Verification and certification report form for CDM project activities

(Version 03.0)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION	
Title and GS reference number of the project activity	Solar DC programme in off-grid regions in India GS reference no.: GS7467
Scale of the project activity	☐ Large-scale ☒ Small-scale ☐ Micro-scale
Version number of the verification and certification report	02
Completion date of the verification and certification report	02/04/2020
Monitoring period number and duration of this monitoring period	01 21/03/2018 to 20/03/2019 (Inclusive of both the dates)
Version number of the monitoring report to which this report applies	Version: 01.1 Date: 21/03/2020
Crediting period of the project activity corresponding to this monitoring period	21/03/2018 to 20/03/2023
Project participants	Cygni Energy Private Limited; Value Network Venture Advisory PTE Ltd.
Host Party	India
Applied methodologies and standardized baselines	AMS-III.BL., "Integrated methodology for electrification of communities", (version 1.0)
Mandatory sectoral scopes	1
Conditional sectoral scopes, if applicable	N/A
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	36,605 tCO_2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	21/03/2018 to 31/12/2018: 23,287 tCO_2e 01/01/2019 to 20/03/2019: 6,432 tCO_2e Total: 29,719 tCO_2e
SDG Impacts:	• SDG 3: Good Health and Well-Being • SDG 7: Affordable and Clean Energy • SDG 13: Climate
Name and UNFCCC reference number of the VVB	Carbon Check (India) Private Limited (E-0052)
Name, position and signature of the approver	

of the verification and certification report	 Vikash Kumar Singh, Compliance Officer

SECTION A. Executive summary

>>

The Project Participant "Value Network Venture Advisory PTE Ltd." (hereafter referred as "PP") has appointed the Carbon Check (India) Private Ltd.(hereafter referred as "VVB")to perform an independent verification of the Gold Standard Project Activity "Solar DC programme in off-grid regions in India" in the host country of India (hereafter referred to as "project activity"). This report summarises the findings of the verification of the project, performed on the basis of Gold Standard criteria for verification, UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. This report contains the findings and resolutions from the verification and a verification opinion.

The Project Participant "Value Network Venture Advisory PTE Ltd." (hereafter referred as "PP") has appointed the Carbon Check (India) Private Ltd.(hereafter referred as "VVB")to perform an independent verification of the Gold Standard Project Activity "Solar DC programme in off-grid regions in India" in the host country of India (hereafter referred to as "project activity"). CCIPL has performed first periodic verification of the GS project activity (GS project id: GS7467) for the period 21/03/2018 to 20/03/2019 (inclusive of both the dates). The verification team assigned by the VVB concludes that the GS Project Activity as described in the revised PDD (version 1.1; Dated: 21/03/2020) /B05-2/ and the monitoring report (version 1.1; Dated: 21/03/2020) /02/, meets all relevant requirements of the Gold Standard, UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 56 and 62 of CDM M & P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/CMP and CDM Executive Board. The verification has been conducted in-line with the requirements of CDM VVS for project activities (version 02.0) /B01-1/, GS4GG - community service activity requirements, version 1.2 /B02-1/ and Gold Standard for the Global Goals Principles & Requirements (version 1.2) /B02-2/.

Verification methodology and process

The Verification team confirms the contractual relationship signed on the 06/01/2020 between the Carbon Check (India) Private Ltd. (hereafter the "VVB") and the project participant – Cygni Energy Private Limited; Value Network Venture Advisory PTE Ltd./05/. The team assigned to the verification meets the Carbon Check (India) Private Ltd's internal procedures including the UNFCCC requirements for the team composition and competence. CCIPL has conducted a thorough contract review as per UNFCCC and Carbon Check's procedures and requirements.

The verification has been performed as per the requirements described in the GS4GG - community service activity requirements, version 1.2 /B02-1/, Gold Standard for the Global Goals Principles & Requirements (version 1.2) /B02-2/ and CDM VVS for project activities (version 02.0) /B01-1/ and constitutes the review and completion of the following steps:

- Review of the final PDD (version 1.1; Dated: 21/03/2020) /B05/, including the monitoring plan and the corresponding validation report /B06/, the SDG impact monitoring data;
- Desk review of the MR, emission reduction spreadsheet
- Review of the applied monitoring methodology, "AMS-III.BL., "Integrated methodology for electrification of communities", (version 1.0) /B03/;
- Review of any CMP and EB decisions, clarifications and guidance and the Gold Standard Secretariat;
- On-site assessment (29/01/2020 to 30/01/2020)
- Resolution of CARs and CLs raised during verification
- Issuance of Verification Report

In Carbon Check's opinion, the project activity was correctly implemented according to selected monitoring methodology monitoring plan and the final PDD /B05/. The monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on-site visit, the verification team confirms that the project has resulted in the 29,719 t CO_2e emission reductions during the first monitoring period. The GHG emission reductions and non-GHG parameters were correctly calculated/monitored based on the approved monitoring methodology "AMS-III.BL., "Integrated methodology for electrification of communities", (version 1.0) /B03/ and the monitoring plan contained in the final PDD (version 1.1; Dated: 21/03/2020) /B05/.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader/ Technical Expert/ Local Expert/ Validator	IR	Anand	Amit	CCIPL	X	X	X	X
2.	Team Member	IR	Chaudhari	Tushar	CCIPL	X			X
3.	Local Expert	ER	Buragohain	Champok	CCIPL		X	X	

Amit Anand: Qualified lead assessor and internal technical reviewer for offset projects validations and verifications under CDM, VCS and Gold Standard (GS) and actively been involved in the validation and verification or internal technical review of more than 200 offset projects. He is qualified as technical expert for TA 1.2, 3.1, 8.1, 13.1 and 14.1 under CDM Sectoral Scope categorisation. He has a professional experience of more than 12 years in various capacities with organizations like MITCON, TUV Rheinland, Deloitte and MGM International in the development and validation/verification of carbon offset projects under different market-based mechanism. He was also involved in validation and verification the following Gold Standard Projects: GS 1078, GS 976, GS 850, and GS 916 PoA (GS 1231 (VPA 01) GS 1029 (VPA 02), GS 1030(VPA 03), GS 1031(VPA 04).

Tushar Chaudhari: He is an appointed Team Member for technical area 1.1,1.2,3.1,13.1. He holds a Masters in Environment Management from North Maharashtra University, Jalgaon and B.Sc. Zoology from M.J. College, in North Maharashtra University, Jalgaon. He is also successfully completed ISO 14001:2015 Lead Auditor course. He had also completed GRI training course. He is having more than 11 years of experience, which involves experience in renewable energy consultancy and auditing. Including 6+ years auditing experience in Climate Change - Clean Development Mechanism. Worked on various projects under CDM, VCS, Gold standard validation and verification process. He has also worked as freelancer EHS, Sustainability consultant and third party auditor for ISO 14001, EHS compliance and GHG quantification, assessment and auditing, carbon foot printing assessment and third party auditing. He has worked on project GS561 as consultant.

Champok Buragohain: is an appointed Local Expert. He is also well versed with English (language of audit) as well as Assamese (local languages spoken) in the project area.

B.2. 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 VVB or outsourced entity)
1.	Technical reviewer	IR	Agarwalla	Sanjay Kumar	CCIPL
2.	Approver	IR	Singh	Vikash Kumar	CCIPL

Sanjay Kumar Agarwalla: He is an appointed Team Leader and Technical Expert for technical area 1.1, 1.2, 2.1, 3.1, 4.1, 5.1, 5.2, 8.1, 9.1, 9.2 and 13.1. He is having more than 17 years of experience, which involves more than 10 years of industrial experience and almost seven years in climate change. He worked in various capacities at Kesoram Rayon, Durgapur Chemicals Limited, Gensol Consultants, TUV Rheinland

India Pvt Ltd and LRQA. He is involved in more than 70 GHG audits including validation/verification/post registration changes. He also has GS Audit Experience and attended the Gold Standard webinar. The GS projects on which he has worked are 1309, 850, 6191, 411, 1353 and 939.

SECTION C. Application of materiality

The threshold of materiality was evaluated based on "Guideline: Application of materiality in verifications" (version 02.0) /B07/. It was concluded that the materiality threshold applicable to the project activity based on actual emission reductions achieved is 5% of 29,719 t CO_2e which is equal to 1486 t CO_2e.

In planning the verification, verification team took cognizance of §11 and §12 of the "Guideline: Application of materiality in verifications" (version 02.0) /B08/ and a materiality threshold of 1486 tCO_2e is determined for the current verification of the project activity.

C.1. Consideration of materiality in planning the verification

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	
1.	Human error in the quantification of emissions	Low	According to the monitoring plan and the Monitoring Report, there are QA/QC procedures applied for monitoring parameters and data management/information flow. Calculation spread-sheets are used to determine the emissions reductions. Further data collected are through calibrated meters and automated system.	Verification team of CCIPL has focused on assessment of the following: • Procedure of raw data collection/ Monitoring procedures. • Data & information flow with a special focus on any material mistake • Calculation spreadsheets. • Procedures/QA/QC established to detect and correct any error or omission in monitoring parameters. • Quality control for monitored parameters • Sampling plan for conducting monitoring survey Complete verification (100 % data) of all the monitoring records (distribution/sales records, monitoring survey records) was done by the verification team and compared with the values indicated in the emission reduction spread-sheet. No risk identified.

C.2. Consideration of materiality in conducting the verification

In line with Guidelines for Application of materiality in verifications /B07/, a reasonable level of assurance is defined for the verification of the project by complete verification of all the monitoring records (distribution/sales records, monitoring survey records) was done by the verification team and compared with the values indicated in the emission reduction spread-sheet/03/, /04/.

Some inconsistencies were identified and subsequently finding was raised. These findings are detailed in Appendix 4 and they were successfully closed. Therefore, related identified mistakes as listed in findings in Appendix 4 to this report have been determined to be immaterial. Thus, it is confirmed that there are no material errors, omissions or misstatements and a reasonable level of assurance is established

SECTION D. Means of verification

D.1. Desk/document review

>>
The verification was performed primarily based on the review of the Monitoring report /01/ and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology. Documents reviewed or referenced during the verification are listed in Appendix 3 below.

D.2. On-site inspection

Duration of on-site inspection: 29/01/2020 to 30/01/2020				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	An assessment of the implementation and operation of the project activity as per the final PDD	Guwahati	29/01/2020	Amit Anand, Champok Buragohain
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	Guwahati	29/01/2020 & 30/01/2020	Amit Anand, Champok Buragohain
3.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD	Guwahati	29/01/2020 & 30/01/2020	Amit Anand, Champok Buragohain
4.	A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources	Guwahati	29/01/2020 & 30/01/2020	Amit Anand, Champok Buragohain
5.	Following on-site inspections were conducted: • 08 households from the baseline survey were visited and interviewed • Sample households where project activity has been implemented (08 in number) were visited • Implementation and operation status were reviewed	Guwahati	30/01/2020	Amit Anand, Champok Buragohain
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions, local stakeholders interview	Guwahati	29/01/2020 & 30/01/2020	Amit Anand, Champok Buragohain
7.	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	Guwahati	29/01/2020 & 30/01/2020	Amit Anand, Champok Buragohain

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Deka	Nayan Jyoti	Value Network Venture Advisory PTE Ltd.	29/01/2020; 30/01/2020	Project implementation and operation, monitoring procedure, data and information flow, compliance of monitoring plan with monitoring methodology and final PDD, Roles and responsibility, Sustainability Monitoring Plan, Sampling plan, Survey records, Sales/Distribution records, Discussion on SD monitoring and Grievance Mechanism – Handling of Grievances	Amit Anand, Champok Buragohain
2.	Das	Inderjeet	Cygni Energy Pvt. Ltd.	29/01/2020; 30/01/2020	Project operation, CER calculation and completeness of monitoring report, Quality Assurance – Management and operating system, compliance of monitoring plan with monitoring methodology and PDD.	Amit Anand, Champok Buragohain
3.	Lakhar	Biju	Nirman Associate	29/01/2020; 30/01/2020	Monitoring procedure, Monitoring procedure, QA/QC Procedures, Quality Assurance, Management and operating system, Management and operating system	Amit Anand, Champok Buragohain
4.	Bezbaruah	Utpal	Cygni Energy Pvt Ltd	29/01/2020; 30/01/2020	CER calculation and completeness of monitoring report, Electronic Monitoring system, Sustainability Monitoring Plan, Sampling Plan, Survey records, Sales/Distribution records, CER waiver records and	Amit Anand, Champok Buragohain

					procedure, QA/QC Procedures, Quality Assurance – Management and operating system	

Through the above mentioned activities, the verification team confirmed the following Gold Standard project aspects in relation to the project activity:

- The implementation and operation of the project activity is as described in the monitoring plan in the PDD.
- The operational and data collection procedures are implemented as per the monitoring plan in the PDD
- The information flow for generating, grouping and reporting of the monitored parameters
- Procedures to avoid double counting are in place.

D.4. Sampling approach

>>
Standard auditing techniques has been applied by CCIPL to assess and verify the quality of information provided during the course of verification.

CCIPL's sample size of 08 households for onsite visit is deemed to be appropriate with the reasoning discussed below:

VVB used sampling during verification for checking the PP's sample size. Considering that the annual emission reductions being claimed are less than 100,000 tCO_2 e, applying paragraph 39 (a) of the sampling standard, version 08 /B09/, a sample size of 08 households was chosen (with no discrepant records). A sample size of 08 was required, based on an AQL of 0.5 % and UQL of 20 %, producer risk 10 % and consumer risk 20 %. Acceptance number (c) thus determined for the sample is 0. It was observed that out of the 8 samples, all the stoves were operational which matched with the PP's records and hence no discrepant records were observed with the published MR /1/ and ER sheet /2/ and thus c=0. Thus, PP's set of records has been accepted in line with § 33 of the sampling standard, version 08 /B09/.

The PP had applied 90/10 confidence / precision for annual monitoring for the project activity, which is deemed acceptable. The verification team confirms that the PP's monitored samples met the desired confidence/ precision level of 90/10.

Hence, CCIPL confirms PP's survey/sampling records to be acceptable and assessment of acceptance of PP's sampling has been conducted in line with the requirements of the Sampling Standard, version 08 /B09/.

Based on above, verification team confirms the following aspects in relation to the project activity:

- The implementation and operation of the project activity is as described in the monitoring plan in the final PDD/B05/.
- The operational and data collection procedures are implemented as per the monitoring plan of the final PDD/B05/.
- The information flow for generating, grouping and reporting of the monitored parameters
  Procedures to avoid double counting are in place.

Verification team also reviewed the impact of the project activity on sustainable development and found it to be in compliance with the Gold Standard requirements.

D.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	--	02	--
Compliance of the project implementation and operation with the registered PDD	01	01	--

Post-registration changes	--	--	--
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	--	--	--
Compliance of monitoring activities with the registered monitoring plan	01	--	--
Compliance with the calibration frequency requirements for measuring instruments	--	--	--
Assessment of data and calculation of emission reductions or net removals	01	--	--
Assessment of reported sustainable development co-benefits	--	--	--
Global stakeholder consultation	--	--	--
Others (Supporting documents)	02	--	--
Other (Sustainability Monitoring)	--	--	--
Total	05	03	--

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	DR, I
Findings	CAR 01 and CAR 02 were raised in this regards and have been resolved successfully. Please refer to Appendix 4 of this report for more details.
Conclusion	In accordance with § 352 of CDM validation and verification standard for project activities, version 02.0/B01-1/, verification team confirms that final monitoring report/02/ is completed using the latest valid version of applicable monitoring report form/B04/.

E.2. Remaining forward action requests from validation and/or previous verifications

>>

There is no pending FAR from validation to be addressed during the 1st verification.

E.3. Compliance of the project implementation and operation with the registered project design document

Means of verification	DR, I
Findings	CL 01 and CAR 03 were raised in this regards and have been resolved successfully. Please refer to Appendix 4 of this report for more details.
Conclusion	The PDD/B05/ contains a description, which provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation. The project participants mentioned in the PDD/B05/ for the project are Cygni Energy Private Limited; Value Network Venture Advisory PTE Ltd. The location of the project activity is clearly defined in the PDD/ B05/ and the household are spread across India viz. Assam, Meghalaya, Manipur, Madhya Pradesh, Rajasthan and Jammu & Kashmir.Project activity involves implementation of Solar DC Inverterless solution in households, which are not connected to the grid and dependent on kerosene-based lamps to meet their lighting needs. Solar DC Inverterless solution includes solar PV generating DC power, battery charging and discharging in DC, and DC loads with wiring at home which is DC. The project start date defined in the final PDD/B05/ as 21/03/2018 i.e. the date of installation of first Solar DC Inverterless solution /13/. The technical specifications of the Solar DC Inverterless solution are: • PV roof top array: 200 Peak capacity in Wp • Inverterless controller • Li-ion Battery/Lead-Acid Battery – 1 kW • 1 DC mobile charger • 1 DC socket

	• 5 DC bulb • 1 BLDC ceiling fan The design of the project technology was assessed through physical site inspection and through the review of documents /01/, /08/, /17/, /18/.Validation team also interviewed representative of PP and also reviewed the complaint lodging and rectification procedure /12/, /14/ to understand the maintenance and monitoring of the project activity. The scenario prior to project implementation is that the households had no access to electricity and were not connected to a national/regional grid. The project activity is specifically aimed for Type I consumers (who were not connected to a national/regional grid or a mini grid prior to the project implementation and who consume less than 500 kWh per year) and the same is in accordance with applied methodology AMS-III.BL (version 01.0) /B03/. The same is verified during on-site visit, sample copies of agreement between Cygni Energy Private Limited and end user for installation/07/, technical specification/08/ and ER sheet/04/. The operational and management structured is verified from document review and site visit interview. Verification team has checked the monitored data through monitoring survey/records /06/ during the monitoring period and ER sheet/04/ and found appropriate. Further, the monitoring staff of PP is competent as verified during onsite interview. As per the PDD /B05/, the project aims to install 50,000 Solar DC Inverterless solution, across the six (06) states of India reducing 36,605 tonnes of CO_2on an annual basis and 1,83,025 tonnes of CO_2 during the 5-year of renewable crediting period. The project capacity is 10 MW (0.2kW*50,000=10 MW)/B05/ which is well below the SSC threshold of 15 MW for type I project activities i.e. renewable energy project. Verification team has checked the lifetime of the project from Proof of operational lifetime/11/, Test Certificates for the main component of the Solar DC Inverterless system/17/, Test report for 200Wp/18/ and final PDD /B05/ which is 10 years. The project is operating well as verified during on-site visit and also from the documents review. As verified during the on-site visit, the project implementation and operation, all physical features of the project complies with the project design document /B05/. Verification team has checked the information in the monitoring report/02/ and compared against the final PDD/B05/ and found consistent. During the on-site inspection, the verification team has checked the project location, implementation, technology applied, project equipment, physical features and monitoring system against the information in the final PDD/B05/. The verification team based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the final PDD/B05/ and that physical features of the project are in place. As per § 354 and § 355 of CDM VVS for project activities, version 02/B01/, the verification team confirms that: a) The project activity is implemented as per final PDD/B05/. b) The actual operation of the proposed CDM project activity is in line with the final PDD/B05/. c) It has reviewed the final PDD/B05/ including the monitoring plan, the applied monitoring methodology, relevant decisions from CMP and the CDM EB and found that the final MR/02/ for this monitoring period is in line with all the above mentioned documents.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents[1]

>>
Not Applicable

E.4.2. Corrections

>>
Not Applicable

E.4.3. Changes to the start date of the crediting period

>>
Not Applicable

E.4.4. Inclusion of a monitoring plan

>>
Not Applicable

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

>>
Not Applicable

E.4.6. Changes to the project design

>>
Not Applicable

E.4.7. Changes specific to afforestation and reforestation project activities

>>
Not Applicable

E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents

Means of verification	DR, I
Findings	CL 02 was raised in this regards and have been resolved successfully. Please refer to Appendix 4 of this report for more details.
Conclusion	The verification team has checked the actual monitoring plan and monitoring methodology and applicable tools. Furthermore, the verification team has checked monitoring system during the onsite inspection by means of comparison with the information given in the monitoring plan and monitoring methodology. The monitoring plan is completely in accordance with the approved methodology /B03/ applied by the final PDD /B05/. All the parameters need to be monitored and corresponding monitoring approach have been discussed in the monitoring plan in the final PDD /B05/ and QA/QC procedure has been stipulated. The verification team confirms that the monitoring plan complies with the applied methodology /B03/ and the monitoring system and all applied procedures are completely in compliance to the latest approved monitoring plan and the methodology AMS-III.BL., (version 01.0) /B03/.

[1] Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

	The verification team took cognizance of §357 and §358 of CDM VVS for project activities (version 02.0) /B01-1/.

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	DR, I
Findings	--
Conclusion	The verification team's assessment of each data and parameter fixed ex-ante is provided below:

Parameter	Description	Value	Unit	Source	Assessment
$EF_{CO2,T1}$	Emission factor for type I consumer(EF CO2, T1)-upto 0.055 MWh/ year	6.8	tCO_2/ MWh	Default value, § 31 of AMS III BL, version 1.0	The value is consistent with final PDD /B05/, applied methodology AMS.III.BL./B03/ and fixed ex-ante for the duration of the crediting period of the project activity.
$EF_{CO2,T1}$	Emission factor for type I consumer(EF CO2, T1-Between 0.055 to 0.250MWh/ year)	1.3	tCO_2/ MWh	Default value, § 31 of AMS III BL, version 1.0	The value is consistent with final PDD /B05/, applied methodology AMS.III.BL./B03/ and fixed ex-ante for the duration of the crediting period of the project activity.
$EF_{CO2,T1}$	Emission factor for type I consumer(EF CO_2, T1-For the portion greater than 0.250 MWh/year)	1.0	tCO_2/ MWh	Default value, § 31 of AMS III BL, version 1.0	The value is consistent with final PDD /B05/, applied methodology AMS.III.BL./B03/ and fixed ex-ante for the duration of the crediting period of the project activity.
Solar Availability factor	Annual average solar availability factor based on manufacturer's data	20.24	%	Manufacturer's data	The value is consistent with final PDD /B05/, Solar availability report/09/ and fixed ex-ante for the duration of the crediting period of the project activity.
Annual hours	Annual hours	8760	hr	AMS-III.BL (version 01.0) /B01/	The value is consistent with final PDD /B05/, footnote 11 of applied methodology

						AMS.III.BL/B03/and fixed ex-ante for the duration of the crediting period of the project activity.
	Type of DC equipment installed at households	Type of DC equipment installed at households DC Fan, DC LED Bulb & DC mobile Charging point/ socket	PV roof top array - 1no Inverterless controller - 1 no Li-ion Battery/ lead – acid battery – 1 no BLDC FAN – 1 no, DC LED Bulb – 5 Nos DC mobile Charging point – 1no socket – 1 no	N/A	Distribution records /	The value is consistent with final PDD /B05/, state wise records of implemented solar DC Inverterless solution/10/ and fixed ex-ante for the duration of the crediting period of the project activity.

The value is consistent with the final PDD /B05/ and defined fixed ex-ante for the duration of the crediting period of the project activity. The fixed ex-ante data and parameter has been listed in the monitoring report and confirmed by the verification team as correct and consistent with that stated in the final PDD /B05/.

The verification team took cognizance of § 360 of CDM VVS for project activities, (Version 02.0) /B01-1/.

E.6.2. Data and parameters monitored

Means of verification	DR, I
Findings	CL 03 was raised in this regards and have been resolved successfully. Please refer to Appendix 4 of this report for more details.

Conclusion	Verification team confirms through onsite visit and from document review, the actual monitoring system complies with the monitoring plan mentioned in the final PDD/B05/. During the verification, the monitoring parameter of the defined monitoring plan in the final PDD /B05/ have been verified with regards to appropriateness of verification method; correctness of values applied for ER calculations, the accuracy and applied QA/QC measures. The assessment for the monitoring parameter is given below: Data/parameter: $EC_{T1,x,y}$ Unit: MWh Description: Electricity consumption at Type I. Value(s) of monitored parameter: The value of the monitoring parameter(0.355 MWh for the current monitoring period) is reported in the ER sheet/02/. The value for the period 21/03/2018 to 20/03/2019 (Inclusive of both the dates) have been verified through review of ER calculation spreadsheet /04/, technical specification /08/, solar availability report/09/, distribution records i.e. state wise records of implemented solar DC Inverterless solution/10/. Verification team checked the same and found appropriate. During the course of on-site visit, the verification team cross verified the implemented solar DC Inverterless solutions. The electricity consumption by the project activity calculation is provided in ER calculation sheet/04/ is accurate and in line with § 54(c) of applied methodology, AMS.III.BL, version 01/B03/ and final PDD/B05/. Thus, the same is deemed acceptable by the verification team. The verification team took cognizance of § 360, § 361 and § 364 of CDM VVS for project activities (version 02.0) /B01-1/. • The monitoring has been carried out in accordance with the monitoring plan in the final PDD /B05/. • All parameters required by the monitoring plan have been measured / determined without material misstatements and in line with all applicable standards and relevant requirements.

E.6.3. Implementation of sampling plan

Means of verification	DR,I
Findings	--
Conclusion	The total quantity of implemented solar DC Inverterless solution in the project activity considered for the monitoring period is 40,595. The monitoring parameter required to be monitored through the sampling plan is: "Proportion of operational systems and connections" of the solar DC system A simple random sampling was opted by PP for selection of the monitoring samples with 90/10 confidence/precision for the parameter for annual monitoring. The project population is homogenous, hence the approach is found conformance with the final PDD/B05/, Standard for Sampling and surveys for CDM project activities and programmes of activities, version 08.0/B09/. PP has determined the minimum sample size to determine number of Solar DC system in operation using the procedure outlined in § 12 of appendix 1, Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities, version 4.0/B08/. The verification team confirms that the applied method for sample size calculation is in accordance with the final PDD /B05/.

The number of samples for each of the parameters covered during the monitoring activity is as given below:

Parameter	Sample Size (n) required	Samples covered during monitoring
Proportion of operational systems and connections	31	50

The actual sample size in the case was not less than either the calculated sample size or the minimum sample size as per the final PDD/B05/. PP applied the online tool, 'Stattrek random number' (http://stattrek.com/statistics/random-number-generator.aspx) for the selection of households. The required sample size is 31 samples, however PP has taken/considered 50 samples for the survey. The same is found conservative and thus acceptable to verification team.

The verification team has checked the sample size calculation and found that for the parameter the confidence/precision of 90/10 was met.

VVB used sampling during verification for checking the operational status and to check the SDG indicator (Number of households, Air quality, Access to affordable and clean energy services) in the households and it was confirmed that the survey was conducted and solar DC Inverterless solution is implemented in household.

As justified in above section D.4, § 39 (a) of the sampling standard, version 08 /B09/, a sample size of 08 households was chosen (with no discrepant records).Thus, PP's set of records has been accepted in line with § 33 of the sampling standard, version 08 /B09/. Verification team has cross verified these sample documents during the on-site visit and found appropriate.

The sampling plan implemented by the PP is in accordance with the applied approved monitoring methodology /B03/ and the final PDD /B05/. The PP has appropriately performed Simple Random Sampling procedure in line with the applied methodology/B03/ and best suited for this type of project. As the final PDD /B05/ mentions the option for Simple Random Sampling procedure, it is acceptable to the verification team.

The necessary confidence / precision of 90/10 each of the parameters is met. The verification team from the supporting documents submitted /04/, /10/, has cross verified this.

The verification took cognizance of § 348 of CDM VVS for PoAs, Version 02.0 /B01-1/.

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	N/A
Findings	N/A
Conclusion	N/A

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	DR, I
Findings	--
Conclusion	Baseline emissions are the product of the baseline emission factor for Type I consumer ($EF_{CO2,T1}$) times the annual electricity consumption of Type I consumer in year y ($EC_{T1,x,y}$) under the project activity.

$$BE_{T1,y} = \sum_{x=1}^{N} \left(EC_{T1,x,y} \times EF_{CO2,T1} \right)$$

The final PDD /B05/ has selected default value of emission factor ($EF_{CO2,T1}$) in line with § 31 of applied methodology/B03/ and the value for the same is fixed for the crediting period. The MR has accordingly used the emission factor fixed ex-ante.

$EC_{T1,x,y}$ is the annual electricity consumption of Type I consumer in year y, which is determined by using technical specification /08/, solar availability report/09/, distribution records i.e. state wise records of implemented solar DC Inverterless solution/10/. The calculation of annual electricity consumption for Type I consumer is provided in ER calculation sheet/04/ which is cross-checked with the input sources /08/,/09/,/10/ by the verification team.

Sl. No.	Items	Description	Units	Values
1.	$EC_{T1,x,y}$	Annual electricity consumption of Type I consumer in year y	MWh	0.355
2.	$EF_{CO2,T1}$	baseline emission factor for Type I consumer	tCO_2/MWh	* § 31 of applied methodology/B03/
3.	$BE_{T1,y}$	Baseline emission for Type I consumer in a year y	tCO_2/yr	29,719

The verification team has checked the distribution records for solar DC Inverterless solution /10/ for the monitoring period and found the parameter is monitored and recorded as per the monitoring plan in the final PDD /B05/. The verification team has cross-checked the ER sheet /04/ and monitoring data /08/, /09/, /10/ and found all the values are consistent.

The verification took cognizance of § 372 of CDM VVS for project activities (version 02.0) /B01-1/ and confirms that:

- A complete set of data for the monitoring period is available.
- Information on the baseline GHG emission calculation provided in the monitoring report has been cross-checked with other sources.
- Calculations of baseline emissions have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology.
- Appropriate emission factor values have been correctly applied.
- No errors, miscalculations, omissions, misstatements or incomplete information has been identified.

E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

Means of verification	DR,I
Findings	--
Conclusion	The project emissions from the project is zero, thus is in accordance with § 39 of AMS.III.BL., (version 01.0) /B03/, final PDD /B05/.

E.8.3. Calculation of leakage GHG emissions

Means of verification	DR,I
Findings	--
Conclusion	The leakage from the project is zero, thus is in accordance with § 35 of AMS.III.BL., (version 01.0)/B03/, final PDD /B05/.

E.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	DR, I
Findings	--
Conclusion	The verification team assessed whether the calculation of GHG emission reductions as presented in the monitoring report /02/ and the ER spread-sheet /04/ are in accordance with the formulae and methods described in the final PDD /B05/. According to ER calculation spreadsheet/04/, the emission reductions are calculated as: $$ER_y = BE_{,y} - (PE_y + LE_y)$$ **Sl. No. / Parameters / Description / Units / Values** 1. / ER_y / Emission reductions in year y / tCO_2/yr / 29,719 2. / BE_y / Baseline emission in a year y / tCO_2/yr / 29,719 3. / PE_y / Project emission in a year y / tCO_2/yr / 0 4. / LE_y / Leakage emission in a year y / tCO_2/yr / 0 The verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from final PDD/B05/. The total number of VERs achieved during the monitoring period /02/, /04/ is as follows. 21/03/2018 to 31/12/2018: 23,287 tCO_2e 01/01/2019 to 20/03/2019: 6,432 tCO_2e Total during the current monitoring period: 29,719 tCO_2e According to § 372 of CDM VVS for project activities (version 02.0) the verification team confirms that: • A complete set of data for the monitoring period is available. • Information provided in the monitoring report has been cross-checked with all input values sources; • Calculations of baseline emissions and emission reduction has been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology. • Appropriate/correct emission factor value has been applied.

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	DR, I
Findings	--
Conclusion	The actual emission reductions in the monitoring period are 29,719 tCO_2e which is less than the estimated emission reductions 36,605 tCO_2e (for an equivalent period of 365 days) as per the final PDD /B04/. The verification team has checked all the technical specification/08/, Solar availability report/09/, state wise records of implemented solar DC Inverterless solution/10/, during OSV applicable for the monitoring period and confirmed that the Electricity consumption at Type I (i.e. Electricity delivered by the solar DC home system per year) is correct and consistent. Therefore, the actual emission reductions from 21/03/2018 to 20/03/2019 (both days inclusive) are calculated correctly and are less than the estimated emission reduction. According to § 372 of CDM VVS for project activities (version 02.0) the verification team confirms that a comparison of actual GHG emission reductions or net anthropogenic GHG removal of the project activity achieved during this monitoring

	period with the estimates in the final PDD has been provided.

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	DR, I
Findings	--
Conclusion	The actual emission reductions in the monitoring period are 29,719 tCO_2e which is less than the estimated emission reductions 36,605 tCO_2e (for an equivalent period of 365 days) as per the final PDD /B05/ i.e., there is an decrease of 18.81% in volume of ERs achieved as against the estimated volume of ERs for the equivalent period. The decrease in GHG emission reductions achieved compared to the amount based on the ex-ante estimation in the final PDD /B05/ is due to actual implementation of lower number of solar DC Inverterless solutions (i.e. 40,595 households) during the monitoring period (which is beyond the control of PP) as compared to the ex-ante projected number of solar DC Inverterless solutions (i.e. 50,000 households). The same was verified through review of final PDD /B05/ and state wise records of implemented solar DC Inverterless solution/10/. From the review and comparison of the data it was concluded that the calculated electricity consumption at Type I (i.e. Electricity delivered by the solar DC home system per year) during the monitoring period were less than the estimated in the PDD/B05/ due to unfavorable conditions in the project area (i.e. less households/end user willingness) compared to the projected number of households /end user used for the initial feasibility study. During the OSV the same is cross verified by the verification team. Thus, deems the same acceptable. The verification took cognizance of § 356(d) of CDM VVS for project activities (version 02.0) /B01-1/.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	DR, I
Findings	--
Conclusion	VERs achieved from 1st January 2013 onwards – 29,719 t CO_2e.

E.9. Assessment of reported sustainable development co-benefits

Means of verification	Not Applicable
Findings	Not Applicable.
Conclusion	Not Applicable.

E.10. Global stakeholder consultation

Means of verification	Not Applicable
Findings	Not Applicable.
Conclusion	Not Applicable.

SECTION F. Internal quality control

>>

The final verification report passed a technical review before being submitted to the GS registry. A technical reviewer qualified in accordance with CCIPL's qualification scheme for Gold Standard requirement, CDM validation and verification performed the technical review.

SECTION G. Verification opinion

>>

Carbon Check (India) Private Ltd. (CCIPL) has performed the first (01st) verification of the GS Project Activity "Solar DC programme in off-grid regions in India" in India having GS reference number GS7467.

The verification team assigned by the VVB concludes that the project activity as described in the final PDD (version 1.1; dated 21/03/2020) /B05/ and the monitoring report (version 1.1 dated 21/03/2020) /02/, meets all relevant GS4GG requirements for project activity and UNFCCC requirements. The verification has been conducted in-line with the GS4GG requirements and requirements of VVS for CDM project activities (version 02.0) /B01-1/.

Verification methodology and process

The verification team confirms the contractual relationship signed on 06/01/2020 between the VVB, Carbon Check (India) Private Ltd. and Project Participants (Cygni Energy Private Limited; Value Network Venture Advisory PTE Ltd.). The team assigned to the verification meets the CCIPL's internal procedures including the UNFCCC requirements for the team composition and competence. The verification team has conducted thorough review as per GS4GG, UNFCCC and CCIPL's procedures and requirements.

The verification has been performed as per the requirements described in the GS4GG requirements /B02/, VVS for CDM project activities (version 02.0) /B01-1/and constitutes the review and completion of the following steps:

- Reviewing the final PDD (version 1.1; dated 21/03/2020) /B05/;
- Receipt of the MR (version 01 dated 20/01/2020) /01/;
- Desk review of the MR /01/ and other relevant documents;
- Review of the applied monitoring methodology (AMS.III.BL., version 01.0) /B03/;
- Review of any CMP and EB decisions, clarifications and guidance;
- On-site assessment (29/01/2020 to 30/01/2020);
- Resolution of CARs and CLs raised during verification;
- Issuance of Verification Report

The project activity was correctly implemented according to the selected monitoring methodology and final PDD /B05/. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review an on-site visit the verification team confirms that the project activity has resulted in 29,719 tCO_2e emission reductions during the first (01st) monitoring period.

The break-up of emission reduction up to 31/12/2012 and 01/01/2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards		
		21/03/2018 to 31/12/2018	01/01/2019 to 20/03/2019	Total
Emission reductions (t CO_2e)	0	23,287	6,432	29,719

CCIPL therefore pleased to issue a positive verification opinion expressed in the attached Certification statement.

SECTION H. Certification statement

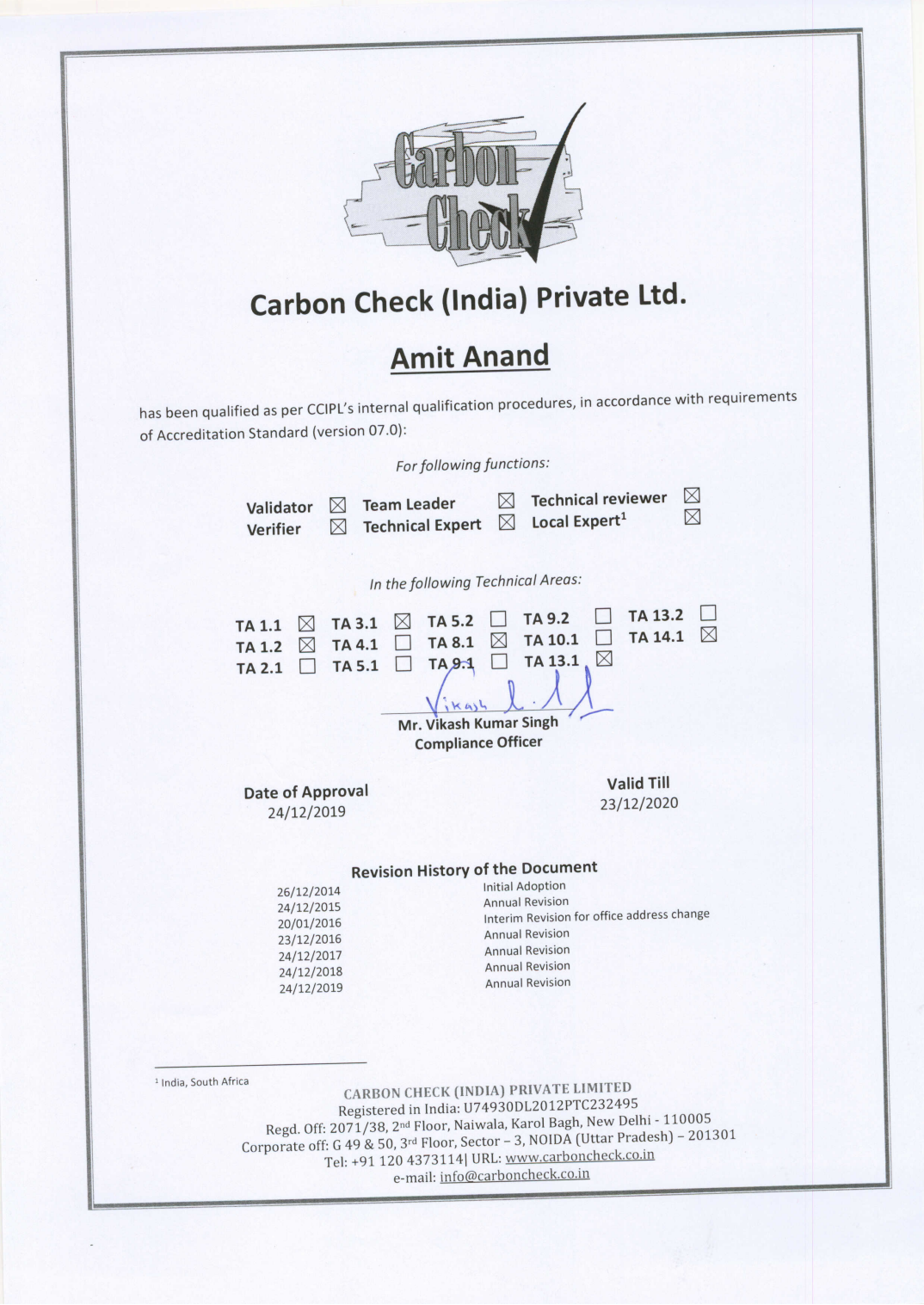
>>

It is CCIPL's opinion that the GHG emission reductions stated in the monitoring report, version 1.1 dated 21/03/2020 for project activity, "Solar DC programme in off-grid regions in India" for period 21/03/2018 to 20/03/2019 (Inclusive of both the dates) are fairly stated. The GHG emission reductions were calculated correctly based on the approved monitoring methodology, AMS.III.BL., version 01.0. Hence, CCIPL able to certify that the emission reductions from the project during the monitoring period 21/03/2018 to 20/03/2019 (Inclusive of both the dates) amount to 29,719 t CO_2e.

Appendix 1. Abbreviations

Abbreviations	Full texts
CDM	Clean Development Mechanism
CEE	Central Environmental Authority
CAR	Corrective Action Request
CCIPL	Carbon Check (India) Private Ltd.
CL	Clarification Request
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DR	Document review
DVR	Draft Validation Report
EB	CDM Executive Board
EF	Emission Factor
EI	External individual
ER	Emission Reduction
FA	Final Approval
FAR	Forward Action Request
FVR	Final validation Report
GHG	Greenhouse gas(es)
GS	Gold standard
GS4GG	Gold standard for Global Goals
I	Interview
IPCC	Intergovernmental Panel on ClimateChange
IR	Internal resource
MOC	Modalities of communication
MW	Mega Watt
MWh	Mega Watt hours
PDD	Project Design Document
PP	Project Participant
OSV	On Site Visit
QC/QA	Quality control /Quality assurance
SS	Sectoral Scope
TA	Technical Area
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
VER	Verified Emission Reduction
VVB	Validation/Verification Body
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



Carbon Check (India) Private Ltd.

Amit Anand

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒		
Verifier	☒	Technical Expert	☒	Local Expert[1]	☒		

In the following Technical Areas:

TA 1.1	☒	TA 3.1	☒	TA 5.2	☐	TA 9.2	☐	TA 13.2	☐
TA 1.2	☒	TA 4.1	☐	TA 8.1	☒	TA 10.1	☐	TA 14.1	☒
TA 2.1	☐	TA 5.1	☐	TA 9.1	☐	TA 13.1	☒		

Mr. Vikash Kumar Singh
Compliance Officer

Date of Approval
24/12/2019

Valid Till
23/12/2020

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2016	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision

[1] India, South Africa

CARBON CHECK (INDIA) PRIVATE LIMITED
Registered in India: U74930DL2012PTC232495
Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
Corporate off: G 49 & 50, 3rd Floor, Sector – 3, NOIDA (Uttar Pradesh) – 201301
Tel: +91 120 4373114| URL: www.carboncheck.co.in
e-mail: info@carboncheck.co.in

Carbon Check (India) Private Ltd.

Tushar Eknath Choudhari

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	☒	**Team Leader**	☐	**Technical reviewer**	☐
Verifier	☒	**Technical Expert**	☒	**Local Expert**[1]	☒

In the following Technical Areas:

TA 1.1	☒	**TA 3.1**	☐	**TA 5.2**	☐	**TA 9.2**	☐	**TA 13.2**	☐
TA 1.2	☒	**TA 4.1**	☐	**TA 8.1**	☐	**TA 10.1**	☐	**TA 14.1**	☐
TA 2.1	☐	**TA 5.1**	☐	**TA 9.1**	☐	**TA 13.1**	☒		

Mr. Vikash Kumar Singh
Compliance Officer

Mr. Amit Anand
CEO

Date of Approval
24/12/2019

Valid Till
23/12/2020

Revision History of the Document	
26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revisison

[1] India

CARBON CHECK (INDIA) PRIVATE LIMITED
Registered in India: U74930DL2012PTC232495
Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
Corporate off: G 49 & 50, 3rd Floor, Sector – 3, NOIDA (Uttar Pradesh) – 201301
Tel: +91 120 4373114| URL: www.carboncheck.co.in
e-mail: info@carboncheck.co.in

Carbon Check (India) Private Ltd.

Sanjay Agarwalla

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	☒	**Team Leader**	☒	**Technical reviewer**	☒
Verifier	☒	**Technical Expert**	☒	**Local Expert**[1]	☒

In the following Technical Areas:

TA 1.1	☒	**TA 3.1**	☒	**TA 5.2**	☒	**TA 9.2**	☒	**TA 13.2**	☐
TA 1.2	☒	**TA 4.1**	☒	**TA 8.1**	☐	**TA 10.1**	☐	**TA 14.1**	☐
TA 2.1	☒	**TA 5.1**	☒	**TA 9.1**	☒	**TA 13.1**	☒		

Mr. Vikash Kumar Singh
Compliance Officer

Mr. Amit Anand
CEO

Date of Approval
24/12/2019

Valid Till
23/12/2020

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision

[1] India

CARBON CHECK (INDIA) PRIVATE LIMITED
Registered in India: U74930DL2012PTC232495
Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
Corporate off: G 49 & 50, 3rd Floor, Sector – 3, NOIDA (Uttar Pradesh) – 201301
Tel: +91 120 4373114| URL: www.carboncheck.co.in
e-mail: info@carboncheck.co.in

Appendix 3. Documents reviewed or referenced

No.	Reference Document
/01/	Initial monitoring report (Version: 01; Dated: 20/01/2020)
/02/	Final monitoring report (Version: 1.1; Dated: 21/03/2020)
/03/	Emission reduction calculation spread sheet corresponding to /01/
/04/	Emission reduction calculation spread sheet corresponding to /02/
/05/	Contract dated 06/01/2020 between GS VVB and VNV Advisory Services PTE Ltd for Validation and verification of the project.
/06/	Monitoring survey records
/07/	Sample copies of agreement between Cygni Energy Private Limited and end user
/08/	Technical specifications of: • Solar DC Inverterless solution
/09/	Solar Availability report By Cygni Energy Private Limited (Ref. No.: CYGNI/20/1547; Dated: 14/02/2020)
/10/	State wise records of Implemented Solar DC Inverterless solution (as on date).
/11/	CYGNI - Proof of operational lifetime and warranty of different components of the solar DC Inverterless systems distributed/installed under the project
/12/	CYGNI - Rectification Report – Quarterly report of monthly maintenance status of functioning of Solar PV based system (Ref. No.: CYGNI/MP-850; Dated: 30/06/2018)
/13/	Proof of project start date (21/03/2018) – Consent form signed between Cygni Energy Private Limited and end-user (TarjenTepon): • IBIS Sl. No.: 1000200318002985 • Solar Panel Module: WS12198006007189
/14/	• Mechanism for lodging complaints and rectification procedure • Snap shot of grievance register at district office
/15/	Employment agreement between Cygni Energy Private Limited and Mr Muratza Ali (Dated 05/03/2019)
/16/	Evidence for the monitoring records for the sustainable development parameters: a) Air Quality (monitoring survey) /06/ b) Access to affordable and clean energy services (monitoring survey)/06/, /10/
/17/	Test Certificates for the main component of the Solar DC Inverterless system: • IEC 61701:2011 (Certificate No.: TC-5688; Report No.: 19631623.0001; 06/04/2018) – TUV Rheinland • IEC 61215:2005 (Ref. Certificate No.: US-32569-UL; Dated: 16/10/2018) - Underwriter Laboratories • IEC 61730-1:2004 (Ref. Certificate No.: US-32570-UL; Dated: 16/10/2018) - Underwriter Laboratories • IEC 61730-2:2004 (Ref. Certificate No.: US-32570-UL; Dated: 16/10/2018) - Underwriter Laboratories
/18/	Central Power Research Institute: Test report for 200Wp, 48 V DC solar controller along with appliances and panel (Ref. No.: CPRIBLRERED 18T0098; Dated: 14/09/2018)
Background Documents	
/B01/	1. CDM VVS for PA (version 02.0) 2. CDM PS for PA (version 02.0) 3. CDM PCP for PA (version 02.0)
/B02/	1. Gold Standard for the Global Goals community service activity requirements (Version 1.2) 2. Gold Standard for the Global Goals Principles & Requirements (Version 1.2)
/B03/	AMS-III.BL., “Integrated methodology for electrification of communities”, (version 1.0)
/B04/	Gold standard for the global goals Monitoring report (Version 1 – June 2017)
/B05/	Final PDD (Version 1.1; Dated 21/03/2020)
/B06/	Corresponding validation report version 03, dated 23/03/2020.
/B07/	Guideline on the application of Materiality in verifications (version 02.0)
/B08/	Guidelines: Sampling and surveys for CDM project activities and programmes of activities, Version 04.0
/B09/	Standard: Sampling and surveys for CDM project activities and programmes of activities, version 08.0

Appendix 4. Clarification requests, corrective action requests and forward action requests

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

FAR ID	xx	**Section no.**	E.2	**Date:** DD/MM/YYYY
Description of FAR				
Project participant response				**Date:** DD/MM/YYYY
Documentation provided by project participant				
VVB assessment				**Date:** DD/MM/YYYY

Table 2. CL from this Verification

CL ID	01	**Section no.**		**Date:**07/02/2020
Description of CL				
1. *In the section B.1 of MR, the information on type of consumer during the current monitoring period as per applied methodology AMS.III.BL, version 01 has not been provided.* 2. *In the section C of MR, the name of PP and advisory firm is inconsistent throughout the MR and GS PDD. Further, the information on SDG monitoring is incomplete and inconsistent with GS PDD.* 3. *The information under section D.1 of MR, for relevant SDG indicator is inconsistent with GS PDD.* 4. *The justification/choice of value defined for ex-ante parameters under section D.1 is inadequate.*				
Project participant response				**Date:**02/03/2020
1. this information has been included in the revised MR. *2. The name of PP & advisory form has been made consistent throughout the MR inline with the GS PDD.* *3. SDG indicators are made consistent through out the document.* *4.The choice of values for ex-ante parameters are inline to the applied methodology. This has been elaborated in the revised MR.*				
Documentation provided by project participant				
Revised MR				
VVB assessment				**Date:**16/03/2020
1. PP has now defined the type of consumers and number of consumers during the current monitoring period in the section A.1 and section B.1 of the revised MR, version 01.1. The same has been checked and found inline with paragraph 22 and 23 of applied methodology AMS.III.BL, version 01. Thus, this part of CL is closed. 2. The name of PP and advisory firm is still inconsistent throughout the MR and revised GS PDD. Further, the information on SDG monitoring is still inconsistent with revised GS PDD.**Thus, this part of CL is kept open.** 3. The information mentioned under section D.1 of MR , for relevant SDG indicator is still inconsistent with revised GS PDD. Further, PP has not mentioned all parameter tables in the revised MR.**Thus, this part of CL is kept open.** 4. PP has now revised the justification/choice of value defined for ex-ante parameters under section D.1 consistent with revised GS PDD. Thus, this part of CL is closed.				
Project participant response				**Date:**21/03/2020
2. The name of PP and advisory firm is made inconsistent throughout the MR. 3. relevant SDG indicator is corrected w.r.t revised GS PDD. Further all parameter tables in the revised MR are included.				
Documentation provided by project participant				
Revised MR				
VVB assessment				**Date:** 31/03/2020

2. The revised MR has been checked and found that now PP has corrected the name of PP (Cygni Energy Pvt. Ltd.) and advisory firm (Value Network Venture Advisory Services PTE LTD.) consistently. **Thus, this part CL01 is closed.** 3. PP has now updated the tables and incorporated all tables for relevant SDG indicator under section D.1 of the revised MR. The same has been checked and found consistent with final GS PDD. **Thus, this part CL01 is closed.**

CL ID	02	**Section no.**		**Date:** 07/02/2020
Description of CL				
1. The section D.2 of the MR, the information on value(s) applied, for the following parameters during the monitoring period has not been provided. *$ECT_{1,x,y}$, Proportion of operational systems and connections, Number of Household* *2. The monitoring frequency mentioned in the MR for the $ECT_{1,x,y}$ parameter is inadequate and inconsistent with GS PDD.* *3. The information for the "Air Quality" parameter for following heading is inconsistent and inadequate with GS PDD, ER calculation sheet, monitoring survey sheet.* *Description, source of data, value(s) applied, measurement methods and procedures.* *Further, the hard copy of the referred survey records for the "Air Quality" parameter is awaited for the assessment.* *4. The information for the "Access to affordable and clean energy services", parameter for following heading is inconsistent and inadequate with GS PDD, ER calculation sheet.* *Description, source of data, value(s) applied, QA/QC procedures.* *5. Further, PP has mentioned in the MR, that 39,000 solar DC home lighting systems being in operation during the monitoring period. Then, PP is requested to clarify, the consideration of 25,139 households only for ER calculation assessment during the current monitoring period. Moreover, value of 39,000 solar DC home lighting systems is inconsistent with the GS PDD and title page of MR.*				
Project participant response				**Date:**02/03/2020
1. revised MR includes the values of the monitored parameters. *2. the monitoring frequency has been corrected inline with the PDD.* *3. MR has been revised information has been included now.* *4. The heading for the parameter has been made consistent with the revised PDD in the revised MR.* *5. This is a typo error, 40,595 HH are invlived in this project and thus same has been corrected in the revised MR.*				
Documentation provided by project participant				
Revised MR				

VVB assessment	Date:16/03/2020

1. PP has now mentioned the values for parameters ($ECT_{1,x,y}$, Proportion of operational systems and connections, Number of Household) in the section D.2 of the revised MR. The same has been checked and found consistent with ER calculation sheet and monitoring survey sheet. Thus, this part of CL 02 is closed.
2. PP has now mentioned monitoring frequency for the $ECT_{1,x,y}$ parameter. However, the QA/QC procedure mentioned in the revised MR is inconsistent with revised GS PDD. **Thus, this part of CL 02 is kept open.**
3. PP has now revised the value (s) applied in the revised MR. The same has been checked and found consistent with ER calculation. However, the information on *description, source of data, measuring frequency, calculation method* is still inconsistent with revised GS PDD. Further, the copy of referred monitoring survey records is still awaited for the assessment. **Thus, this part of CL 02 is kept open.**
4. PP has now revised the information of the "Access to affordable and clean energy services", parameter for description and value(s) applied in the revised MR. The same has been checked and found consistent with revised GS PDD and ER calculation sheet.

   However, the following information is still inconsistent with the revised GS PDD. **Thus, this part of CL 02 is kept open.**
   Relevant SDG indicator, source of data, measuring frequency, QA/QC procedure
5. PP has now mentioned the 40,595 household during the current monitoring period. The same has been checked and found consistent with ER calculation sheet. However, the estimated value of household under SDG 7 mentioned on the title page of the revised MR is inconsistent with the revised GS PDD. **Thus, this part of CL02 is kept open.**

Project participant response	Date:21/03/2020

2.Now the QA/QC procedure mentioned in the revised MR is consistent with revised GS PDD.
3.The copy of referred monitoring survey records is provided for the assessment
4.*Relevant SDG indicator, source of data, measuring frequency, QA/QC procedure are included as per revised PDD.*
5. The estimated value of household under SDG 7 mentioned on the title page of the revised MR is made consistent with the revised GS PDD.

Documentation provided by project participant

Revised MR
Monitoring survey records

VVB assessment	Date: 31/03/2020

2. PP has now incorporate the QA/QC procedure in the revised MR. the same has been checked and found in compliance with the final GS PDD. **Thus, this part of CL 02 is closed.**
3. The provided revised MR has been checked and found that the information on *description, source of data, measuring frequency, calculation method* for *"Air Quality"* parameter has been updated consistently with final GS PDD. Further, the *values for monitored parameter* has been cross checked with provided monitoring survey records and found appropriate. **Thus, this part of CL 02 is closed.**
4. The provided revised MR has been checked and found that the information on *Relevant SDG indicator, source of data, measuring frequency, QA/QC procedure* for *"Access to affordable and clean energy services"* parameter has been updated consistently with final GS PDD. **Thus, this part of CL 02 is closed.**
5. PP has now mentioned the estimated value of household under SDG 7 on title page of revised MR. The same has been checked now and found consistent with final GS PDD. **Thus, this part of CL 02 is closed.**

CL ID	03	Section no.		Date: 07/02/2020

Description of CL

1. *In the section E.2 of the MR, 'Improvement in health and decrease in illness', PP referred about third party survey. However, the same is awaited for the assessment.*
2. *The formula mentioned in the in the section E.3 of the MR, is inconsistent with GS PDD, applied methodology, ER calculation sheet.*
3. *In the section E.4 and E.5 of the MR, for SDG 13 the ex-ante baseline estimate value of 16,692 is inconsistent with GS PDD, ER calculation sheet.*

Project participant response	Date:02/03/2020

1. The survey is done by PP's internal team and no third part is involved. This was a type error which has been corrected now.
2.The formula under section E.3 of MR has been made consistent with the revised PDD.
3. The typo error for estimated ER has been corrected in the revised MR.

Documentation provided by project participant

VVB assessment	**Date:**16/03/2020

1. PP has now revised the referred statement in section E.2 of the revised MR. However, the survey report is awaited for assessment. **Thus, this part of CL 03 is kept open.**
2. The formula mentioned in the revised MR is still inconsistent with revised GS PDD, applied methodology and Total ERs (SDG 13) spreadsheet of ER calculation sheet. **Thus, this part of CL 03 is kept open.**
3. In the section E.4, E.5 of the revised MR for SDG 13, PP has now revised the ex-ante baseline estimates value as 36,605 t CO_2e/year. The same has been checked and found consistent with revised GS PDD, ER calculation sheet. **Thus, this part of CL 03 is closed.**

Project participant response	**Date:**21/03/2020

1. the survey report is provided now for assessment.
2. The formula mentioned in the revised MR is made inconsistent with revised GS PDD, applied methodology and Total ERs (SDG 13)spreadsheet of ER calculation sheet.

Documentation provided by project participant

Revised MR
Survey report

VVB assessment	**Date:** 31/03/2020

1. PP has now provided the referred monitoring survey report. Verification team cross checked the referred monitoring survey report and found conformance with the claim/statement, "..end users response shows that health problems related to smoke is reduced" mentioned in the revised MR. **Thus, this part of CL03 is closed.**
2. In the section E.3 of revised MR, PP has now updated the emission reductions calculation formula. The same has been checked and found consistent with final GS PDD, applied methodology, ER calculation sheet. Thus, **Thus, this part of CL03 is closed.**

CL ID	04	**Section no.**		**Date:** 07/02/2020

Description of CL

1. *The end user details mentioned in the provided project database sheet is inconsistent with referred voter ID details for the state of Assam and Meghalaya.*
2. *Further, the end user details for state of Rajasthan has also been provided in project database sheet. PP is requested to clarify the omission of the same during the current monitoring period.*

Project participant response	**Date:**02/03/2020

1. the project database has been corrected.
2. Same has been corrected in the revised project database.

Documentation provided by project participant

Revised project database sheet.

VVB assessment	**Date:**16/03/2020

1. The end user details mentioned in the provided revised project database sheet is still inconsistent with referred voter ID details for the state of Assam (eg. sr. no. 174, 175, 182,183, 575, 648) and Meghalaya (eg. Sr. 23,164 and 23175,) of earlier submitted sheet. PP is requested to the check the project database sheet for all rest of states as well for consistency. **Thus, this part of CL is kept open.**
2. The revised ER calculation sheet and revised MR has been reviewed and found that PP has now included the households in Rajasthan state in project database for the emission reduction calculation during the current monitoring period. Thus, this part of CL is closed.

Project participant response	**Date:**21/03/2020

The database has been corrected and there are few errors in the earlier sheet which has been corrected.

Documentation provided by project participant

Project database

VVB assessment	**Date:** 31/03/2020

1. The updated project database sheet has been checked and now found that now the inconsistency error has been taken care by PP. **Thus, this part of CL 04 is closed.**

CL ID	05	**Section no.**		**Date:**07/02/2020

Description of CL

PP is requested to provide following supportive documents for the assessment.

1. *Installation/commissioning records for each consumer type as per applied methodology.*
2. *Technical specifications for project technology and relevant certificates.*
3. *Baseline survey report to demonstrate that the beneficiaries are not connected to the regional or nation grid before the implementation of the project activity.*
4. *It is mentioned in the PDD that list of beneficiaries are provided by the DISCOM, PP is requested to provide the work order/ tender for all the state where the Solar DC inverterless system is distributed. Complaint book or grievance book and also provide information where these books are kept during the monitoring period.*
5. *Solar availability factor report from the manufacturer/ supplier.*
6. *Beneficiary training records to be provided. Since Cygni is involved in operation and maintenance, PP is requested to provide monthly maintenance record for June'18, Oct'18, & Feb'19 for Assam, Manipur, Meghalaya, J & K, Madhya Pradesh. Also, provide information on how the maintenance of the solar DC system is carried out, what is the mechanism for logging the complaint etc.*
7. *PP is requested to provide the IEC certificates for the solar PV panel.*
8. *PP shall provide the database of users where monitoring survey was conducted to determine "Proportion of operational systems and connections".*

Project participant response	**Date:**02/03/2020

1. installation documents are provided on sample basis.
2.technical specification has been provided.
3. there are no baseline survey report provided by the government agencies to the PP. they(government agencies) has provided the list of the villages which are not connected to the grid.
4. WO copies on sample basis has been provided.
5. Solar availability certificate from supplier has been provided.
6.Benificiary training records provided.
7. IEC certificate has been provided.
8. Survey database has been provided.

Documentation provided by project participant

VVB assessment	**Date:**16/03/2020

1. The referred sample copies of installation/commissioning records for each type of consumer is awaited for the assessment. **Thus, this part of CL 05 is kept open.**
2. PP has provided the technical specification and test report dated 14/09/2018 for the project technology. The same has been checked and found reliable. Thus, this part of CL 05 is closed.
3. The provided justification regarding baseline survey/database is acceptable and same has been found consistent with the monitoring personnel's interview during site visit. Thus, this part of CL05 is closed.
4. PP has now removed the referred sentence in the revised GS PDD and now mentioned that*," The DISCOMs/ state electricity board then provides a list of the beneficiaries who are not connected to the grid to CYGNI for disseminating the solar DC electricity systems."*. Thus, this part of CL 05 lost its relevance and is closed.
5. The referred copy of solar availability report is awaited for the assessment. **Thus, this part of CL 05 is kept open.**
6. The referred copy of training *records of* the monitoring personnel and sought clarification on *operation and maintenance procedure, its records and complaint/grievance lodging and its management* procedure is awaited for the assessment. **Thus, this part of CL 05 is kept open.**
7. PP has provided the IEC test certificate (US-32569-UL and US-32570-UL dated 16/10/2018) for the project technology. The same has been checked and found reliable. Thus, this part of CL is closed.
8. PP has provided monitoring survey database sheet and project database sheet. The same has been cross verified on sample basis during site visit and found that individual systems are working. Thus, this part of CL is closed.

Project participant response	**Date:**21/03/2020

1. The referred sample copies of installation/commissioning records of consumer is already provided in the round 1 of the VVB assessment. Also note that there is only line type of consumer i.e. TYPE 1 consumer, thus there are no such each type of consumer involved in this project. 5. The solar availability report is provided now. Same is also provided in the assessment of PDD earlier. 6.The monitoring personal are trained on job and it is an on going process and most of them are already having work experience in solar industries before joining Cygni. O &M are done as and when required and requested by the HH users. There is a single toll free number where the HH user logged their complaint and the respective technicians do the rectification /maintenance of the solar DC system**.** Also there is grievance book kept at Cygni office in each state for recording any grievances of HH users**.**
Documentation provided by project participant
Sample installation records *Solar availability certificate*
VVB assessment **Date:** 31/03/2020
1. PP has provided the sample copies of agreement between the PP and the customer (end user) Stove ID:I000200318002985 having installation date 21/03/2018; Stove ID:I000200318003332 having installation date 07/04/2018; Stove ID:I000601418008127 having installation date 05/04/2018. The same has been cross checked with provided project database sheet and found consistent. **Thus, this part CL 05 is closed.** 5. PP has provided the solar availability declaration by manufacture i.e. Cygni Energy Pvt. Ltd. dated 14/02/2020 to support the mentioned solar availability factor. The calculation has been checked and found appropriate. **Thus, this part CL 05 is closed.** 6. The provided PP's internal mechanism for lodging the complaint and its standard compliant/grievance handling procedure adopted. The document also contains the single toll free number for all customer care, list of customer service center details for each state and sample copy of service call note. The same has been checked and found conformance with provided response. **Thus, this part CL 05 is closed.**

Table 3. CAR from this Verification

CAR ID	01	**Section no.**		**Date:** 07/02/2020
Description of CAR				
The current monitoring report is inconsistent with GS MR template requirement (eg. Font type, font size, table templates, formatting, information under certification pathway on title page etc.)				
Project participant response				**Date:** DD/MM/YYYY
The font type and size are now corrected inline with the GS MR template.				
Documentation provided by project participant				
Revised MR				
VVB assessment				**Date:**16/03/2020
The revised MR is still needs to be corrected for consistency with GS MR template requirements (eg. Font type, font size on title page, section A.3, E.1, E.4 of revised MR). **Thus, the CAR is kept open.**				
Project participant response				**Date:**21/03/2020
The MR is revised and made the necessary correction for consistency with GS MR template requirements (eg. Font type, font size on title page, section A.3, E.1, E.4 of revised MR.				
Documentation provided by project participant				
Revised MR				
VVB assessment				**Date:** 31/03/2020
The revised MR has been checked and now found that referred title page, section A.3, E.1, E.4 has been corrected for consistency with GS MR template requirements. **Thus, CAR 01 is closed.**				

CAR ID	02	**Section no.**		**Date:**07/02/2020
Description of CAR				
1. *In the section A.1 of the MR, the information on "…relevant dates for the project (e.g. construction start/end, commissioning, continued operation periods, etc.)" is missing as required by GS MR template.* 2. *Title of the methodology has not been mentioned as required by GS MR template.* 3. *The start date and length of crediting period is inconsistent with the GS PDD and throughout the MR.*				
Project participant response				**Date:**02/03/2020

1. The relevant date of project start, commissioning etc has been included under section A.1 of revised MR. *2. The title of the applied methodology has been mentioned now.* *3. Now the start date and the length of crediting period is made consistent w.r.t revised PDD.*
Documentation provided by project participant
Revised MR
VVB assessment **Date:**16/03/2020
1. PP has now incorporated the required project start date, commissioning date of the project in the section A.1 of the revised MR. The same has been checked and found consistent with provided supportive start date proof. Thus, this part of CAR is closed. 2. PP has now mentioned the title of the applied methodology in the section A.3 of the revised in compliance with the GS MR template requirement. Thus, this part of CAR is closed. 3. In the section A.4 of the revised MR, PP has mentioned crediting period start date as 21/03/2019 and length of crediting period as 10 years. The mentioned information is found inconsistent with section C of the revised GS PDD. **Thus, this part of CAR is kept open.**
Project participant response **Date:** 21/03/2020
The start date and length of crediting period is corrected in the revised MR.
Documentation provided by project participant
Revised MR
VVB assessment **Date:** 31/03/2020
3. The section A.4 of revised GS MR, has been checked and found that now PP has corrected the crediting period start date as 21/03/2018 and crediting period of the project as 5 years, renewable. The same has been found consistent with GS PDD. **Thus, part of CAR 02 is closed.**

CAR ID	03	**Section no.**		**Date:** 07/02/2020
Description of CAR				
During the OSV, it was observed that some of the systems distributed under the project activity are powered using Lead Acid Battery. However, no information has been provided on the same in the MR.				
Project participant response				**Date:**02/03/2020
Only 5 5 of the system included the battery as lead acid type, the remaining system is similar with lithium ion battery type system. This dosen't have any impact on the size & capacity of the solar DC system, since the solar PV panel is still 200Watt capacity.				
Documentation provided by project participant				
VVB assessment				**Date:**16/03/2020
PP has now updated the battery type and included lead-acid battery along with lithium ion battery in the section A.5 of the revised GS PDD. Thus, this will cover the occurrence of such instance in project database in future. Thus, this CAR is closed.				

Table 4. FAR from this verification

FAR ID	xx	**Section No.**		**Date:** DD/MM/YYYY
Description of FAR				
Project participant response				**Date:** DD/MM/YYYY
Documentation provided by project participant				
VVB assessment				**Date:** DD/MM/YYYY

Appendix 5. Sustainability Monitoring

Indicator	Chosen parameter in the registered GS PDD and monitoring report	Way of monitoring	Assessment	Verified Score
SDG 3. Good health and well-being	Air Quality: Users' perception on smoke reduction and Incidence of disease	Air quality will be assessed through users interviews during the HH User Survey.	The project aims to promote and penetrate the adoption of clean and reliable energy supply in rural areas leading to a reduction in air pollution. It does not trigger any concern issues of increase in incidence of disease, safety requirements, dignity and cultural property of indigenous people. Appropriateness for this safeguarding principle was verified and confirmed through the monitoring survey records and OSV interviews with: • Representatives of Project Participant • Local Stakeholders (sampled household/end user visited) 100% of household/end user has confirmed that the smoke reduced drastically and indoor air quality has been improved. The perception of indices of concerned diseases identified during monitoring survey is as follows. Respiratory disease: 0% Eye Infection: 2% Cough: 6% Hence, rating of this indicator as positive is	+ (positive)

			correct.	
SDG 7. Access to affordable and clean energy services	Total number of household where the DC based solar system is installed	Project owner will monitor the distribution records &Sample survey to confirm if project Solar DC system are operational. Operational status will confirm that the users are accessed to affordable and clean energy.	During the current monitoring period, the project activity has distribution/implemented 40,595 of Solar DC based Inverterless solutions/systems in India. The same has been verified through review of state wise distribution/implemented records /10/, monitoring survey records /06/ and also through OSV interview with PP representative. Hence, rating of this indicator as positive is correct.	+ (positive)
SDG 13. Climate action	Air Quality: Users' perception on smoke reduction and Incidence of disease	Air quality will be assessed through users interviews during the HH User Survey.	Appropriateness for this safeguarding principle was verified and confirmed through the monitoring survey records and OSV interviews with: • Representatives of Project Participant • Local Stakeholders (sampled household/end user visited) 100% of household/end user has confirmed that the smoke reduced drastically and indoor air quality has been improved. Further, the project implementation leads to 29,719 tCO_2e emission reduction during the current monitoring period /02/,/04/. This confirms that project contribute for the improvement of air quality and climate action on reduction of GHG emissions. Hence, rating of this indicator as positive is correct.	+ (positive)

- - - - -

Document information

Version	*Date*	*Description*
03.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM validation and verification standard for project activities" (CDM-EB93-A05-STAN); • Make structural and editorial improvements.
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the "CDM validation and verification standard for project activities" (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		