Ghani Solar Renewable Power Project by Greenko Group

Document Prepared By Earthood Services Private Limited

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Summary:

The project activity involves the generation of electricity through a greenfield solar photovoltaic plant with a capacity of 500 MW in Kurnool district of Andhra Pradesh that supply the generated electricity to the National power grid.

The project has aimed to reduce the dependence on fossil fuel-powered power plants by substituting carbon-intensive energy with the inexhaustible and clean solar energy. As per the baseline scenario, "Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants that are fossil fuel fired power plants". The baseline scenario is the same as the scenario existing prior to the implementation of the project activity.

During the Current Monitoring Period from 01-July-2018 to 30-Sept.-2019 (First and last date included) the project activity has supplied 1,510,794 MWh of electricity, and thus contributing to the GHG reductions 1,431,477 tCO2e.

Zuvan Energy Private Limited contracted **ESPL** to conduct the verification of the project "**Ghani Solar Renewable Power Project by Greenko Group**". The scope of verification includes confirming the implementation of the monitoring plan in the registered project activity "Ghani Solar Renewable Power Project by Greenko Group" (VCS ID – 1792) VCS PD (Ver. 02 dated 05-Feb.-2018) and the application of methodology ACM0002: Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources, Version 18.1.
The verification consisted of three phases: a. Desk review of the project; b. Follow-up onsite visit; c. Resolution of outstanding issues and issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted following ESPL's internal quality procedures.

A total of 03 CL and 01 CARs have been raised during the verification process of the project activity which were successfully closed.

- ESPL confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements.

CONTENTS

1 INTRODUCTION

1.1 Objective

"**M/s. Zuvan Energy Private Limited**" has contracted ESPL (Hereinafter referred as Earthood) to conduct the verification of the project activity "Ghani Solar Renewable Power Project by Greenko" according to the requirements of the Verified Carbon Standard version 4.0.

The objective of this verification is to verify and certify emission reductions reported for the VCS PA "Ghani Solar Renewable Power Project by Greenko" for the period 01-July-2018 to 30-Sept-.2019 (Both days included)

1.2 Scope and Criteria

The scope of the verification is to establish/verify that:

- the appropriate VCS-MR form (and other templates) was used and correctly filled up;

  (as per https://verra.org/wp-content/uploads/2019/09/VCS-V4-Summary-of-Effective-Dates.pdf the use of updated version of all VCS Program templates and representations is mandatory from 19 March 2020)

- the project activity is in accordance with all relevant host country criteria (India);
- the project activity is in accordance with all relevant VCS rules and requirements;
- the project activity is in accordance with conditions of the latest version of applied methodology ACM0002: Large Consolidated methodology --- Version 17/7/.

The verification of the project activity is based on the VCS-PD and estimated GHG emission reduction calculations.

1.3 Level of Assurance

☒ Reasonable level of assurance

☐ Limited level of assurance

ESPL's verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. ESPL planned and performed the verification by obtaining evidence and other information and explanations that ESPL considers necessary to give reasonable assurance that reported estimated GHG emission reductions are fairly stated.

In our opinion, the estimated GHG emissions reductions were calculated correctly on the basis of the approved baseline and monitoring methodology ACM0002, Version 18.1 and the VCS standard 4.0. All

documentary evidences were checked, and site visit was conducted to project plant site to arrive at a verification conclusion by the assessment team.

1.4 Summary Description of the Project

Grid-connected solar PV project in Andhra Pradesh generates renewable solar electricity and supplies power to the Indian power grid. The current monitoring period from 01-July-2018 to 30-Sept.-2019 (First and last date included) involved the generation and supply of 1,510,794MWh solar power from plants located in Kurnool district of Andhra Pradesh. The power generated by the grid will be replacing an equivalent amount of electricity from the grid system of India which is majorly dependent on fossil-fuel based grid imports for its electricity requirements.

The project is a voluntary action being undertaken by each project owner of the project activity. EKI Energy Services Limited (hereafter referred as "EKIESL") is acting as the other party for this project activity.

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source and Sale to State Utility. The project is a bundled project activity which involves installation of 500 MW solar project in Andhra Pradesh state of India.

Verification team confirmed the capacity by verifying commissioning certificates and also physically verified during site visit that plants are operational at all locations in Andhra Pradesh.

Project includes total 10 SPVs launched by Zuvan Energy Private Limited with capacity of 50 MW each totalling to 500 MW. Technical specification of the plants as verified for all the locations and details provided in sec. 4.1 of this report.

The electricity meters are of the make L&T with a precision of 0.2s. The SCADA system allows the PV system to be manually or automatically controlled and monitored. The project is based on sectoral Scope 1: Energy Industries (renewable sources) with ACM0002: Large-scale Consolidated methodology: Grid-connected electricity generation from renewable sources, Version 18.1.

During the Current Monitoring Period from 01-July.-2018 to 30-Sept-2019 (First and last date included) the project activity has supplied 1,510,794 MWh of electricity, and thus contributing to the GHG reductions 1,431,477 tCO2e.

2 VERIFICATION PROCESS

The registered VCS project is undergoing second verification and the approach adopted to ensure the quality of emission reductions is described in the following sub-sections.

2.1 Method and Criteria

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using ESPL's internal procedures. The Project was verified against the latest requirements (Version 4.0) /14/ and guidance set out in VCS Standards as applicable.

The validation/verification process consists of the following three phases:

- A document review of the VCS PD and VCS MR (described in Section 2.2)
- Site visit and follow up interviews with project stakeholders (described in Section 2.3 and 2.4)
- The resolution of outstanding issues and issuance of the final report and opinion. (described in Section 2.5)

DOE's Sampling Approach: No sampling approach was required for undertaking the current verification since all monitored data was verified by the assessment team.

2.2 Document Review

The verification is performed primarily as a document review of the documents submitted at various stages of assessments. The review is performed by assessment team using dedicated protocols. The assessment team cross checks the information provided in the documents (PDD, MR, validation report) and information from sources other than those used, if available, and also conducts independent background investigations. Earthood conducted a desk review as under;

a) A review of the data and information presented to verify their completeness.

b) A review of the monitoring plan, the monitoring methodology including applicable tool(s) and, where applicable, the applied standardized baseline, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures.

c) An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

2.3 Interviews

The site visits for the project activity were carried out from 25-Feb-2020 to 26-Feb-2020 which covers all the sites (includes all the locations) in the state Andhra Pradesh in India. No sampling procedures

were adopted either in document verification and all the documents were cross checked to ensure conservative estimation of emission reduction. The list of persons interviewed during the project assessment and on site visit is provided below:

S.N.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Raju	Murali	PP Representative	25-Feb-2020 & 26-Feb-2020	Implementation of the project, monitoring and emission reduction calculations	Mr. Pankaj Kumar
2.	Rao	Anjali	Consultant	25-Feb-2020 & 26-Feb-2020		
3.	Sharma	Barun	Consultant	25-Feb-2020 & 26-Feb-2020		
4.	S	Krishnappa	Villager	26-Feb-2020	Local stake holder meeting consultation	Mr. Pankaj Kumar
5.	Reddy	Shekhar	Villager	26-Feb-2020		

During the on-site visit, the PP representatives were questioned about the implementation of the project activity. Several topics like the verification of commissioning date of meters, the generation, recording, and monitoring of the data and the error accountability were discussed. Various documents like the JMR sheets, invoice slips, purchase slips etc were also verified at the site itself.

Several photographs were also clicked at the site to capture the name plate data, meter specifications, key technical specifications of the major equipment like panel, inverter and meters and to establish the current status and the implementation of the Project Activity.

2.4 Site Inspections

Duration of on-site inspection: 25/02/2020 to 26/02/2020					
No.	**Activity performed on-site**	**Investors**	**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.	Aarish Solar Power Private Limited Aashman Energy Private Limited Divyesh Power Private Limited Elena Renewable Energy Private Limited Pratyash Renewable Private Limited SEI Baskara Power Private Limited SEI Enerstar Renewable Energy Private Limited SEI Mihir Energy Private Limited Shreyash Renewable Energy Private Limited Zuvan Energy Private Limited	Ghani Solar Park, village Ghani, District Kurnoo, Andhra Pradesh, India	25/02/2020 & 26/02/2020	Pankaj Kumar

A site visit was undertaken by the assessment team (Pankaj Kumar) during 25-Feb-2020 to 26-Feb-2020 to carry out the following;

a. An assessment of the implementation and operation of the registered project activity as per the registered PD or any approved revised PD/1/ and MR/2/;

b. A review of information flow for generating, aggregating and reporting the monitoring parameters;

c. Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PD;

d. A cross-check between information provided in the monitoring report and data from other sources such as JMR sheets, invoice slips, PPA agreement etc.;

e. A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PD/1/, the applied methodology including applicable tool(s), and, where applicable, the applied standardized baseline;

f. A review of calculations and assumptions made in determining the GHG data and emission reductions;

g. An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

The findings may be of the following types: CAR- Corrective Action Request, CL- Clarification Request and FAR- Forward Action Request.

The list of findings and their resolution are presented in Appendix IV of this verification report. The section also includes the response, if provided, by the project participants and an assessment by the assessment team if it was closed or otherwise. It is to be noted that all the findings have been satisfactorily resolved by the assessment team.

A total of 01 CAR and 03 CL were raised in the current verification. All the findings that are raised and communicated to project participant during the verification are included under Appendix 2. The section also includes the response, if provided, by the project participants and an assessment by the verification team if it was closed out or otherwise

2.5.1 Forward Action Requests

This is 2nd periodic verification of the project activity and no FAR is raised during current verification and no FAR from previous verification as well.

2.6 Eligibility for Validation Activities

As project is already validated and this is 2nd verification of the project. Hence, this section not applicable.

3 VALIDATION FINDINGS

As project is already validated and this is 2nd verification of the project. Hence, this section not applicable.

3.1 Participation under Other GHG Programs

PP has submitted an undertaking regarding no participation in any other GHG mechanism. VVB raised clarification 03 related to this which was closed successfully during verification. Hence, VVB confirm that PP is not participating in any other GHG mechanism during current monitoring period.~~This section is not applicable for present verification.~~

3.2 Methodology Deviations

VVB confirm that no ~~No~~ methodology deviation is envisaged for present verification.

3.3 Project Description Deviations

VVB confirm that there was~~Not applicable as~~ no deviation in project description observed during this monitoring period.

3.4 Grouped Project

This is not a grouped project. Thus, this section is not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

During the verification site visit it was concluded that the project is implemented as per the instruction of the registered PD/1/, Final Validation report and commissioning certificates/10/. During the current monitoring period it was observed that no unforeseen situation evolved which can impact the operation of the project activity. Breakdown summary is submitted by PP for the solar plants. Scheduled maintenance was carried out as per the instruction of the manufacturer and the same is acceptable to the assessment team/9/.

The total installed capacity of the project is 500 MW which involves 10 SPVs of Zuvan Energy Private Limited with 50 MW capacity each in Ghani Solar Parks in Ghani village of kurnool district of Andhra Pradesh/10/. The technical parameters have been verified with the nameplates as well as the technical specifications of solar panels/9/.
The assessment team physically visited the solar plant site in order to verify the status of the project implementation of the monitoring plan. It has also been verified as per the guidelines in ACM0002: Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources, Version 18.1 that the calculations for the GHG emission reductions are done in accordance with the aforesaid methodology/7/.

The assessment team also confirmed that the monitoring system for emission reduction calculation was in place and in accordance with the registered VCS PD/1/. There was no deviation observed by the assessment team in the implementation of the monitoring system form the registered VCS PD during the current monitoring period/1/.

During the current monitoring duration, no events have been found that can change the design of project.

The details of the SPVs for the project and their location of installation are mentioned in the table below:

Name of Investor	Capacity (MW)	Village Tehsil / Mandal	Latitude (N)	Longitude (E)
Aarish Solar Power Private Limited	50 MW	Ghani Solar Park, village Ghani, District Kurnoo, Andhra Pradesh, India	15° 39’ 46.80” N	78° 16’ 04.80” E
Aashman Energy Private Limited	50 MW		15° 40’ 48.0” N	78° 14’ 24.0” E
Divyesh Power Private Limited	50 MW		15° 39’ 03.60” N	78° 15’ 21.60” E
Elena Renewable Energy Private Limited	50 MW		15° 40’ 26.40” N	78° 14’ 56.40” E
Pratyash Renewable Private Limited	50 MW		15° 40’ 33.60” N	78° 14’ 13.20” E
SEI Baskara Power Private Limited	50 MW		15° 39’ 10.80” N	78° 15’ 46.80” E

Name of Investor	Capacity (MW)	Village Tehsil / Mandal	Latitude (N)	Longitude (E)
SEI Enerstar Renewable Energy Private Limited	50 MW		15° 40' 40.80" N	78° 15' 25.20" E
SEI Mihir Energy Private Limited	50 MW		15° 41' 06.00" N	78° 16' 30.00" E
Shreyash Renewable Energy Private Limited	50 MW		15° 39' 21.60" N	78° 15' 10.80" E
Zuvan Energy Private Limited	50 MW		15° 39' 43.20" N	78° 15' 39.60" E

Capacity of the projects and date of commissioning (31-March-2017) verified with commissioning certificates/10/. The technical parameters/specification have been verified by the assessment team during the onsite visit/09/with the nameplates as well as the same is also verified with the details as provided by the manufacturer/18/

Geo coordinates checked on google earth/17/ and also checked during site visit and verification team conclude geo coordinates of project locations are consistent with registered PD.

Assessment team checked the technical details of the project activity from the manufactures specification and the detail are as follow:

Solar PV Project Technology Details –

The project activity aims to harness solar energy through installation of Solar PV project with total installed capacity of 500 MW.

The technical specification of 500 MW plant interconnection with grid on 31-March-2017 by all following 10 SPV is as follows:

Sr. No	Name of Investor	Capacity in MW	Commissioning Dates
1.	Aarish Solar Power Private Limited	50 MW	31/03/2017
2.	Aashman Energy Private Limited	50 MW	31/03/2017
3.	Divyesh Power Private Limited	50 MW	31/03/2017
4.	Elena Renewable Energy Private Limited	50 MW	31/03/2017
5.	Pratyash Renewable Private Limited	50 MW	31/03/2017
6.	SEI Baskara Power Private Limited	50 MW	31/03/2017

Sr. No	Name of Investor	Capacity in MW	Commissioning Dates
7.	SEI Enerstar Renewable Energy Private Limited	50 MW	31/03/2017
8.	SEI Mihir Energy Private Limited	50 MW	31/03/2017
9.	Shreyash Renewable Energy Private Limited	50 MW	31/03/2017
10.	Zuvan Energy Private Limited	50 MW	31/03/2017

Sl. No.	Technical details of the equipment	Description
1	Technology Used	Solar PV technology (Poly-Crystaline)
2	Module capacity	Module capacity- 315 Wp 320 Wp & 325 Wp
3	Number of Inverters , Inverter Make & Model	56 Inverters SMA/Sunny Central 1000CP XT
4	Modules per String	21
5	Tilt	Fixed Tilt

Assessment team concludes the following:

a) The implementation status of project activity was found to be in compliance with registered PD/1/.

b) DOE has conducted the on-site visit to confirm the implementation status of the project/9/.

c) The commissioning date of the project activity was found to be accurately and consistently recorded/10/.

d) The actual operation of project activity was found to be in compliance with the flow diagram provided in registered PD/1/.

e) The emission reductions achieved during the current monitoring period are 1,431,477 tCO2e.

The project activity contributes to the sustainable development by utilising solar energy for generating electricity which otherwise would have been generated through fossil fuels. Thereby reduction in usage of non-renewable sources used to generate energy.

Further the GHG emission reductions generated by the project activity has not been included by any other an emissions trading program or any other mechanism that includes GHG allowance trading. Also the project has not received any other form of environmental credit and has not been participated/rejected under any other GHG programs.

Sustainable Development- The project will contribute to the sustainable development in the following ways

1. Environmental: Since the project activity leads to cleaner production of energy, it is leading to displacement of fossil fuel-based energy.
2. Social: Setting up of the project activity has created new job openings hence is supporting employment of the local people around.
3. Cleaner Air: Since the project activity leads to lesser GHG emission it results in better air quality.

Further the project has been implemented as described in the Project Description/1/. CL 02,03 and CAR 01 were raised on the editorial issue of description and same were resolved by revision in the MR.

The total emission reductions achieved in this monitoring period i.e. from 01-July-2018 to 30-Sept.-2019 are 1,431,477 tCO2e.

4.2 Safeguards

4.2.1 No Net Harm

As PP does not see and identify any potential negative environmental and socio-economic impacts, hence this section is not required. Assessment team also cross checked by interviewing stakeholders during on site visit and confirm that there are no any potential negative environmental and socio-economic impacts attributed to the project activity.

4.2.2 Local Stakeholder Consultation

Local stakeholder consultation has been conducted at the time of project registration hence not applicable in the current monitoring period.

4.3 AFOLU-Specific Safeguards

This is non AFOLU projects, hence this section not applicable.

4.4 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 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 MR.
Findings	No finding was raised during the verification process.
Conclusion	**Ex-ante Parameter:**

	$EF_{grid,OM,y}$ = Parameter is fixed ex-ante for the entire crediting period and as per the validated VCS PD same is fixed 0.9726 tCO_2/MWh. Verification team found same was used in the ER calculations. Ex ante value of emission factor is taken from CEA database, Ver. 13, June, 2018. Verification team checked the EF value and found in consistent with registered PD **$EF_{grid,BM,y}$ =** Parameter is fixed ex-ante for the entire crediting period and as per the validated VCS PD same is fixed 0.8723 tCO_2/MWh. Verification team found same was used in the ER calculations. Ex ante value of emission factor is taken from CEA database, Ver. 13, June, 2018. Verification team checked the EF value and found in consistent with registered PD **$EF_{grid,CM,y}$** = Parameter is fixed ex-ante for the entire crediting period and as per the validated VCS PD same is fixed 0.9475 tCO_2/MWh. Verification team found same was used in the ER calculations. Ex ante value of emission factor is taken from CEA database, Ver. 13, June, 2018. Verification team checked the EF value and found in consistent with registered PD. **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 CO_2/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 CO_2 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 CO_2/MWh) **Monitored Parameter:** **$EG_{PJ,y}$ =** 1,510,794.81 MWh 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 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 18.1, 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 18.1, Leakage emissions are not considered for the project activity.

4.5 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 and the feeder wise location of the solar plants is also checked. The metering arrangement is tri-vector bi-directional energy meters (main and check and also one standby meter) at the State Electricity Board (SEB) substation. These meters record parameters including electricity exported & imported. Moreover, the meters are located at the HT side of the transformer and are of accuracy class of 0.2S for each project activity applied for verification. These electricity meters are being used by state electricity board for JMR (Joint Meter Reading) electricity generation statements. The Net electricity supplied to the grid is then calculated from export and import values. The net electricity exported to the grid is also cross checked from the invoices raised to respective state electricity board which is in line with Methodology requirement for large scale project activity. The main meter reading 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. The agency is experienced in the monitoring system and is managing O&M of numerous other solar farm projects. Verification team confirms the metering process by interviewing the O&M personnel and PP representatives during site visit and found the monitoring process is in line with approved PD. Calibration of all the meters were conducted by state electricity board officials as per the industry standards. However, the calibration is done once in a 5 year[19]. The details of Calibration of the meters as confirmed during site visit and details of calibration certificates are mentioned in Appendix 5 of this report. The assessment team checked the same and found correct. 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. PP representatives confirmed that the CMS data as well as JMR sheets and invoices will be kept for 2 years following the end of the crediting period. During site visit and discussion with PP, assessment team confirm 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

<table>
<tr><td></td><td>and the same was verified during the site visit by interviewing O&M personnel and checking of records/ log books maintained at site.</td></tr>
<tr><td>Findings</td><td>No finding was raised during the verification process.</td></tr>
<tr><td>Conclusion</td><td>Hence assessment team confirmed that the value of net electricity exported to the grid as used in emission reduction calculation is correct.

The validation team therefore is of the opinion that the project participant through the O&M agency is capable of implementing the monitoring plan in the context of the project activity.

On-site visit and interview with O&M personnel also confirms that the operational and organizational chart as mentioned in MR is as per the site practice and thus assessment team confirms that the details are correct.

The break down log is checked and found that the solar Panels undergone scheduled maintenance and break down. No unforced error observed and feeder wise solar Panels location is also checked and found correct.

Calibration and Meter Details provided in Annex. 5 of this report.

Comparison of actual and estimate emission reductions achieved:

Assessment team checked the calculation of estimated VERs vs. actual VER. As per the registered PD, the amount of VERs annually is 996,010 tCO_2e/year. The days involved in present monitoring period are 457/ Therefore on pro rata basis, the estimated VERs for this monitoring period is 1,247,059 tCO_2e. The actual emission reductions 1,431,477 tCO_2e for the monitoring period) are 14.79 % higher than what is stated in the registered VCS PD.

The generation of electricity depends upon the climatic conditions which varies a lot and affects PLF, and not within the control of the project participant. Further, current monitoring period included the months from April to July which wherein maximum PLF is achieved. This variation is majorly due to the variations in climatic conditions, grid availability and other parameters which are not in the control of PP. However, the achieved GHG emission is 14.79 % is higher than the estimated value.

However, the increased PLF is crosschecked with the breaching value of IRR and the result IRR found within limit. Also, the increased PLF is crossed checked with the IRR breaching values (Breaching values 15.10 % and the observed values for all SPVs calculated which are depicted below :
<table>
<tr><th>Project Investors</th><th>PLF Observed</th><th>Subsequent IRR</th><th>Breaching Values</th></tr>
<tr><td>Aarish Solar Power Private Limited</td><td>27.48%</td><td>8.92%</td><td>15.10%</td></tr>
<tr><td>Aashman Energy Private Limited</td><td>27.68%</td><td>9.07%</td><td>15.10%</td></tr>
<tr><td>Divyesh Power Private Limited</td><td>27.52%</td><td>8.95%</td><td>15.10%</td></tr>
<tr><td>Elena Renewable Energy Private Limited</td><td>27.69%</td><td>9.08%</td><td>15.10%</td></tr>
<tr><td>Pratyash Renewable Private Limited</td><td>27.43%</td><td>8.89%</td><td>15.10%</td></tr>
</table></td></tr>
</table>

	SEI Baskara Power Private Limited	27.55%	8.97%	15.10%
	SEI Enerstar Renewable Energy Private Limited	27.56%	8.98%	15.10%
	SEI Mihir Energy Private Limited	27.62%	9.02%	15.10%
	Shreyash Renewable Energy Private Limited	27.46%	8.91%	15.10%
	Zuvan Energy Private Limited	27.51%	8.94%	15.10%
	Verification team concludes on the estimated IRR value based on increased PLF that these are below the benchmark of 15.10% and no impact on additionality. Verification team also checked during site visit and confirmed that no change in project design occurred since installation of project which can affect generation of electricity.			

4.6 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	
NA	NA	NA	NA	NA

5 VERIFICATION CONCLUSION

Earthood Services Private Limited (Earthood), contracted by Zuvan Energy Private Limited has performed the independent verification of the emission reductions for the VCS project activity reference number 1792 "Ghani Solar Renewable Power Project by Greenko Group" in India for the monitoring period 01-July -2018 to 30-Sept-2019 reported in the Monitoring Report Version 02 dated 03-March-2020.

It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity.

Earthood commenced the verification on the basis of the baseline and monitoring methodology "ACM0002 - Version 18.1", the monitoring plan contained in the PD version 02 and VCS guidelines version 4.0, Monitoring Report Version 02 dated 03-March-2020 as per the process described under Section 2 of this report.

Earthood's verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. Earthood planned and performed the verification by obtaining evidence and other information and explanations that

Earthood considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions reported for the project activity for the period 01-July-2018 to 30-Sept-2019 are fairly stated in the Monitoring Report Version 02 dated 03-March2020. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology "ACM0002 - Version 18.1" and the VCS standard.

Verification period: 01-July-2018 to 30-Sept-2019 (inclusive of both days).

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

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2018	574,995	0	0	574,995
2019	856,482	0	0	856,482
Total	1,431,477	0	0	1,431,477

Approved by

Dr. Kaviraj Singh

Managing Director **Date:**

Earthood Services Privated Limited **Place: Gurgaon, Haryana**

APPENDIX 1: DOCUMENTS REVIEWED OR REFERENCED (VERIFICATION)

S.No	Title of Document	Version	Date
1.	Registered VCS PD	version 02	05/12/2018
2.	VCS Monitoring Report	2	03/03/2020
3.	ER spreadsheet (corresponding to the final monitoring report)	2	03/03/2020
4	Certificates of Calibration for all the meters belongs to project activity **Name of Investor** Aarish Solar Power Private Limited Aashman Energy Private Limited Divyesh Power Private Limited Elena Renewable Energy Private Limited Pratyash Renewable Private Limited SEI Baskara Power Private Limited SEI Enerstar Renewable Energy Private Limited SEI Mihir Energy Private Limited Shreyash Renewable Energy Private Limited Zuvan Energy Private Limited	-	05-July-2019 30-June-2019 02-July-2019 30-June-2019 01-July-2019 02-July-2019 29-June-2019 29-June-2019 03-July-2019 03-July-2019
5.	Invoice issued by PP for the duration of monitoring period	-	01-July-2018 to 30-Sept.-2019
6.	Joint Meter Readings for the duration of monitoring period	-	01-July-2018 to 30-Sept.-2019
7.	"Consolidated baseline methodology for grid-connected electricity generation from renewable sources", ACM0002,	"ACM0002 - Version 18.1"	-
8.	CO_2 Baseline Database for the Indian Power Sector published by the Central Electricity Authority (CEA), Ministry of Power, Govt.	version 13	-
9.	On-site assessment, interviews of plant staff	-	25/02/2020 to 26/02/2020
10.	Commissioning certificate for all the Solar plants of the project activity	-	31-March-2017
11.	Power Purchase Agreements	-	22-March-2016

S.No	Title of Document	Version	Date
12.	VCS webpage for the project, VCS ID 1792; https://www.vcsprojectdatabase.org/#/project_details/1792	-	Last accessed on 18/03/2020
13.	O&M contract for all projects (A.P. Solar Power Corporation Limited)	-	10-Oct-2016 15-Oct-2016
14.	VCS Standard	Version 4.0	Last accessed on 18/03/2020
15.	VCS Program Guide	Version 4.0	Last accessed on 18/03/2020
16	Letter of declaration dated from PP regarding not having created or sought any other form of environmental credit for the same period and double counting	-	02-March-2020
17	Google Earth desktop/Mobile application	-	Last accessed on 18/03/2020
18	Technical specifications by technology suppliers (Purchase orders)		10-Oct-2016 15-Oct-2016
19	Meter calibration guidelines: http://cea.nic.in/reports/regulation/CEA_metering_regulation_amendment_2019.pdf		

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

Table 1. Remaining FAR from previous verification

FAR ID	00	Section no.		Date : 27/02/2020
Description of FAR				
There is no FAR from the validation/previous verifications of the project activity				
Project participant response				Date :DD/MM/YYYY

NA
Documentation provided by project participant
NA
DOE assessment **Date:** DD/MM/YYYY
NA

Table 2. CL from this verification

CL ID	02	**Section no.**	1.3	**Date : 27/02/2020**
Description of CL				
In sec. 1.3, name of PP not consistent with registered PD *PP shall also provide commissioning certificates of all plants.*				
Project participant response				**Date :**03/03/2020
Correct PP is now being mentioned in the MR V02. Commissioning Certificates is being submitted.				
Documentation provided by project participant				
MR V02 and Commissioning Certificates				
DOE assessment				**Date:** 14/03/2020
1. PP name corrected in sec. 1.3 of revised MR, ver. 2.0 dated 03/03/2020 which is now consistent with registered PD. **Comment closed.** 2. PP have now provided commissioning certificates of all plants. **Comment closed.**				

CL ID	03	**Section no.**	1.9	**Date : 27/02/2020**
Description of CL				
PP shall provide an undertaking regarding no double counting of emission reductions claimed for this monitoring period.				
Project participant response				**Date :** 03/03/2020
No double counting declaration has been provided.				
Documentation provided by project participant				
Double Counting Declaration				
DOE assessment				**Date:** 14/03/2020
PP has provided an undertaking dated 02/03/2020 regarding no double counting and participation in other GHG mechanism. **Comment closed.**				

Table 3. CAR from this verification

CAR ID	04	Section no.	1.11	Date: 27/02/2020
In sec. 1.11, name of host country DNA incorrectly mentioned. Corrective action required				
Project participant response				**Date:** 03/03/2020
DNA name has been updated over section 1.11.				
Documentation provided by project participant				
MR V2				
DOE assessment				**Date: 14/03/2020**
Name of host country DNA corrected in sec. 1.11 of revised MR, ver. 2.0 dated 03/03/2020. Comment closed.				

Table ~~4~~3. FAR from this validation

FAR ID	Nill	Section no.		Date: 27/02/2020
Description of FAR				
Project participant response				**Date:** DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				**Date:** DD/MM/YYYY

APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Competence Statement	
Name	Pankaj Kumar
Education	M.Sc. in Environment Management Post Graduate Diploma in Environment Law B.Sc. (Hons.) Environment and Water Management
Experience	15 Years
Field	Climate Change/Waste Management/EIA
Approved Roles	
Team Leader	YES
Validator	YES

Verifier	YES		
Methodology Expert	YES (AMS I.D, ACM0002)		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (1.2)	YES		
Reviewed by	Shreya Garg	**Date**	01/11/2019
Approved by	Anshika Gupta	**Date**	01/11/2019

Competence Statement			
Name	Shreya Garg		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	7 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS.I.A., AMS.I.C., AMS.I.D., AMS.I.F., AMS.II.D., AMS.II.G., AMS.II.J., AMS.III.AV., ACM0002, ACM0012		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.2, TA 3.1)		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018
Approved by	Ashok Gautam	**Date**	01/03/2018

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_2e	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

PP	Project Participant
OM	Operating Margin
PLF	Plant Load Factor
PPA	Power Purchase Agreement

APPENDIX 5: METER CALIBRATION DETAILS

Meter and Calibration Details for 50 MW solar project by Aarish Solar Power Private Limited

Meter Details	Main Meter	Main Meter
Feeder Detail	5A	5B
Meter Serial No	16196352	16192427
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Date of Calibration	23-March-2017	23-March-2017
Date of Subsequent Calibration	05-July-2019	05-July-2019
Due date of Calibration	04-July-2024	04-July-2024

Meter and Calibration Details for 50 MW solar project by Aashman Energy Private Limited

Meter Details	Main Meter	Main Meter
Feeder Detail	8A	8B
Meter Serial No	16196354	16196342
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Date of Calibration	23-March-2017	23- March - 2017
Date of Subsequent Calibration	30-June-2019	30-June-2019
Due date of Calibration	29-June-2024	29-June-2024

Meter and Calibration Details for 50 MW solar project by Divyesh Power Private Limited

Meter Details	Main Meter	Main Meter
Feeder Detail	1A	1B
Meter Serial No	16196391	16196395
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Date of Calibration	23-March-2017	23-March-2017
Date of Subsequent Calibration	02-July-2019	02-July-2019
Due date of Calibration	01-July-2024	01-July-2024

Meter and Calibration Details for 50 MW solar project by Elena Renewable Energy Private Limited

Meter Details	Main Meter	Main Meter
Feeder Detail	7A	7B
Meter Serial No	16196404	16196421
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Date of Calibration	23-March-2017	23-March-2017
Date of Subsequent Calibration	30-June-2019	30-June-2019
Due date of Calibration	29-June-2024	29-June-2024

Meter and Calibration Details for 50 MW solar project by Pratyash Renewable Private Limited

Meter Details	Main Meter	Main Meter
Feeder Detail	6A	6B
Meter Serial No	16196349	16196413
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Date of Calibration	23-March-2017	23-March-2017
Date of Subsequent Calibration	01-July-2019	01-July-2019
Due date of Calibration	30-June-2024	30-June-2024

Meter and Calibration Details for 50 MW solar project by SEI Baskar Power Private Limited

Meter Details	Main Meter	Main Meter
Feeder Detail	2A	2B
Meter Serial No	16196359	16196371
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Date of Calibration	23-March-2017	23-March-2017
Date of Subsequent Calibration	02-July-2019	02-July-2019
Due date of Calibration	01-July-2024	01-July-2024

Meter and Calibration Details for 50 MW solar project by SEI Enerstar Renewable Energy Private Limited

Meter Details	Main Meter	Main Meter
Feeder Detail	10A	10B
Meter Serial No	16196365	16196412
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Date of Calibration	23- March-2017	23- March-2017
Date of Subsequent Calibration	29-June-2019	29-June-2019

Due date of Calibration	28- June-2024	28- June-2024

Meter and Calibration Details for 50 MW solar project by SEI Mihir Energy Private Limited

Meter Details	Main Meter	Main Meter
Feeder Detail	9A	9B
Meter Serial No	16196350	16196330
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Date of Calibration	23- March-2017	23- March-2017
Date of Subsequent Calibration	29-June-2019	29-June-2019
Due Date of Calibration	28- June-2024	28- June-2024

Meter and Calibration Details for 50 MW solar project by Shreyash Renewable Energy Private Limited

Meter Details	Main Meter	Main Meter
Feeder Detail	3A	3B
Meter Serial No	16196386	16196396
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Date of Calibration	23-March-2017	23-March-2017
Date of Subsequent Calibration	03-July-2019	03-July-2019
Due Date of Calibration	02-July-2024	02-July-2024

Meter and Calibration Details for 50 MW solar project by Zuvan Energy Private Limited

Meter Details	Main Meter	Main Meter
Feeder Detail	4A	4B
Meter Serial No	16196369	16196374
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Date of Calibration	23-March-2017	23-March-2017
Date of Subsequent Calibration	03-July-2019	03-July-2019
Due Date of Calibration	02-July-2024	02-July-2024

The meter and Calibration details at 220KV side at 400KV Substation:

Meter Details	Main Meter	Main Meter	Main Meter	Main Meter
Substation Code	PS1	PS1	PS2	PS2
Feeder	211	213	215	216
Meter Serial No	16196439	16196434	16196452	16196455
Meter Make	L & T	L & T	L & T	L & T

Accuracy Class	0.2s	0.2s	0.2s	0.2s
Date of Calibration	23-March-2017	23-March-2017	23-March-2017	23-March-2017
Date of Subsequent Calibration	05-July-2019	05-July-2019	05-July-2019	05-July-2019
Due date of Calibration	04-July-2024	04-July-2024	04-July-2024	04-July-2024