Solar PV Project Technology Details –

The project activity aims to harness solar energy through installation of PV with total installed capacity of 45 MW (AC).

The technical specification of 20 MW plant interconnection with grid on 24/03/2016 by Vector Green Sunshine Private Limited are as follows:

Sl. No.	Technical details of the equipment	Comments
1	Technology Used	Multi Crystalline
2	Number of modules installed	67760
3	Sources(s) of the modules installed	Renesola
4	Make & Number of Inverters	TMEIC- 23 Nos.
5	Make & Number of Power Transformers	CG- 10 MVA, 2 Nos.
6	Make & Number of Inverter Transformer	Esennar- 3MVA, 1.5 MVA, 750 MVA 7 Nos.
7	HT Panel	ABB
8	Make & Number of UPS	EMERSON, 8 Nos.

The technical specification of 25 MW plant interconnection with grid on 27/06/2016 by Polepally Solar Parks Private Limited are as follows:

Sl. No.	Technical details of the equipment	Comments
1	Technology Used	Multi Crystalline
2	Number of modules installed	290430 95Wp = 29880 (FS-395-PLUS) 97.5Wp = 189180 (FS-397-PLUS) 100WP = 71370 (FS-3100-PLUS)
3	Sources(s) of the modules installed	First Solar
4	Make & Number of Inverters	SMA- 30 Nos.
5	Make & Number of Power Transformers	Schneider Electric- 25/30 MVA, 1No.
6	Make & Number of Inverter Transformer	Silchar Technologies- 1.8 MVA 15 Nos.
7	HT Panel	Technocraft- 24 Nos.
8	LT Panel	Arrow Engineers- 16 Nos.
9	Make & Number of UPS	Delta, 3 Nos. (10KVA, 3KVA & 3KVA)

Project Crediting Period : The project activity follows below crediting period and the same is renewed.

Crediting Period Start date: 24/03/2016

Crediting Period End date: 23/03/2026

The project activity adopts renewable crediting period of 10 years period which can be renewed for maximum 2 times

The commissioning date of Project activity has been checked and the start date of crediting period is in line with commissioning date. This is found to be appropriate and accepted.

Project Ownership - Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited are the project proponents (PP) of project activity and they have the legal right to control and operate the project activities. The PP has submitted the commissioning certificates and Power Purchase Agreement and these documents clearly mentioned the name of respective PP

and clearly indicate that PP have legal right to control and operate the Project activity. This is found to be appropriate and is accepted.

Means of verification	The guideline for completing VCS Joint validation and verification Report template form version 03 for this project activity is checked by the assessment team. The location and geo-coordinates of the project activity is checked with commissioning certificates and same are verified during site visit. Further, start date of the project activity is verified from the commissioning certificate issued by Punjab Energy Development Agency & TSSPDCL and found correct. Technical specifications of Solar PV modules are verified during onsite visit with installed PV panels and model number.
Findings	The Joint Project Description & Monitoring Report version 01 submitted to the DOE were not in compliance with the directive of the Joint Project Description & Monitoring Report.
Conclusion	CAR 01 was closed based on revision in the PD and MR and in compliance with VCS form version 03 for this project activity. The PD and MR version 02 is thus acceptable to the assessment team.

3.2 Participation under Other GHG Programs

The project is not seeking registration under any other GHG programs. However, CAR 02 was raised regarding submission of Undertaking in effect of rejection by other GHG program, involvement in other GHG program, no compliance with an emission trading program, ownership of VCU & creation of another form of environmental credit etc. PP has submitted the undertaking and thus CAR closed successfully.

3.3 Application of Methodology

3.3.1 Title and Reference

Applied methodology: ACM0002: Grid-connected electricity generation from renewable sources - Version 17.0. Sectoral Scope: 01

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

The project activity also takes reference from following Tools from the tools prescribed by applied methodology:

- Methodological Tool: Tool to calculate the emission factor for an electricity system - Version 6.0, EB 97, Annex 7.

http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v6.pdf/history_view

- Methodological Tool: Tool for the demonstration and assessment of additionality - Version 07.0.0, EB 70 Annex 8.

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

3.3.2 Applicability

Applus+ Certification has assessed the relevant information contained in the PD and evidence obtained during on-site visit against the application criteria listed in the methodology. The applicability of this methodology is justified as below:

- The proposed project activity is a greenfield, grid connected renewable electricity generation project,
- The project activity is the installation of Solar power plant,
- The project does not involve capacity addition, a retrofit of (an) existing plant(s) or a replacement of (an) existing plant(s)
- Project activity does not involve switching from fossil fuels to renewable energy sources at the site of project activity
- The project does not involve combined heat and power generation activity
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.

Means of verification	The assessment team has validated the documentation referred to in the PD and verified the documentation content for verifying the justification of the applicability of the methodology and confirmed that the documentation referred to in the PD is correctly quoted and interpreted. The assessment team has also crosschecked the information provided in the PD with the documentation other than from the PD based on the local and sectoral knowledge of the assessment team. Following documentation has been reviewed by the assessment team: ▪ Site visit ▪ Interview with the concerned person mentioned in this report ▪ Technical detail analysis of the power plant from the documents submitted by the manufacturer. ▪ Commissioning certificates The assessment of the project's compliance with the applicability criteria of ACM0002 - Version 17.0 are documented in detail in joint VCS PD & MR.
Findings	Applicability criteria were explained properly as per the requirement of the applied approved methodology. No NC was raised during the validation process.
Conclusion	The applied baseline methodology is justified as it has been demonstrated that the proposed project activity is: • The proposed project activity is a greenfield, grid connected renewable electricity generation project, • The project activity is the installation of solar power plant, • The project does not involve capacity addition, a retrofit of (an) existing plant(s) or a replacement of (an) existing plant(s) • Project activity does not involve switching from fossil fuels to renewable energy sources at the site of project activity • The project does not involve combined heat and power generation activity • The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available. Applus+ Certification confirms that the application of the baseline methodology is transparent and conservative and confirms that the chosen baseline and monitoring methodology i.e. ACM0002 - Version 17.0 is applicable to the project activity.

3.3.3 Project Boundary

Means of verification	The project boundary as depicted in the Joint VCS PD & MR version 01 is checked during the validation site visit and also during the interview with the plant official.																								
Findings	No NC was raised during the validation process.																								
Conclusion	The spatial extent of project boundary diagram (including the metering system) referred by the methodology is now mentioned in the Joint VCS PD & MR as per the requirement of applied methodology and thus the same is acceptable to the assessment team. The below table mentions the emission source <table border="1"> <thead> <tr> <th></th><th>Source</th><th>GHGs</th><th>Included?</th><th>Justification/Explanation</th></tr> </thead> <tbody> <tr> <td rowspan="3">Baseline</td><td rowspan="3">INDIAN Grid</td><td>CO₂</td><td>Yes</td><td>Main emission source</td></tr> <tr> <td>CH₄</td><td>No</td><td>Minor emission source</td></tr> <tr> <td>N₂O</td><td>No</td><td>Minor emission source</td></tr> <tr> <td>Project</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> </tbody> </table>					Source	GHGs	Included?	Justification/Explanation	Baseline	INDIAN Grid	CO ₂	Yes	Main emission source	CH ₄	No	Minor emission source	N ₂ O	No	Minor emission source	Project	NA	NA	NA	NA
	Source	GHGs	Included?	Justification/Explanation																					
Baseline	INDIAN Grid	CO ₂	Yes	Main emission source																					
		CH ₄	No	Minor emission source																					
		N ₂ O	No	Minor emission source																					
Project	NA	NA	NA	NA																					

3.3.4 Baseline Scenario

Means of verification	The baseline scenario as depicted in the Joint VCS PD & MR version 01 is checked during the validation site visit and also during the interview with the plant official.			
Findings	No findings were raised.			
Conclusion	Being a grid connected Solar energy generation project, PP developed the project based on the Methodology ACM0002 - Version 17.0. As per Para 23 the methodology <i>“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”.</i> As per CDM validation and verification standard for project activities Version 01.0, <i>“The DOE shall determine whether the description of the identified baseline scenario in the PDD is in accordance with the selected standardized baseline”.</i> As the selected approved methodology clearly mention the baseline scenario and the same has been opted in this project, therefore, no further analysis on baseline is required. Validation Team, therefore, concludes that the PD conforms to the guidance given by EB via CDM validation and verification standard for project activities Version 01.0.			

3.3.5 Additionality

Means of verification	The cost of Solar Power plant, electricity tariff, O&M cost, depreciation, salvage value and tax rate have been checked with offer letters, purchase order, tariff order, Income Tax Act 1961, Power purchase agreement, third party PLF report and financial analysis sheet. During the validation site visit validation team interviewed the personal and confirms that the input parameters considered is appropriate and correct.			
Findings	Assessment team raised concern regarding the additionality and supporting document. The detail of the same is mentioned as CAR 03 in this report and the same is closed successfully			
Conclusion	During conceptualization of the project activity, board of directors of the project proponents considered the GHG revenue to improve the project financials. During the board meeting dated 12/10/2015 & 12/09/2015, board of Directors of Vector Green & Polepally Solar respectively decided that they would consider GHG revenue for their project activity. In continuation to the board decision, PP received offer letter and then after subsequent decision with the manufacturer placed the purchase order for procuring of the Solar power plant. <i>In the above background Validation Team concludes that the additionality justification regarding the serious CDM/VCS consideration given by the project developer is in accordance with the requirements derived from CDM validation and verification standard for project</i>			

activities Version 01.0. PD mentioned that the project would not be economically or financially feasible without the revenue from the sale of verified emission reductions (VERs). The claim of the project developer has been assessed by the Validation Team through the following steps:

a) Suitability of investment analysis, financial indicator and benchmark:

Project developer had demonstrated that the financial returns of the proposed VCS project activity would be insufficient to justify the required capital investment as per CDM validation and verification standard for project activities Version 01.0. In the Joint VCS PD & MR version 01, PP has adopted a conservative approach to identify the benchmark for the project activity. The project is earning revenue from the installation of the project activity. Thus simple cost analysis is not appropriate. Also in the absence of the project activity grid electricity would have been the obvious choice for the Project which requires no investment.

Hence investment analysis is also not appropriate for the project activity. Therefore, benchmark analysis is used for the project activity as per project type and decision making context. As per Para 12 of the Guidance to Investment Analysis states that required returns on equity is appropriate benchmark for Equity IRR. Therefore, the Expected return on equity is considered appropriate benchmark. Accordingly, the post tax Equity IRR has been considered as the relevant financial indicator for the project activity. PP at first identified the benchmark using the guideline vide EB97, Annex 8, "The values in the table in Appendix A may also be used, as a simple default option". However, since RBI (Reserve Bank of India, India Central Bank) provides forecast inflation for both 5 & 10 years, the project investor has calculated benchmark using both the durations and the most conservative value is considered as benchmark for the project activity. The WPI median inflation forecast for 5 years and 10 years are added to the default values for the project participant as per the requirement of EB97, Annex 8. The benchmark for the project is as follows:

For the 20 MW Solar Project by Vector Green Sunshine Private Limited

Benchmark Calculations	Value
Default Value for India as per UNFCCC guidelines	11.10%
Inflation forecast (WPI Mean) as per RBI for 10 yrs	3.60%
Benchmark (with 10 yrs Forecast)	15.10%

For the 25 MW Solar Project by Polepally Solar Parks Private Limited

Benchmark Calculations	Value
Default Value for India as per UNFCCC guidelines	11.10%
Inflation forecast (WPI Mean) as per RBI for 10 yrs	3.50%
Benchmark (with 10 yrs Forecast)	14.99%

b) Parameters and assumptions used:

The project activity is a renewable source of electricity generation and supplies the electricity to the INDIAN grid. The total installed capacity of the project activity is 45 MW. The key parameters which determine the Equity IRR of the project activity are project cost, PLF and profitability estimates.

In the Joint VCS PD & MR version 01, the project cost is based on the DPR of the project. Same have been submitted to validation team.

Project cost as per the DPR & Audit Report

Site Name	Name of the Investor/Owner	Project Cost (In Million)	DPR Date
Punjab	Vector Green Sunshine Private Limited	1711.03	07/09/2015

Telangana	Polepally Solar Parks Private Limited	2080.70	21/08/2015
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Project cost as per Balance Sheet/Audit Report

Site Name	Name of the Investor/Owner	Project Cost (In Million)	Audit Report Date
Punjab	Vector Green Sunshine Private Limited	1536.80	As on 31/03/2017
Telangana	Polepally Solar Parks Private Limited	1907.22	As on 31/03/2017

The DPR was available during decision making and financial profitability of the project was decided based on this DPR. Validation team checked DPR of the project activity and found that consideration of the project cost in PD is correct and it is in line with EB97, Annex 8 as well as in compliance to CDM validation and verification standard for project activities Version 01.0. Hence, the project cost consideration is justified.

Further, signed purchase orders have been checked by the assessment team as the actual cost is available during the validation. The IRR calculated with the purchase order and it does not breach the benchmark. The variation in purchase and DPR is taken care in sensitivity analysis and the approach is considered correct by the assessment team. The profitability of the project, which forms the basis for IRR calculation is based on installed capacity, PLF, electricity tariff, O&M cost, depreciation and taxation. The installed capacity is based on the capacity of Solar Power plant, which is evidenced by the DPR, purchase orders issued subsequently.

c) Assessment of Plant Load Factor (PLF):

PP considered the Plant load factor from DPR, for expected electricity generation estimation. They are contracted by the PPs for this project. PP has submitted the copies of the PLFs estimation report to the assessment team.

Site Name	Name of the Investor/Owner	PLF (%)= 3 rd party engineering company
Punjab	Vector Green Sunshine Private Limited	19.22%
Telangana	Polepally Solar Parks Private Limited	18.80%

d) Assessment of Electricity Tariff:

The tariff is based SERC tariff policy.

Tariff rate as per actual PPA and SERC (= State Electricity regulatory commission)

Site Name	Name of the Investor/Owner	Tariff Rate (as per SERC)	Tariff Rate (as per PPA)	PPA Date
Punjab	Vector Green Sunshine Private Limited	7.45	7.45	31/03/2015
Telangana	Polepally Solar Parks Private Limited	6.49	6.49	29/05/2014

Validation team assessed the tariff order and found that same value was available during decision making and in conformity with EB97, Annex 8. Furthermore, assessment team has also checked the actual tariff in the power purchase agreement signed for further substantiation as these values are available during the validation stage. The consideration of tariff rate mentioned in the power purchase agreement also does not breach the benchmark and hence the project is still additional.

e)Assessment of O& M cost:

During submission of Joint VCS PD & MR version 01, PP considered the O&M cost from the DPR. The DPR value has been used in the financial calculation as same was available during decision making and hence applicable. According to EB97, Annex 8, the cost should be based on the input parameters available at the time of decision making and the PP have submitted DPR supporting this consideration.

Therefore, considering the above assessment, validation team concluded that the O&M cost considered from respective DPR in the computation of financial indicator is in conformity with EB97, Annex 8.

f) Assessment of Tax computation:

The project developer has adopted book depreciation rates as per Schedule XIV of the Companies Act, 1956 for computing book profit and Income Tax Act 1961 stipulated for income tax calculation, which are in conformity with the accepted accounting principles adopted by the company and income tax laws in the host country. The block of assets has been computed for depreciation purpose as per the accepted accounting principles. Tax liability has been calculated as per the income tax rules and the rulings given. In computing the income tax liability, the project developers have considered Tax holiday (u/s 80IA of the Income Tax Act, 1961). Accelerated depreciation on plant and machinery is also sourced from IT act. The tax rates assumed corresponds to the tax rate prevailing at the time of taking decision (conformity to EB97, Annex 8). Hence, these assumptions are appropriate during decision making context.

g) Cross checking parameters:

The cost of project, electricity tariff, O&M cost, depreciation, salvage value and tax rate have been checked with DPR, tariff order, Income Tax Act, power purchase agreement. The DPR value has been used in the financial calculation as same was available during decision making and hence applicable. According to EB97, Annex 8, the O&M cost should be based on the input parameters available at the time of decision making and the PP have submitted DPR supporting this consideration. There is no difference in the value used for O&M in the IRR sheet and the offer DPR. The same is acceptable to the assessment team. The project developer has adopted book depreciation rates as per Schedule XIV of the Companies Act, 1956 for computing book profit and Income Tax Act 1961 stipulated for income tax calculation, which are in conformity with the accepted accounting principles adopted by the company and income tax laws in the host country. The tariff is based SERC tariff policy.

There is no difference in the value used for tariff in the IRR sheet and the SERC order. The documents supporting the financial calculations, in the opinion of Validation Team, are therefore authentic and conform to the guidance given by EB. CAR was raised as non-conformities and they were either set right. With the corrections having been incorporated, the input costs considered conform to guidance on investment analysis issued by EB. All the input parameters considered in computation, the basis, correctness and appropriateness thereof are checked and found correct.

h) Assessment of correctness of computation:

The assessment involved checking the data input taken from DPR, tariff order, adoption of correct accounting principle and arithmetical accuracy. Validation Team checked the documents and ensured that appropriate input has been taken in the project cost and projections. Based on the CAR, corrections were incorporated or issues were clarified. The arithmetical accuracy was also found to be correct. The equity IRR has been computed for a period of 25 years, which is the life time of the project and is in conformity with the EB97, Annex 8. As required by EB97, Annex 8 the expected realization on the sale of assets at the end of the operating life has been taken as salvage value in the terminal year. In computing the IRR, the project developer has taken into account profit after tax, depreciation tax shield and salvage value (in the terminal year). The principle adopted conforms to the accepted accounting and taxation principles. Validation team also confirms that rest of the input parameters are considered appropriately and are in line with EB97, Annex 8. Therefore, from the above arguments/ justifications it is evident that the project is not business as usual scenario and requires CDM /VCS benefits to sustain.

Sensitivity analysis:

The Guidance on Assessment of Investment Analysis requires the robustness of the conclusion arrived at to be proved through a sensitivity analysis by varying the critical assumptions to a reasonable variation. The project developer has identified Plant Load Factor (PLF), Project cost, Electricity tariff and O&M cost as critical assumptions. These critical parameters constitute more than 20% of either total project costs or total project revenues. The sensitivity analysis reveals that even under more favorable conditions, the IRR without CDM revenue would not cross the benchmark return as given in the following

table:

Vector Green Sunshine Private Limited

Sensitivity Analysis	Equity IRR			
Variation %	-10%	Normal	10%	Breaching Value
PLF	2.66%	6.76%	11.61%	16.32%
O&M	8.16%	6.76%	5.34%	-57.69%
Project Cost	10.74%	6.76%	4.28%	-18.53%
Tariff Rate	2.66%	6.76%	11.61%	16.32%

Polepally Solar Parks Private Limited

Sensitivity Analysis	Equity IRR			
Variation %	-10%	Normal	10%	Breaching Value
PLF	6.72%	9.93%	13.90%	12.90%
O&M	10.39%	9.93%	9.53%	-121.06%
Project Cost	13.86%	9.93%	7.34%	-12.63%
Tariff Rate	6.72%	9.93%	13.90%	12.90%

a) Project Cost

The proposed project activity consists of two investors. The details are given below.

Name of the Investor/Owner	Project Capacity (MW)	Project Cost (In Million)	Project cost in Million per MW
Vector Green Sunshine Private Limited	20 MW	1711.03	95.55
Polepally Solar Parks Private Limited	25 MW	2080.70	83.23

The project cost has been considered from DPR and was available at the time decision made for the project activity.

The DOE has also checked the actual cost of the each project site from the Audit Report and found that few project sites, the reduction in project cost is within 10% range of sensitivity analysis. Since the comparison is done with actual project cost and hence increase of the same in future is not possible. Thus the project activity is additional with actual project cost.

Site Name	Name of the Investor/Owner	Project Capacity (MW)	Project Cost (In Million)- Actual from Audit Report	Project Cost (In Million) per MW- Actual from Audit Report
Punjab	Vector Green Sunshine Private Limited	20 MW	1536.80	76.84
Telangana	Polepally Solar Parks Private Limited	25 MW	1907.22	76.29

The difference in actual project cost for different project site is due to time difference, manufacturer, different EPC contractor, negotiation skills of individual PP etc.

The assessment team also checked different states tariff orders and found that project cost considered

for project is found to be appropriate.

Based on sectoral scope expert and local knowledge, the project cost considered as per DPR for the proposed project activity is found to be appropriate for solar projects. Also since the actual cost is available to DOE and IRR is still within benchmark and thus the same is acceptable.

The IRR as per the assumption from the DPR is as follows:

Site Name	Name of the Investor/Owner	Project Capacity (MW)	Project Cost (In Million)	IRR	Benchmark
Punjab	Vector Green Sunshine Private Limited	20 MW	1711.03	6.76%	15.10%
Telangana	Polepally Solar Parks Private Limited	25 MW	2080.70	9.93%	14.99%

The IRR as per the actual project cost is defined as below:

Site Name	Name of the Investor/Owner	Project Capacity (MW)	Actual project cost as per the PO	IRR	Benchmark
Punjab	Vector Green Sunshine Private Limited	20 MW	1536.80	10.56%	15.10%
Telangana	Polepally Solar Parks Private Limited	25 MW	1907.22	13.14%	14.99%

As described above actual project cost with benchmark, the project is still additional. Since the comparison is done with actual project cost, the increase of the same in future is not possible. Thus assessment team is of the opinion that project is still additional with the consideration of actual project cost for the project activity.

b) O&M Costs:

The proposed project activity consists of two investors. The details are given below.

Name of the Investor/Owner	Project Capacity (MW)	O&M (In Million)
Vector Green Sunshine Private Limited	20 MW	50
Polepally Solar Parks Private Limited	25 MW	20

The O&M cost has been considered from Offer Letter and was available at the time decision made for the project activity.

The DOE has also checked the actual O&M contract for each project site and found the changes in O&M cost is within threshold limit. Thus the project activity is additional with actual O&M cost.

Site Name	Name of the Investor/Owner	Project Capacity (MW)	O&M (In Million) (Without tax)- Actual
Punjab	Vector Green Sunshine Private Limited	20 MW	48.33
Telangana	Polepally Solar Parks Private Limited	25 MW	19.06

The difference in actual O&M cost for different project site is due to time difference, manufacturer, different EPC contractor, negotiation skills of individual PP etc.

The assessment team also checked different states tariff orders and found that O&M cost and its escalation considered for project is found to be appropriate.

IRR value as per the assumptions from the DPR is as below:

Name of the Investor/Owner	Project Capacity (MW)	O&M (In Million)	IRR	Benchmark
Vector Green Sunshine Private Limited	20 MW	50	6.76%	15.10%
Polepally Solar Parks Private Limited	25 MW	20	9.93%	14.99%

IRR value based on the actual O&M agreements signed is as below:

Site Name	Name of the Investor/Owner	Project Capacity (MW)	O&M (In Million) (Without tax)- Actual	IRR	Benchmark
Punjab	Vector Green Sunshine Private Limited	20 MW	48.33	7.23%	15.10%
Telangana	Polepally Solar Parks Private Limited	25 MW	19.06	10.14%	14.99%

Benchmark for the project as described above along with actual O&M value, the project is still additional. Based on sectoral scope expert and local knowledge, the project O&M cost and its escalation considered as per Offer Letter for the proposed project activity is found to be appropriate for solar projects. Also since the O&M cost is available to DOE and IRR is still within benchmark and thus the same is acceptable.

c) Tariff:

The proposed project activity consist of two investors. The details are given below.

The Tariff rate has been considered from central tariff order as both Punjab & Telangana state follow the CERC tariff order and the same was available at the time decision made for the project activity.

The DOE has also checked the actual PPA for each project site and found there are no changes in tariff rate and is within threshold limit. Thus the project activity is additional with actual Tariff rate.

Site Name	Name of the Investor/Owner	Tariff Rate (as per CERC)	Tariff Rate (as per PPA)
Punjab	Vector Green Sunshine Private Limited	7.04	7.45
Telangana	Polepally Solar Parks Private Limited	7.04	6.49

The CERC tariff order has been checked and found that tariff rate considered for the project activity are appropriate.

<http://cercind.gov.in/2015/orders/SO4.pdf>

The tariff considered is levelized tariff and hence there is no any escalation. This is found to be appropriate and found to be accepted.

IRR value as per the actual PPA signed between Individual project owners and State electricity Board is as below:

Site Name	Name of the Investor/Owner	Tariff Rate (as per PPA)	IRR
Punjab	Vector Green Sunshine Private Limited	7.45	6.76%
Telangana	Polepally Solar Parks Private Limited	6.49	9.93%

Since the IRR is still below benchmark with the consideration of Actual Power purchase agreement

signed which is valid for total operational lifetime of the project, assessment team confirms that the project is still additional with actual Tariff rate. Moreover, in the above table the order from State electricity tariff order is checked and it is confirmed that PPA signed with the rate as mentioned in the Tariff order and hence increase of the same is not possible.

Based on sectoral scope expert and local knowledge, the project tariff rate considered as per state tariff order for the proposed project activity is found to be appropriate for solar projects.

d) **PLF:**

The proposed project activity consists of two investors. The details are given below.

Name of the Investor/Owner	Project Capacity (MW)	PLF (%)
Vector Green Sunshine Private Limited	20 MW	19.22%
Polepally Solar Parks Private Limited	25 MW	18.80%

Validation team assessed the DPR. Same report has been used in the financials and the emission reduction calculation. PLF estimation by 3rd party engineering company is in line with Para 3 (b) Annex 11, EB 48 and acceptable to the assessment team.

Both Punjab & Telangana state follow CERC tariff order, and the same has been checked and found that PLF considered for the project activity in within the range of sensitivity analysis and found to be appropriate.

<http://cercind.gov.in/2015/orders/SO4.pdf>

Based on sectoral scope expert and local knowledge, the project PLF considered as per DPR for the proposed project activity is found to be appropriate for solar projects.

IRR for PLF value as per the DPR = 3rd party report, Annex 11 EB 48

Name of the Investor/Owner	Project Capacity (MW)	PLF (%)	IRR
Vector Green Sunshine Private Limited	20 MW	19.22%	6.76%
Polepally Solar Parks Private Limited	25 MW	18.80%	9.93%

IRR as per the PLF value of the Tariff orders= Third party CERC (=Central electricity regulatory commission) order. The details link are given above:

Name of the Investor/Owner	Project Capacity (MW)	PLF (%) - As per the tariff order of Central electricity regulatory commission	IRR
Vector Green Sunshine Private Limited	20 MW	19%	6.27%
Polepally Solar Parks Private Limited	25 MW	19%	10.36%

Assessment team confirms that since with the value as mentioned in the tariff order for Central Electricity regulatory commission report are considered and still the IRR is still below the benchmark, hence the project is additional.

Assessment team also confirmed the breaching values for individual parameters (=Individual project owners) and thus confirms that the project is still additional

Site Name	Name of the Investor/Owner	PLF in DPR	Tariff order PLF	Variation in PLF	Breaching Value for PLF
Punjab	Vector Green Sunshine Private Limited	19.22%	19%	1%	16.32%
Telangana	Polepally Solar Parks Private Limited	18.80%	19%	-1%	12.90%

Site Name	Name of the Investor/Owner	Offer Letter Cost	Actual PO Cost	Variation in project cost	Breaching value for Project Cost
Punjab	Vector Green Sunshine Private Limited	1711.03	1536.80	10%	-18.53%
Telangana	Polepally Solar Parks Private Limited	2080.70	1907.22	8%	-12.63%

Site Name	Name of the Investor/Owner	SERC Tariff	PPA Tariff	Variation in Tariff	Breaching value in Tariff Rate
Punjab	Vector Green Sunshine Private Limited	7.04	7.45	6%	16.32%
Telangana	Polepally Solar Parks Private Limited	7.04	6.49	-8%	12.90%

Site Name	Name of the Investor/Owner	DPR O&M cost / MW	Actual O&M cost/MW	Variation in O&M	Breaching value in O&M
Punjab	Vector Green Sunshine Private Limited	2.5	2.41	3%	-57.69%
Telangana	Polepally Solar Parks Private Limited	0.8	0.76	5%	-121.06%

Considering the above assessment on additionality demonstration, benchmark selection, appropriateness of parameters used and correctness of financial calculations, Validation Team concludes that the project scenario is not economically feasible without benefits from CER sales. Hence, validation team confirms that CER revenues alleviate the project feasibility.

Common practice analysis is checked with the following steps:

Stepwise approach for common practice analysis has been carried out as per Methodological tool "Common Practice", version 03.1 EB84, Annex 7:

- (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.

For the concerned project activity, Common Practice Analysis has been carried out separately for Vector Green Sunshine Private Limited (20 MW capacity) and Polepally Solar Parks Private Limited (25 MW capacity).

1. Common Practice Analysis for Vector Green Sunshine Private Limited

Stepwise approach for common practice analysis has been carried out as per Methodological tool "Common Practice", version 03.1 EB 84, Annex 7:

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

Range	Capacity	Unit
+50%	30	MW
Capacity of the proposed project activity	20	MW
-50%	10	MW

Step (2): Identify similar projects (both CDM and non-CDM) which fulfil 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.

Identification of the similar projects (CDM and non-CDM) is carried out as per sub-steps of Step (2) as follows:

- a) As the projects are located in Punjab state of India, therefore, projects in the geographical area of Punjab have been chosen for analysis. The project activity involves generation of electricity from solar energy. The project activity is located in the state of Punjab in India and the policy applicable for the solar projects is regulated by Punjab state policy. The policies/tariff for each state is regulated by State

	Electricity Regulatory Commissions of respective states and they differ for respective states. The project implemented in different states is claimed as different since the policies and regulations differ in each state. Each state has different policies regarding renewable energy, hence Punjab state is considered as geographical region for common practise analysis. b) The project activity is a green-field solar power project and uses measure (b) “Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies”. Therefore, projects applying same measure (b) are candidates for similar projects. c) The energy source used by the project activity is solar. Hence, only solar energy projects have been considered for analysis. d) The project activity produces electricity; therefore, all power plants that produce electricity are candidates for similar projects. e) The capacity range of the projects is within the applicable capacity range from 10 MW to 30 MW. f) The start date of the project activity is 24/03/2016. Therefore projects, which have started commercial operation before 24/03/2016, have been considered for analysis. Numbers of Similar projects identified, which fulfil above-mentioned conditioned are $N_{\text{solar}} = 11$ The CPA has been done in a separate excel spreadsheet. The same has been shared to the DOE. 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}. CDM project activities, which have got registered or are under validation have been excluded in this step. The list of the power plants identified is provided to the DOE. After excluding the registered and under validation projects the total number of projects. $N_{\text{all}} = 2$ 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}. As per the tool on Common Practice, the project activities have been separated from the different technologies on the basis two criteria: 1. Size of Installation – Since project activity is large scale project, small and micro scale projects are considered as different technology project. Based on this criteria, there are no any different technology project out of similar identified projects. 2. Investment climate on the date of the investment decision – The solar projects developed under different phases and different batches of National Solar Mission (NSM) can considered as different
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technology projects. For proposed project activity, there are no any different technology project considered out of similar identified projects.

Hence, projects where either of the conditions is satisfied those projects are counted for calculating N_{diff} projects.

$$N_{diff} = 0$$

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.

$$\text{Calculate } F=1-N_{diff}/N_{all}$$

$$F = 1-(0/2) = 1$$

As per methodological tool “common practise” version 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.

Thus if both conditions are fulfilled, then project activity will be a common practise otherwise, the project activity is treated as not a common practise.

Outcome of Common Practise analysis:

As,

i. $F = 1$; is greater than 0.2

ii. $N_{all} - N_{diff} = 2$; is not greater than 3

The project activity does not satisfy second condition. Hence, project activity is not a common practice.

Thus, the proposed project activity is not a “common practice” within a sector in the applicable geographical area.

The above discussions show that solar power development is not a common practice and the project activity is not financially attractive; hence the project activity is additional.

2. Common Practice Analysis for Polepally Solar Parks Private Limited

Stepwise approach for common practice analysis has been carried out as per Methodological tool “Common Practice”, version 03.1 EB 84, Annex 7:

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

Range	Capacity	Unit
+50%	37.5	MW

Capacity of the proposed project activity	25	MW
-50%	12.5	MW

Step (2): Identify similar projects (both CDM and non-CDM) which fulfil 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.

Identification of the similar projects (CDM and non-CDM) is carried out as per sub-steps of Step (2) as follows:

- a) As the projects are located in Telangana state of India, therefore, projects in the geographical area of Telangana have been chosen for analysis. The project activity involves generation of electricity from solar energy. The project activity is located in the state of Telangana in India and the policy applicable for the solar projects is regulated by Telangana state policy. The policies/tariff for each state is regulated by State Electricity Regulatory Commissions of respective states and they differ for respective states. The project implemented in different states is claimed as different since the policies and regulations differ in each state. Each state have different policies regarding renewable energy, hence Telangana state is considered as geographical region for common practise analysis.
- b) The project activity is a green-field solar power project and uses measure (b) "Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies". Therefore, projects applying same measure (b) are candidates for similar projects.
- c) The energy source used by the project activity is solar. Hence, only solar energy projects have been considered for analysis.
- d) The project activity produces electricity; therefore, all power plants that produce electricity are candidates for similar projects.
- e) The capacity range of the projects is within the applicable capacity range from 12.5 MW to 37.5 MW.
- f) The start date of the project activity is 27/06/2016. Therefore projects, which have started commercial

	operation before 27/06/2016, have been considered for analysis. Numbers of Similar projects identified, which fulfil above-mentioned conditioned are $N_{\text{solar}} = 10$ The CPA has been done in a separate excel spreadsheet. The same has been shared to the DOE. 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}. CDM project activities, which have got registered or are under validation have been excluded in this step. The list of the power plants identified is provided to the DOE. After excluding the registered and under validation projects the total number of projects. $N_{\text{all}} = 3$ 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}. As per the tool on Common Practice, the project activities have been separated from the different technologies on the basis two criteria: 1. Size of Installation – Since project activity is large scale project, small and micro scale projects are considered as different technology project. Based on this criteria, there are no any different technology project out of similar identified projects. 2. Investment climate on the date of the investment decision – The solar projects developed under different phases and different batches of National Solar Mission (NSM) can considered as different technology projects. For proposed project activity, there are no any different technology project considered out of similar identified projects. Hence, projects where either of the conditions is satisfied those projects are counted for calculating N_{diff} projects. $N_{\text{diff}} = 0$ Step (5): Calculate factor $F = 1 - N_{\text{diff}}/N_{\text{all}}$ 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. Calculate $F = 1 - N_{\text{diff}}/N_{\text{all}}$ $F = 1 - (0/3) = 1$ As per methodological tool “common practise” version 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 $N_{\text{all}} - N_{\text{diff}}$ is greater than 3.
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	Thus if both conditions are fulfilled, then project activity will be a common practise otherwise, the project activity is treated as not a common practise. Outcome of Common Practise analysis: As, i. $F = 1$; is greater than 0.2 ii. $N_{all} - N_{diff} = 3$; is not greater than 3 The project activity does not satisfy second condition. Hence, project activity is not a common practice. Thus, the proposed project activity is not a “common practice” within a sector in the applicable geographical area. <i>The above discussions show that solar power development is not a common practice and the project activity is not financially attractive; hence the project activity is additional.</i>
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3.3.6 Quantification of GHG Emission Reductions and Removals

Means of verification	The emission reduction sheet, CEA database and Joint VCS PD & MR version 01 is checked by the assessment team.
Findings	Assessment team raised concern regarding the calibration frequency of monitoring meters and value of net electricity export value. The detail of the same is mentioned as CAR 05 in this report and the same is closed successfully
Conclusion	The baseline emissions as discussed in Joint VCS PD & MR will include emissions that would have occurred in the absence of the project activity. The emission reduction calculation has been done as per the methodology ACM0002 - Version 17.0. $BE_y = EG_{PJ,y} * EF_{grid,CM,y}$ Where, BE_y = Baseline emissions in year y (t CO₂/yr) $EG_{PJ,y}$ = 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/yr) $EF_{grid,CM,y}$ = 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) PP has estimated the baseline energy generation considering the capacity of the project activity, yearly generation hour and plant load factor. Validation team assessed the technical specification of the promoters of the project activity, Further, PP considered the PLF of the project activity from DPR. Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors according to the procedure prescribed in the “Tool to calculate the emission factor for an electricity system” version 6.0 and OM & BM values are sourced from Baseline CO₂ Emission Database, Version 12.0 published by Central Electricity Authority (CEA), Government of India and forms the part of emission reduction calculation. The baseline emission factor calculation is checked by the

validation team and found that the calculation is transparent and conservative.

The combined margin of the Indian grid used for the project activity is as follows:

Parameter	Value	Nomenclature	Source
$EF_{grid,CM,y}$	0.9653 tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO ₂ Emission Database, Version 12.0 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,OM,y}$	0.9843 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 12.0, published by Central Electricity Authority (CEA), Government of India
$EF_{grid,BM,y}$	0.9083 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 12.0, published by Central Electricity Authority (CEA), Government of India

$EF_{grid,CM,y} = 0.9653$ tCO₂e/MWh and it is fixed ex ante for the crediting period. Considering this process, combined margin emission factor has been considered and same value is confirmed correct.

The combined margin grid emission factor (which is determined based on operating margin and built margin) is only ex-ante parameter which is fixed for first crediting period. Central Electricity Authority (CEA), Government of India published the database the emission factor for grid connected power plants in the document "Baseline CO₂ Emission Database, Version 12.0". These document is the latest document available at the time of VCS PD finalization and published by Government of India as per Tool to calculate the emission factor for an electricity system. Thus the data considered for the operating margin (OM), Built margin (BM) and calculations of combined margin emission factor is found to be authentic and found to be appropriate as per Tool to calculate the emission factor for an electricity system.

Project Emissions

As per para 36 of ACM0002 - Version 17.0 $PE_y = 0$.

Leakage

As per applied methodology, no other leakage emissions are considered..

The project activity reduces carbon dioxide emissions through displacement of grid electricity generation with predominantly fossil fuel based power plants by renewable electricity. The emission reduction (ER_y) due to project activity during a given year y is calculated as the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage, as per the formulae given below:

	$ER_y = BE_y - PE_y$ Where, ER_y = Emission Reduction in tCO₂/year BE_y = Baseline emission in tCO₂/year PE_y = 0 for the project activity as per the methodology. Therefore, $ER_y = BE_y$.
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3.3.7 Methodology Deviations

No methodology deviation is sought for the project activity.

3.3.8 Monitoring Plan

Means of verification	Assessment team checked the monitoring practice onsite and also checked the guideline of Madhya Pradesh Electricity Regulatory Commission.
Findings	Assessment team raised concern regarding the Monitoring and supporting document. The detail of the same is mentioned as CAR 04 in this report and the same is closed successfully.
Conclusion	Parameters determined ex-ante: Baseline emission factor of INDIAN Grid is establish ex-ante based on Tool to calculate the grid emission factor, using a combined approach consisting 75 % operating margin and 25 % build margin. The emission coefficient from official data published in Central Electricity Authority (CEA) CO₂ Baseline database available to the project participant at the time of submission of PD for validation and global stakeholder's consultation process. CEA is an official source of Ministry of Power, Government of India have worked out baseline as CO₂ baseline database. The assumption were verified by the validation team and found to be correct. Parameters determined ex-post: The parameters monitored ex-post involves net electricity supplied to the grid (calculated from electricity exported and imported) to the INDIAN grid by the project activity. As per the Joint VCS PD & MR (version 02), the JMR provided by State Utility are the source of the monthly values of net electricity supplied by the project activity. The DOE will use the same source for verification of emission reductions. State Utility is a Government Organization responsible for distribution of electricity, with no interests in the Project Activity. As per the applied methodology ACM0002 - Version 17.0 "Monitoring shall consist of metering the net electricity supplied by the project activity to the grid. Measurement results shall be cross-checked with records for sold electricity/electricity bills". In accordance with the methodology requirement, net electricity supplied by the project activity is obtained from the JMR statement provided by State Utility and form the forms the basis for emission reduction calculation. Electricity export to the grid and import from the grid is metered by main and check tri-vector energy meters. The meter readings is taken jointly on a fixed day of every month for the preceding month at the delivery point and signed by the representatives of state utility and O&M personnel. In the event of failure of main meter, the check meter will be used in monitoring the electricity data. Calibration of all the meters is done by state electricity board officials as per the

	industry standards. However, the calibration will be done once in a 5 year. The energy meter recording the export and import from the grid at substation is under the control and supervision of state electricity board officials. Similarly O&M contractor is responsible for monitoring of the generation data at CMS. It is reported that the data will be kept for 2 years following the end of the crediting period. The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the site visit.
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3.4 Non-Permanence Risk Analysis

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
n/a	n/a	n/a	n/a	n/a

4 SAFEGUARDS

4.1 No Net Harm

No potential environment or socio economic matter was found during the site visit. The project is renewable energy project and thus no negative impact observed in Air or water quality onsite.

4.2 Environmental Impact

Means of verification	The guideline provided by MOEFCC is checked by the assessment team http://envfor.nic.in/legis/eia/so1533.pdf
Findings	NA
Conclusion	The project activity is expected to have positive impacts and no significant adverse environmental impacts are foreseen. Since, the project activity is an electricity generation from renewable source (i.e. solar energy) therefore no negative impact are envisaged. There is no mandatory legal requirement for carrying out an environmental impact assessment in the host country. The Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India (GoI) notification dated September 14, 2006 regarding the requirement of Environment Impact Assessment (EIA) studies states that any project developer in India needs to file an application to the Ministry of Environment and Forests (including a public hearing and an EIA) in case the proposed industry or project is listed in a predefined list. The list includes thirty nine project activities that require EIA studies. The solar power projects are not included in this list and thus an EIA study is not required.

4.3 Local Stakeholder Consultation

Means of verification	The local stakeholder consultation MOM, attendance sheet is checked by the assessment team. During the validation site visit assessment team also interviewed some of the stakeholder present during the meeting with PP.
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Findings	CAR 05 related to Local Stakeholders Consultation documents submission and same was successfully closed after submission of requisite documents.
Conclusion	As per the CDM/VCS requirements, it is necessary to invite the relevant stakeholders, before the validation process starts. All the stakeholders have been invited through public notices to attend the stakeholders meeting. The local stakeholder consultation meeting was conducted on 20/05/2016 for Vector Green & 22/08/2016 for Polepally Solar Parks and attended by local persons including local villagers, local vendors and technology suppliers. The stakeholders identified by the project participant were local villagers who are the major population of the particular area, local communities and gram panchayat (Village head), project proponent representatives and other people involved in the project. Validation team verified the list of participants who attended the stakeholder meeting and feedback questionnaire and confirms the stakeholders identified are relevant. The validation team also verified the minutes of meeting to note that no negative comments were received and the same was cross checked with the information obtained during follow up interviews with the stakeholder's. Thus Validation team is of the opinion that the stakeholder meeting was adequate and appropriate.

4.4 Public Comments

Means of verification	The local stakeholder consultation MOM, attendance sheet is checked by the assessment team. During the validation site visit assessment team also interviewed some of the stakeholder present during the meeting with PP.
Findings	CAR 05 related to Local Stakeholders Consultation documents submission and same was successfully closed after submission of requisite documents.
Conclusion	The project received positive comments from stakeholders and related employment opportunities and infrastructure development in the project region. Since there were no negative comments received from the stakeholders, therefore, it was not necessary to take due account of any comments.

5 VERIFICATION FINDINGS

5.1 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the Joint VCS PD & MR. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan of the VCS PD
Findings	CAR 6 was raised during the verification. The description of the CAR and its closure is described below in Appendix 2 of this report.
Conclusion	Ex-ante Parameter: $EF_{grid,CM,y}$ = Parameter is fixed ex-ante for the entire crediting period and as per the validated VCS PD same is fixed 0.9770 tCO₂/MWh. Verification team found same was used in the ER calculations. Baseline Emissions: The baseline Emissions for a given year is calculated by multiplying the energy baseline with the grid emission factor. The grid in this case would be the 'Indian Grid' Formula Used:- $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ Where: BE_y = Baseline emissions in year y (t CO₂/yr) $EG_{PJ,y}$ = 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/yr) $EF_{grid,CM,y}$ = 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) $EG_{PJ,y}$ = The verification team has checked the entire monthly JMR reports for net electricity generated & supplied to the grid and crosschecked same with the invoices raised by PP towards State Utilities for the monitoring period. All values are found correct. All the parameters are monitored and recorded as per the monitoring plan in the Joint VCS PD & MR. The verification team has crosschecked the revised emission reduction sheet and monitoring report data with the JMR sheet and invoice and found all the values are matching. PE_y = As per ACM0002 - Version 17.0, all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected. As the project activity involved solar power project emissions (PE_y) are taken as zero. Leakage: As per ACM0002 - Version 17.0, Leakage emissions are not considered for the project activity.

5.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	The verification team checked the break down log for the monitoring period. During the verification site visit the feeder wise location of the solar plants is also checked. The Calibration details of the monitoring meters are also checked with calibration certificates.																																								
Findings	CAR 07 was raised during the verification process. The description of the CAR and its closure is described below in Appendix 2 of this report.																																								
Conclusion	The metering arrangement is tri-vector bi-directional energy meters of Secure Make; accuracy class 0.2s (main and check) at the State Electricity Board (SEB) substation. These meters record several parameters including electricity exported & imported. These electricity meters are being used by state electricity board for JMR (Joint Meter Reading) electricity generation statements. During commissioning of the monitoring meters of accuracy class i.e. 0.2s were installed. The meters are monitored continuously & cumulative readings are taken at the end of the month by joint meter reading procedure. These are sealed by State Utilities to avoid malfunctioning with meter readings. Meter is calibrated yearly by the meter testing division of the state utility in the presence of O&M Contractor / investor's representatives and State Utilities officials to ensure the working of meter within permissible limits, however, calibration frequency and schedule is under the complete discretion of State Utility and PP do not have control on it. The calculation of net electricity supplied to grid is under purview of state electricity board and PP does not have control on it. Calibration details of the monitoring meters checked with calibration certificates dtd. 25/01/2016 for Vector Green and 16/12/2015 for Polepally Solar Parks submitted by PP and found that calibration frequency of 5 years is complied. Calibration and Meter Details Meter Calibration details of 20 MW solar project by Vector Green Sunshine Private Limited <table><tr><th>Meter Details</th><th>Main Meter</th><th>Check Meter</th><th>Grid Meter</th></tr><tr><td>Sl. No</td><td>15191785</td><td>15191778</td><td>PBB 37438</td></tr><tr><td>Make</td><td>Secure</td><td>Secure</td><td>Secure</td></tr><tr><td>Accuracy Class</td><td>0.2 s</td><td>0.2 s</td><td>0.2 s</td></tr><tr><td>Date of Calibration</td><td>25/01/2016</td><td>25/01/2016</td><td>25/01/2016</td></tr></table> Meter Calibration details of 25 MW solar project by Polepally Solar Parks Private Limited <table><tr><th>Meter Details</th><th>Main Meter</th><th>Check Meter</th><th>Standby Meter</th></tr><tr><td>Sl. No</td><td>XC510829</td><td>XC510830</td><td>APX00481</td></tr><tr><td>Make</td><td>Secure</td><td>Secure</td><td>Secure</td></tr><tr><td>Accuracy Class</td><td>0.2 s</td><td>0.2 s</td><td>0.2 s</td></tr><tr><td>Date of Calibration</td><td>16-12-2015</td><td>16-12-2015</td><td>16-12-2015</td></tr></table> By comparing the actual ER claimed in this monitoring period with the estimate in the registered VCS PD (134,579 tCO₂e/year), the actual emission reductions 130,024	Meter Details	Main Meter	Check Meter	Grid Meter	Sl. No	15191785	15191778	PBB 37438	Make	Secure	Secure	Secure	Accuracy Class	0.2 s	0.2 s	0.2 s	Date of Calibration	25/01/2016	25/01/2016	25/01/2016	Meter Details	Main Meter	Check Meter	Standby Meter	Sl. No	XC510829	XC510830	APX00481	Make	Secure	Secure	Secure	Accuracy Class	0.2 s	0.2 s	0.2 s	Date of Calibration	16-12-2015	16-12-2015	16-12-2015
Meter Details	Main Meter	Check Meter	Grid Meter																																						
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Accuracy Class	0.2 s	0.2 s	0.2 s																																						
Date of Calibration	16-12-2015	16-12-2015	16-12-2015																																						

	tCO ₂ e for the monitoring period) are lower than what is stated in the registered VCS PD which surely will not lead to the overestimation of VERs.
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6 VALIDATION AND VERIFICATION CONCLUSION

Validation Conclusion: Applus+ Certification has performed a validation of the “*Bundled Solar Power Project by Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited*”. The validation was performed on the basis of UNFCCC/VCS criteria and host country criteria, as well as criteria, e.g. ACM0002 - Version 17, given to provide for consistent project operations, monitoring and reporting. The review of the project documentation and the subsequent follow-up interviews has provided Applus+ Certification with sufficient evidence to determine the fulfilment of stated criteria. In our opinion, the project meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The project will hence be recommended by Applus+ Certification for registration with the VCS. By displacing fossil fuel-based electricity with electricity generated from a renewable source, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the investment and technological barriers demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of annual emission reductions of 70,073 tCO₂e. The validation has been performed following the requirements of the latest version of the CDM validation and verification standard for project activities Version 01.0, VCS standard and guideline version 3.7 and on the basis of the contractual agreement. The single purpose of this report is its use during the registration process as part of the VCS project cycle.

Verification Conclusion:

Applus+ Certification has been engaged by *Vector Green Sunshine Private Limited* and *Polepally Solar Parks Private Limited* to perform the 1st periodical verification of the “*Bundled Solar Power Project by Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited*”

The *Vector Green Sunshine Private Limited* and *Polepally Solar Parks Private Limited* is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project’s Monitoring Plan in the registered Joint VCS PD & MR and the applied methodology ACM0002 - Version 17.0.

Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board and VCS. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the project is operated as planned and described in the project document;
- the monitoring plan is as per the applied methodology;
- the monitoring process in Monitoring Report is as per the Joint VCS PD & MR ;
 - the development and maintenance of records and reporting procedures are in accordance with the monitoring plan;

- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.

Verification period: 24/03/2016 - 31/01/2018 (including both days)

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)
24/03/2016 – 31/12/2016	44,017	0	0	44,017
01/01/2017 – 31/12/2017	74,039	0	0	74,039
01/01/2018 - 31/01/2018	11,968	0	0	11,968
Total	130,024	0	0	130,024

APPENDIX 1: DOCUMENTS REVIEWED OR REFERENCED

No.	Author	Title	References to the document	Provider
1.	NA	Commissioning certificates of the project activity implemented.	NA	Project participant
2.	NA	Contract of the project participant with the DOE	Contract document signed between PP and DOE	Project participant
3.	NA	Technical specifications of PV modules from manufacturers	Manufacturer technical specifications	Project participant
4.	NA	Power Purchase agreement for the project activity	NA	Project participant
5.	NA	PROJECT DPR for both power plants	DPR	Project participant
6.	NA	Balance Sheet/Financial Audit Report	NA	Project participant
7.	NA	Commisioning Certificates	NA	Project participant
8.	NA	Reports on Stakeholders' Consultation Meeting	NA	Project participant
9.	NA	JOINT PROJECT DESCRIPTION & MONITORING REPORT	Version 01, dated 20/02/2018 Version 02, dated 17/03/2018 Version 03, dated 21/03/2018	Project participant
10.	NA	Financial Calculation sheet- version 01	Version 01, dated 20/02/2018	Project participant
11.	NA	Emission reduction calculation sheet- version 01 Emission reduction calculation sheet- version 02 Emission reduction calculation sheet- version 03	Version 01, dated 20/02/2018 Version 02, dated 17/03/2018 Version 03, dated 21/03/2018	Project participant
12.	NA	JMR records for the complete monitoring period	JMR records	Project participant
13.	NA	Invoices for the complete monitoring period	Invoice	Project participant
14.	NA	Ministry of Environment and forest: www.envfor.nic.in UNFCCC www.cdm.unfccc.int CEA: Central electricity authority www.cea.nic.in VCS: Verified Carbon Standard	Reference link is provided.	Independent Search

No.	Author	Title	References to the document	Provider
		www.v-c-s.org		
15.	NA	Tools/ guidelines used in the project activity • Tool to determine the remaining lifetime of the project activity in line with Annex 15 EB 50 • Tool to calculate the emission factor for an electricity system • Glossary of CDM terms version 07 • VCS verification report template version 03.4	UNFCCC CDM web site	UNFCCC

APPENDIX 2: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS (CAR/CL/FAR)

Table 1. CL from this joint validation & verification

No CLs are raised.

Table 2. CAR from this joint validation & verification

Project Details

CAR ID	01	Section no.	1 of Joint VCS PD & MR	Date: 14/03/2018
Description of CAR				
PP requested to submit following documents:				
1. Commissioning certificates of the project activity. 2. Technical specification of the PV module along with lifetime of the project. 3. The state nodal agency approval.				
Project participant response				Date: 16/03/2018
1. The commissioning certificates of the project activity are now provided to the assessment team. 2. Since this is a solar project, the required technical specifications of the solar project activity have been mentioned in the revised version-2 of the joint PD+MR report. Also, the project lifetime is taken from DPR and the same can be referred from the project DPR. 3. The state nodal agency approvals are now provided				
Documentation provided by project participant				
1. Commissioning Certificates 2. Revised version-2 of the joint PD+MR 3. DPR to refer project lifetime 4. State nodal agency approvals				
DOE assessment				Date: 19/03/2018
The requested documents have been submitted by the PP and information is checked by assessment team for correctness. Found ok. CAR closed.				

Participation under Other GHG Programs

CAR ID	02	Section no.	1.12 of Joint VCS PD & MR	Date: 14/03/2018
Description of CAR				
PP requested to submit undertaking in effect of rejection by other GHG program, involvement in other GHG program, no compliance with an emission trading program, ownership of VCU & creation of another form of environmental credit etc.				
Project participant response				Date: 16/03/2018
Declaration letter from PP is now provided.				
Documentation provided by project participant				
Declaration Letter				
DOE assessment				Date: 19/03/2018
The declaration submitted by PP. CAR closed.				

Additionality

CAR ID	03	Section no.	2.5 Joint VCS PD & MR	Date: 14/03/2018
Description of CAR				
During the desk review of the Joint VCS PD & MR and onsite visit document verifications, APPLUS team observed following inconsistency in the additionality determination : 1. Following documents are missing and thus the IRR calculation is reserved: a. DPR copy b. PLF reports c. Board decision documents d. Project Cost defragmentation e. Administrative expenses f. Offers and purchase order g. Insurance letter All other supporting documents for Additionality demonstration is requested for further analysis. Further, IRR calculations based on the actual variable parameters like Project cost, O&M cost, PLF etc shall be submitted to DoE. Moreover, data and calculation of IRR and additional justification missing in Section 2.5 of joint PD & MR.				
Project participant response				Date: 16/03/2018
1. The following documents are now provided for supporting the IRR calculation. a. DPR copy is now provided. b. PLF has been referred from the DPR. The DPR copy is provided. c. Board Resolution has now been provided. d. Project cost defragmentation is provided. e. Admin costs are not involved for this project activity. f. The offer price has been taken from the DPR. The actual cost has been referred from the Audit reports. g. Insurance letters are now provided. All other supporting documents for additionality demonstration are now provided to the DOE assessment team for further analysis. The supporting documents related to project cost, O&M cost, PLF,etc are now provided to the DOE. The data and calculation of IRR along with the additional justifications are now provided in the Section 2.5 of revised version-2 of the joint PD+MR.				
Documentation provided by project participant				

1. DPR copy
2. Board Resolution
3. Project cost defragmentation
4. Audit reports
5. Insurance letters
6. IRR calculation sheets
7. Revised version-2 of joint PD+MR
DOE assessment
Date: 19/03/2018
Supporting Documents related to additionality justification submitted by PP. Validation team checked the financial sheet for appropriateness of assumptions and correctness of calculations and found ok. CAR closed.

Monitoring Plan

CAR ID	04	Section no.	4.3 Joint VCS PD & MR	Date: 14/03/2018
Description of CAR				
Apportioning procedures in case of JMR & monitoring period does not match is missing in the section.				
Project participant response				Date: 16/03/2018
The apportioning procedure has been explained in the section 4.3 of the revised version-2 of the joint PD+MR.				
Documentation provided by project participant				
Revised version-2 of joint PD+MR				
DOE assessment				Date: 19/03/2018
Revised MR submitted by PP with appropriate corrections. CAR closed.				

Local Stakeholder Consultation

CAR ID	05	Section no.	4.3 Joint VCS PD & MR	Date: 14/03/2018
Description of CAR				
Supporting documents for Local Stakeholder Consultation to be submitted by PP.				
Project participant response				Date: 16/03/2018
The supporting documents for Local Stakeholder Consultation are now submitted to the assessment team.				
Documentation provided by project participant				
Local Stakeholder documents i.e. Notice, MOM and List of Attendees.				
DOE assessment				Date: 19/03/2018
PP has submitted documents related to Local Stakeholders Consultation and information in joint PD & MR found correct. CAR closed.				

VERIFICATION FINDINGS

Accuracy of GHG Emission Reduction and Removal Calculations

CAR ID	06	Section no.	6.0 Joint VCS PD & MR	Date: 14/03/2018
Description of CAR				

1. Emission reduction calculations are reserved for Emission reduction calculation sheet submission along with supporting documents; JMRs, Invoices, Calibration certificates etc. 2. Section 6 MR is incomplete with respect to appropriate information required in respective section. 3. Section 6.1 of MR is lacking of the monthly electricity supplied/exported by the project activity as per the JMR and its cross checking with the monthly invoices of sale.	
Project participant response	Date: 16/03/2018
1. Emission reduction calculation sheet along with supporting documents like JMRs, Invoices, calibration certificates, etc. have now been provided to the DOE assessment team. 2. Section 6 of MR has now been completed with appropriate information in the respective section. 3. Section 6.1 of MR has now been completed by checking the details of monthly electricity supplied/exported by the project activity from the JMR and monthly invoices.	
Documentation provided by project participant	
1. Emission reduction calculation sheet 2. Revised version-2, joint PD+MR 3. Monthly JMRs & Invoices	
DOE assessment	Date: 19/03/2018
Revised joint PD & MR submitted by PP along with ER calculation sheet and found correct. CAR closed	

Quality of Evidence to Determine GHG Emission Reductions and Removals

CAR ID	07	Section no.	Section 6 of Joint VCS PD & MR	Date: 14/03/2018
Description of CAR				
Calibration compliance along with dates of the calibrations is missing in MR.				
Project participant response				Date: 16/03/2018
The details of the calibrations are now mentioned in Appendix-2 of the revised version-2 joint PD+MR				
Documentation provided by project participant				
1. Calibration Certificates 2. Revised version-2 joint PD+MR				
DOE assessment				Date: 19/03/2018
Validation team checked the calibration certificates of the monitoring meter and found that calibration frequency of once in 5 years is complied. CAR closed.				

Table 3. FAR from this joint validation & verification

No FAR raised during this joint validation and verification

APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS**Verification team member**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader/Lead Assessor	OR	Takarkhede	Dr. Atul	TQC-Outsourced entity	No	No	Yes	Yes
	Auditor	OR	Das	Sukanta	TQC-Outsourced entity	Yes	Yes	Yes	Yes

Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TR)	IR	Xue	Hanshen (Denny)	Applus+ Certification
2.	Approver	IR	Sendin	Juan	Applus+ Certification B.U. Managing Director

Short CVs of the Team:

- Dr. Atul Takarkhede counts with 9 years of experience in field of Environmental Auditing, consulting and accreditation. He is an Expert in ISO 9001-14001, CO₂/GHG Reporting, Carbon Foot Print, Energy, Water and Waste Management Reporting for organizations environmental performance. His professional portfolio is mainly related with carrying out EIA, conducting QA/QC of EIA Reports; Conducting Environmental/water Audits; NABET requirements appliance. Furthermore, he counts with solid experience on CDM-VCS-GS consultancy and auditing. He has Ph.D. (Environmental Science) from Institute of Science, RTM Nagpur University, Nagpur, and he has already published different technical reports related to environmental science.

2. Mr. Sukanta DAS, has done M. SC in (Electronics and Photonics) and M. Tech in (Energy technology) from Tezpur Central University/ Indian Institute of technology Bombay in India. He is a certified lead auditor for ISO 14001 EMS LA and ISO 9001 QMS LA from International registry for Certified Auditors (IRCA) and Certified Lean Management practitioner from Quality Council of India (QCI). He has more than 10 years of working experience at TUV NoRD/ Re-consult/CRA/APROJECT OWNERSLUS certifications under various categories of projects stating from Renewable to waste to supercritical projects. He was JI/ CDM Lead Assessor in TUV NoRD and was involved in more than 100 CDM validation and verifications activities in Gold Standard, VCS, CDM projects as a team leader/technical reviewer / validator / verifier covering the sectoral scope 1, 13 technical areas 1.2/1.1/13.1. Currently he is associated with True Quality Certifications Private Limited and is empanelled with APROJECT OWNERSLUS certification to carry out GHG audit.
3. Mr. Hanshen (Denny) Xue (Master Degree in Environmental Engineering, Bachelor Degree in Thermal Engineering) is an Auditor appointed by Applus+ Certification for the GHG project assessment. He is based on Shanghai. He has 1.5 years of work experiences in CDM project development. Before he joined Applus+ Certification, he has been worked for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development.

APPENDIX 4: ABBREVIATIONS

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification request
CM	Combined Margin
CMS	Central Monitoring system
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming potential
JMR	Joint Metering reading
PP	Project Participant