



SHINE- DISTRIBUTION OF LED LIGHTBULBS IN INDIA -2

Document Prepared By



VKU Certification Pvt. Ltd.

Regd. Off: Flat No. 306, Sky Star, N-1, New Rani Bagh Khandwa Road, Indore, Madhya Pradesh, India - 452020

URL: <http://vkucertification.com> | e-mail: info@vkucertification.com

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Prepared By	VKU Certification Pvt. Ltd.
Contact	Regd. Off: Flat No. 306, Sky Star, N-1, New Rani Bagh Khandwa Road, Indore, Madhya Pradesh - 452020 URL: http://vkucertification.com e-mail: info@vkucertification.com
Approved By	Dr. Vikas Kumar Aharwal (Founder and Director) vikas.aharwal@vkucertification.com
Work Carried Out By	Mr. Barun Kumar - Team Leader cum Technical Expert TA 3.1 Ms. Niharika Kaushik - Validator/Verifier-Trainee Mr. Anil Dhankar – Project Trainee Mr. Sanjay Kumar- Technical Reviewer cum Technical Expert TA 3.1

Summary:

M/s VKU Certification Pvt. Ltd. (referred to as VKU hereafter) was engaged by Brightspark Energy Private Limited (referred to as PP hereafter) to verify the reported greenhouse gas emission reductions for the project activity titled **"SHINE - Distribution of LED Lightbulbs in India -2" (VCS ID 2608)** in India. This verification serves as the second assessment within the fixed crediting period of the project activity. The monitoring period spans from **01-June-2022 to 31-December-2022, encompassing both the start and end dates**. The fixed crediting period for the project activity is from **12-August-2018 to 11-August-2028, inclusive of both dates**.

Purpose of the Verification: The objective of the verification process is to obtain an impartial evaluation of the ex-post determination of the monitored reductions in greenhouse gas (GHG) emissions. This verification aims to ensure that the monitoring methodology was implemented in accordance with the monitoring plan, and that the monitoring data used to validate the reductions in anthropogenic emissions from sources is thorough, conclusive, and presented in a clear and transparent manner

The verification scope of the project is:

- To authenticate that the project is executed in accordance with the registered VCS PD/3/ and CDM-CPA-DD/4/.
- To evaluate the project's adherence to relevant regulations, including the legislation of the host country.
- To validate the implementation and functionality of the monitoring system, ensuring the generation of Verified Carbon Units without any instances of double counting.
- To verify the accuracy, completeness, consistency, transparency, and absence of significant errors or omissions in the reported data by examining monitoring records and emissions reduction calculations.
- To ensure that the actual monitoring systems and procedures align with those described in the monitoring plan.
- To assess the GHG emission reduction data and provide a conclusion with a reasonable level of assurance regarding the absence of material misstatements.
- To verify that the reported GHG emission data is adequately supported by evidence.

VKU conducted the verification process in accordance with its own established procedures, aligning with the requirements set forth in the VCS Program Guide version 4.3/7/, VCS Standard Version 4.4/8/, VCS Validation and Verification Manual version 3.2/9/, CDM M&P, the latest edition of the CDM Validation and Verification Standard 3.0/10/, "Standard for sampling and surveys for CDM project activities and programme of activities" version 09.0/18/, as well as relevant decisions made by the COP/MOP and the CDM EB. These requirements encompass Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance provided by COP/MOP & CDM Executive Board, and other applicable rules, including the Host Country legislation. Furthermore, standard auditing techniques were applied throughout the verification process.

The verification process encompassed a desk review, on-site assessment, resolution of any outstanding matters, and the issuance of the final verification report and certification. This comprehensive verification aimed to ensure that the reported emission reductions are thorough and precise, aligning with the relevant VCS requirements, thus enabling the project to obtain certification.

VKU diligently followed a rule-based approach during the verification process, ensuring strict adherence to the applicable VCS requirements. The verification encompassed a comprehensive assessment of the project activity's operations, monitoring procedures, and GHG emission reduction calculations. As a result, a total of **seven (07) findings** were identified, comprising four **(4) Corrective Action Requests (CARs)**, three **(3) Clarification Requests (CLs)**, and zero **(0) Forward Action Requests (FARs)**. All the raised findings were raised and successfully resolved by the PP, reinforcing the project's compliance with the rigorous standards set forth by the VCS program. The same has been discussed in [Appendix B](#) of this verification report.

The verification team ensured that the reported emission reductions are complete and reliable in accordance with applicable VCS requirements in order to be certified therefore the verification team has accepted the values within the precision levels applied as part of sampling techniques.

The GHG emission reductions were calculated based on the

1. Approved methodology AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0 /12/,
2. Tool to calculate the emission factor for an electricity system; Version 07 /20/,
3. Independent life-test reports of the LEDs as per national standard IS 16012 (Part 2): 2017/48/
4. Monitoring plan included in the registered VCS PD (version 2.2) dated 21-January-2023/3/
5. CDM-CPA-DD (Version 03) Dated 10-January-2020/4/

Verification Conclusion:

Based on VKU's thorough assessment, it is their professional judgment that the project activity "SHINE-Distribution of LED Lightbulbs in India -2" (VCS ID 2608) in India fully complies with the applicable requirements of VCS standard version 4.4 /8/ and associated guidelines. The project has successfully implemented the designated baseline and monitoring methodology outlined in AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0 /13/.

The monitoring system in place is effective and reliable, ensuring reasonable level of measurement and precision level allowed by the methodology and the VCS standards without any significant discrepancies. As a result, VKU is able to objectively state that the project has achieved an emission reduction of 121,546 tCO₂e during the second verification period, which spans from **01-June-2022 to 31-December-2022 (inclusive of both start and end dates)**. This certification validates the project's substantial contributions towards mitigating greenhouse gas emissions.

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1 INTRODUCTION

1.1 Objective

M/s Brightspark Energy Private Limited (hereinafter referred to as PP) engaged the services of M/s VKU Certification (hereinafter referred to as VKU) to conduct the second verification of the "SHINE- Distribution of LED Lightbulbs in India -2" (VCS ID 2608) project in India. This verification covered the period from 01-June-2022 to 31-December-2022, encompassing both the project's start and end dates. The project falls within the fixed crediting period of 12-August-2018 to 11-August-2028, inclusive of both dates.

This report provides a summary of the verification findings, which were conducted in accordance with VCS Requirements and UNFCCC criteria for CDM. VKU followed its standard verification procedure, which aligns with VERRA standard version 4.4/8/ for verification, ensuring consistent project operations, monitoring, and reporting.

The objective of the verification was to independently evaluate the project activity by an accredited validation and verification body, in compliance with the requirements outlined in the VCS Program Guide Version 4.3/7/, VCS standard version 4.4/8/, and the applied GHG program. The assessment was based on the registered VCS PD (Version 2.2) dated 21-January-2022/3/ and CDM-CPA-DD (Version 03) dated 10-January-2020/4/.

This is the **second verification** of crediting period (**12-August-2018 to 11-August-2028**), (Inclusive of both dates) for a period of seven months of the project activity. The project activity adopts **fixed crediting period of 10 years period** as mentioned in section 1.9 of VCS PD version 2.2 dated 21-January-2022 /3/.

Table No 01: Number and time period of VCS Verification under fixed crediting period:

Fixed Crediting Period: 12-August-2018 to 11-August-2028, Including of both dates.		
Periodic Verification No.	Monitoring Period (Inclusive of both dates)	Number of years
1 st in VCS	01-January-2021 to 31-May-2022	1 year 5 months
2 nd in VCS (Current Monitoring Period)	01-June-2022 to 31-December-2022	7 months

The verification will be performed by review of evidences & documents submitted to the VKU Assessment/Verification Team by PP, for the registered project activity to establish that:

- The project activity has been executed and operated in strict adherence to the registered VCS PD version 2.2 dated 21-January-2022/3/ and CDM-CPA-DD version 03 dated 10-January-2020/4/. Furthermore, all essential physical aspects of the project, including the technology employed, technical specifications of the LED, monitoring protocols, replacement

- of inefficient lighting with LED, and efficient distribution of LEDs, have been diligently implemented.
- The monitoring report/1/ and accompanying documentation have been meticulously compiled and are comprehensive in nature.
 - The data has been methodically recorded and stored in accordance with the prescribed monitoring methodology outlined in "AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0"/13/ and the approved monitoring plan.
 - The verification process aimed to confirm the seamless implementation and full functionality of the monitoring system, ensuring the accurate generation of Verified Carbon Units (VCUs) without any instances of double counting. Additionally, meticulous scrutiny of the monitoring records and emissions reduction calculations has been carried out to guarantee the accuracy, completeness, consistency, transparency, and absence of any material errors or omissions in the reported data.
 - To assess the project's compliance with other relevant rules including the host country (India) legislation.
 - To confirm that the monitoring system is implemented and fully functional to generate Verified Carbon Units without any double counting.
 - To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
 - To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement & is sufficiently supported by evidence.

1.2 Scope and Criteria

The scope of this verification was the independent and objective review and ex-post determination of the monitored reductions in GHG emissions from the "SHINE – Distribution of LED Lightbulbs in India-2". The verification of this project was based on the validated & registered VCS PD version 2.2 dated 21-January-2022 /3/ and CDM-CPA-DD version 03 dated 10-January-2020/4/ & monitoring report/1/ along with supporting documents submitted by the project proponent to the VKU verification team. The documents thus submitted to the VKU Assessment/Verification Team were reviewed against the following guidance & protocols:

- i) VCS Programme Guide (Version 4.3) /7/
- ii) VCS Standard (Version 4.4) /8/
- iii) VCS program Definitions (Version 4.3) /11/
- iv) VCS Registration & Issuance Process (Version 4.3) /12/
- v) CDM Approved methodology AMS I.D. Version 18.0 /14/
- vi) Guidelines for Sampling and surveys for CDM project activities and programmes of activities, version 09 /18/

The verification process ensures that the reported emission reductions are comprehensive and accurate in order to obtain certification. The project is assessed against the requirements of VCS standard version 4.4/8/, VCS program guide version 4.3/7/, VCS validation and verification manual version 3.2/9/, guidelines for Sampling and surveys for CDM project activities and programmes of activities, version 09/18/, as well as other relevant rules and guidance. VKU has employed a rule-based approach based on the recommendations in the latest version of CDM Validation and Verification Standard version 3.0/10/ and VCS validation and verification manual version 3.2/9/ to conduct the verification, with a focus on significant reporting rules and the reliability of project monitoring.

The verification method and criteria encompassed several phases, including

- (i) Desk review of CDM-CPA-DD/4/ and VCS PD/3/ and other supporting documents listed in Table-03;
- (ii) Acceptance Sampling /50/
- (iii) Onsite interviews & Focussed Group Discussions with End-Users, Stakeholders & PP representatives involved in project's implementation.
- (iv) VKU's Completeness/Quality Check,
- (v) and the Final issuance of the verification report.

Outstanding issues were resolved, leading to the issuance of the final verification report and the relevant VCS Validation and Verification Deeds of Representation.

It is important to note that the verification process does not involve providing consultancy to the project proponents. However, requests for clarifications and corrective actions may have contributed to improvements in the monitoring process

1.3 Level of Assurance

All the revisions of the verification report before being submitted to the client were subjected to an independent internal technical review to confirm that all verification activities had been completed according to the pertinent VKU's procedure, with a **Reasonable level of assurance**.

The threshold for quantitative materiality with respect to the aggregate of errors, omissions, and misrepresentations, relative to the total reported GHG emission reductions and/or removals was to 10% percent, as required by section 4.1.27 of the VCS Standard version 4.4/8/.

The verification report is based on the Monitoring report/1/, registered VCS PD version 2.2 dated 21-January-2022/3/ and CDM-CPA-DD version 03 dated 10-January-2020/4/ & supporting documents that were made available to the VKU's assessment team (25//26//27//28//29/30//31//32//33//34//35//36//37//38//39//40//41//42//43//44//45) made available to the verification team and information collected through performing interviews /47/ with End-Users/PP Representatives/Local Stakeholders during on-site visit/48/

The technical review was performed by a technical reviewer(s) qualified in accordance with VKU's qualification procedure. The verification/assessment team and the technical reviewers consist of the following personnel.

Table No 02: The Assessment Team Members are as follows:

Role/Qualification of Assessment Team	Last Name	Middle Name	First Name
VCS Team Leader, Technical Expert TA 3.1	Kumar	NA	Barun
Validator/Verifier Trainee	Kaushik	NA	Niharika
Project Trainee	Dhankar	NA	Anil

Table No 03: The Technical Team is as follows:

Role/Qualification of Technical Team	Last Name	Middle Name	First Name
Technical Reviewer & Technical Expert TA 3.1	K	Kumar	Sanjay

1.4 Summary Description of the Project

The grouped project involves distribution of Light Emitting Diodes (LEDs) for domestic lighting in North-East Indian states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura as per the VCS PD version 2.2 dated 21-January-2022/3/ and CDM-CPA-DD version 03 dated 10-January-2020/4/. But the distribution has been done only in the two states which are Assam and Tripura as per MR/1/ and the Distribution database/32/ and ER sheet submitted/02/.

This is the second monitoring period for the project "SHINE- Distribution of LED Lightbulbs in India -2", which is a grouped project and employs the methodology; AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0 /13/.

Thus, under this grouped project, 60W ICL have been replaced with 7W/9W LED and/or 100W ICL with 12W/14W LED as the lumen output is within the specified limit so VVB confirmed the

same from the methodology AMS II C version 15 paragraph 45 table no: 02 specifies the light output requirements.

The table below states the baseline ICL wattage and the LED lumen output requirements as per the applied methodology /13/ and the installed LEDs Lumen output as per installed technology specifications/44/.

Table No 04: LEDs Lumen output as per installed technology specifications.

S.No.	Baseline technology Incandescent lamp (Watt)	Minimum light output (Lumen)	Lumen outputs of different Installed LEDs
1.	60	715	7W= 740 lm 9W=820 lm
2.	100	1350	12W=1340 lm 14W= 1400 lm

The grouped project activity has been divided into six project activity instances based on the electricity division and subdivision in which LED distribution has been carried out by Project Proponent.

Under this grouped project each project activity instance refers to the number of project devices, i.e., number of LEDs distributed to each grid connected household. Maximum number of six LEDs and minimum one LED (7 W/9 W and/or 12 W/14 W) were distributed to an individual grid connected household under a single project activity instance. Total **1,411,863 LEDs** have been distributed in **246,104** grid connected households in the state of Assam and Tripura till the end of the first monitoring period under VCS which covers monitoring period from 01-January-2021 to 31-May-2022 (both dates included). The first LED was distributed on **12-August-2018** and the last LED was distributed on **31-July-2021** as verified by assessment team through the Consent Deed cum invoice submitted by PP to VKU's verification team/28/. No further distribution of LEDs has been carried out or planned by PP after 31-July-2021 under this grouped project activity as stated/declared by PP in the MR/1/. The start date for the grouped project is 12-August-2018 which is the date when the first energy efficient LED has been distributed as per MR/1/ section 3.1 and the **End User Consent Deed cum Invoice** /28/ submitted by PP

The project proponent for the project activity is **Brightspark Energy Private Limited** (Indian Subsidiary and Project Management Entity of C-Quest Capital LLC), owns the rights to Verified Carbon Units.

All the above information has been verified by the assessment team of VKU through desk review and during on-site assessment and it is found to be in line with the details provided in the registered VCS PD version 2.2 dated 21-January-2022/3/ and CDM-CPA-DD version 03 dated 10-January-2020/4/ which is further found to be in-line with the adopted methodology i.e., AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0./13/.

The ex-ante GHG emission reductions for the current monitoring period, spanning from 01-June-2022 to 31-December-2022 (inclusive of both start and end dates), within the fixed crediting period of 12-August-2018 to 11-August-2028 (inclusive of both dates), are estimated to be 131,534 tCO₂e. However, the achieved emission reductions for the same monitoring period amount to 121,546 tCO₂e. This represents an 8% reduction compared to the initially projected emission reductions due to the inclusion of loss rates for LEDs, as determined by the monitoring survey results. Specifically, loss rates of 4.05% for 7 W LEDs and 3.91% for 12 W LEDs were considered. Verification team confirmed the same from the ER sheet where PP has shown the required calculations for the percentage difference.

The implementation of the project activity aligns with the specifications outlined in the registered VCS PD version 2.2 dated 21-January-2022/3/ and CDM-CPA-DD version 03 dated 10-January-2020/4/. The calculation of emission reductions has been conducted conservatively, adhering to the applied methodology/13/.

2 VERIFICATION PROCESS

The registered VCS project “SHINE- Distribution of LED Lightbulbs in India -2” ([VCS ID 2608](#)) is undergoing second periodic verification with VKU Certification Pvt Ltd from 01-June-2022 to 31-December-2022, both dates included. The fixed 10-year crediting period from 12-August-2018 to 11-August-2028 (both dates included)

The project is already registered under CDM as a part of POA- as [CPA 10484-P1-0002-CP1](#). The validation/05/ was done by Carbon Check (India) Private Ltd. First verification of the grouped project was done by Carbon Check (India) Private Ltd./6/.

The approach adopted to ensure the quality of emission reductions is described in the following sections.

2.1 Method and Criteria

Verification was conducted using VKU’s procedures in line with the requirements specified in the VCS Requirements, i.e., VCS Program Guide Version 4.3 /7/, VCS standard document version 4.4 /8/. The project activity fall under category “grouped projects”, hence sampling methods was employed by the validation/verification body for the verification of GHG emission reductions or

removals generated by the project in accordance with the paragraph 26 of the Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 09.0/18/.

- The GHG emission reductions are based on the approved Baseline and monitoring methodology AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0/13/
- Scope: 03 Energy Demand
- Project type: Type II – Energy Efficiency improvement project

Tools used for GHG Calculations are as follows as per registered VCS PD version 2.2 dated 21-January-2022/3/ and CDM-CPA-DD version 03 dated 10-January-2020 /4/:

- Tool to calculate the emission factor for an electricity system, Version 07 /20/

During onsite visit /34/ verification team reviewed VVB's selected sample size of 11 (11 LEDs of each type; 7W, 9W, 12W & 14W Total = 44 LEDs) with acceptance number (c) as 0.

2.2 Document Review

During the document review, VKU has applied standard auditing techniques to assess the quality of information provided. The verification was performed primarily based on the review of VCS monitoring report for "SHINE – Distribution of Led Lightbulbs in India -2" version 1.0 of 06-March-2023, version 2.0 of 15-May-2023, version 2.1 of date 19-May-2023/1/ and final version 3.0 on 24-May-2023 and the emission reduction calculations spreadsheet version 1.0 of 06-March-2023, version 2.0 of 15-May-2023 and final version 3.0 on 24-May-2023 /2/ were assessed as part of the verification. In addition, the registered VCS PD version 2.2 dated 21-January-2022/3/ and CDM-CPA-DD version 03 dated 10-January-2020/4/in particular the baseline estimations and the monitoring plan for the project was reviewed. The following table-04 lists the documentation that was reviewed during the verification

Table No: 05; Lists of the documentation that were reviewed during the current verification:

/01/	Brightspark Energy Private Limited: VCS monitoring report for "SHINE- Distribution of LED Lightbulbs in India -2", • Version 1.0 dated 06-March-2023 • Version 2.0 dated 15-May-2023 • Version 2.1 dated 19-May-2023 • Version 3.0 dated 24-May-2023
/02/	Brightspark Energy Private Limited: Emission Reduction Calculation spreadsheet "SHINE- Distribution of LED Lightbulbs in India -2", • Version 1.0 dated 06-March-2023, • Version 2.0 dated 15-May-2023

	Version 3.0 dated 24-May-2023
/03/	Brightspark Energy Private Limited. <u>Registered VCS PD for the project SHINE – Distribution of LED Lightbulbs in India-2’ version 2.2 dated 21-January-2022</u>
/04/	<u>CDM-CPA-DD/03/ 10484-P1-0002-CP1 under registered CDM Programme of Activities (PoA) 10484 titled:” SHINE – Distribution of LED Lightbulbs in India”</u>
/05/	Carbon Check (India) Private Ltd: <u>Validation Report “SHINE – Distribution of LED Lightbulbs in India-2” version 04 dated 22-January-2022</u>
/06/	Carbon Check (India) Private Ltd: <u>Previous Verification Report “SHINE – Distribution of LED Lightbulbs in India-2” version 3.0 dated 22-October-2022</u>
/07/	<u>VCS Program Guide, version 4.3 dated 17-January-2023</u>
/08/	<u>VCS Standard, version 4.4 dated 17-January-2023</u>
/09/	<u>Validation and verification manual version 3.2 dated 19-October-2016</u>
/10/	<u>CDM Validation & Verification Standard version 3.0 dated 09-September-2021</u>
/11/	<u>VCS Program Definitions version 4.3 dated 21-December-2022</u>
/12/	<u>VCS Registration & Issuance Process (Version 4.3) of 17-January-2023</u>
/13/	<u>VCS: AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0.</u>
/14/	<u>CDM Executive Board: Baseline and Monitoring Methodology Baseline and monitoring: AMS-I. D: Grid connected renewable electricity generation; Version 18.0</u>
/15/	<u>Methodological tool 19: Demonstration of additionality of microscale project activities Version 09.0</u>
/16/	<u>Methodological tool 21: Demonstration of additionality of small-scale project activities Version 12.0</u>
/17/	<u>UNFCCC: Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities, Ver. 4.0</u>
/18/	<u>UNFCCC: Standard for Sampling and surveys for CDM project activities and programmes of activities, Version 09.0</u>
/19/	<u>CO2 Baseline Database for the Indian Power Sector, User Guide; Version 13.0</u>
/20/	<u>Tool to calculate the emission factor for an electricity system’; version 07</u>
/21/	<u>VCS: Monitoring report Template VCS Version 4.2</u>

/22/	<u>VERRA: Project search</u>
/23/	<u>UNFCCC: Project search</u>
/24/	<u>Gold Standard Foundation</u>
/25/	<u>GPS map camera (GPS App)</u>
/26/	<u>GPS Google earth software used for Location</u>
/27/	ICL collection and disposal agreement Brightspark Energy Private Limited and Auctus E Recycling Solutions Pvt. Ltd dated 31-August-2018 and 01-December-2019
/28/	Brightspark Energy Private Limited: End user agreement showing the start date of project activity as 12-August-2018
/29/	Brightspark Energy Private Limited: Sample copies of end user agreement between PP and end user of all the samples visited during site visit from 17-April-2023 to 20-April-2023
/30/	Monitoring survey agreement between Brightspark Energy Private Limited and CPASS Services LLP
/31/	Brightspark Energy Private Limited: Project Replacement Database
/32/	Brightspark Energy Private Limited: Project installation/Distribution Database
/33/	Brightspark Energy Private Limited: Spreadsheet for average annual operating hours survey
/34/	Brightspark Energy Private Limited: Sample Ex-Post Monitoring User Survey Form
/35/	Brightspark Energy Private Limited: NPV Investment Analysis Spreadsheet
/36/	Brightspark Energy Private Limited: Sampling Survey and calculation analysis sheet of Monitoring Period 02 from 01-June-2022 to 31-December-2022 (Inclusive of both dates)
/37/	Brightspark Energy Private Limited: Training & Audit Report • Shine Spot Check mechanism records • Shine spot check audit report
/38/	Brightspark Energy Private Limited: Employment records of people employed
/39/	Brightspark Energy Private Limited: Database Management system (DMS) screenshots
/40/	Brightspark Energy Private Limited: Screenshot of Public statement and copy of email to avoid double claiming of Scope 3 emissions.

/41/	Brightspark Energy Private Limited: Training records - Monitoring Survey Training dated 06-July-2022 - Capacity Building Workshop of Project Shine dated 03-November-2020
/42/	VKU.F56W.Risk Assessment_VKU.VER.95.23_VCS_2608
/43/	Brightspark Energy Private Limited: Declaration to avoid double counting, non-inclusion of projects in other standards dated 19-April-2023
/44/	Auctus E Recycling Solutions Pvt. Ltd: - - Certificate of ICL Collection and destruction issued by ICL destruction Agency. - Certificate of handling over/ taking over of ICLs issued by ICL destruction Agency - Inventory list for certificates of handling of ICLs issued by ICL destruction Agency
/45/	Test Reports for Lamp life certificates of LEDs distributed showing technical specification of LEDs: - For 12W & 7W- The report has been issued by Planet Electro Labs - For 9 W and 12 W - the reports have been issued by Classic Instrumentation Pvt Ltd - For 12W & 14 W: The report has been issued by the HPL Electric & Power Limited.
/46/	Brightspark Energy Private Limited: Grievance/ Replacement/ Logbook Record on sample basis for current monitoring period from 01-June-2022 to 31-December-2022 (Inclusive of both dates)
/47/	Interviews conducted onsite from 17-April-2023 to 20-April-2023 detailed in section 2.3 of this report.as recorded by assessment team of VKU Certification Pvt. Ltd. during onsite visit in a form called as VKU.F46W. Attendance Sheet of Onsite Audit
/48/	Site visit Photographs and attendance sheet from 17-April-2023 to 20-April-2023
/49/	VKU.62W: Appendix-2 of Field Assessment Checklist for Sample Selected by VVB for Energy Demand & Distribution Projects
/50/	VKU.24W. Onsite Audit and Sampling Plan for Verification Activity version 01 dated 31-March-2023
/51/	Brightspark Energy Private Limited: Certificate of Incorporation issued at City: Bangalore, State: Karnataka, Country: India dated 12-June-2013

2.3 Interviews

An on-site inspection/47/ was performed by the assessment team. However, the representatives of the PP were interviewed personally by assessment team on **17-April-2023 and 20-April-2023**; i.e., Tables 06, 07 & 08 provide a comprehensive overview of the onsite interview process/37/ conducted during the verification. These tables outline the personnel involved in the interviews, along with their respective roles. The interviews specifically targeted individuals responsible for monitoring the project activity, data collection and management, as well as those involved in the quality assurance and quality control (QA/QC) procedures. The tables serve to identify the individuals interviewed and provide relevant information regarding their roles within the project.

The details of the people interviewed are mentioned in the table below.

Location: State- Assam and Tripura, Country- India.

Table no: 06: Details of Personnel Interview

S.no	Name	Designation	Topic of Discussion
1	Kanti Gopal Debnath	Centre for Rural Development Project manager	- Project Design - Project Implementation status
2	Rahul Rabi das	CRD (supervisor)	- Project start date and Project Location - Baseline Scenario - Baseline Identification and Additionality
3	Rajib Biswas	Consultant (CQC)	
4	Banamali Nath	CRD (Supervisor)	
5.	Debarshi Das	CQC	
7.	Gurjeet Singh	CPASS- For Survey in Assam	
8.	Chandraketu Sarkar	CPASS-For Survey in Tripura	- Qualification and Training requirement of the personnels - Monitoring and reporting documentation - Quality Assurance Management and operating system
9.	Neha Oli	Senior Associate CSAT-CQC	
6.	Kishore Kr. Dass	CQC Sr. Operations Manager	

The topics covered during interview ranges from general features and implementation of project to technical details of the project like, distribution of LEDs, Collection of ICL, Replacement procedure of LEDs, process of Monitoring/sampling survey, Spot Checking procedures, internal audit and archiving procedures i.e., management of DMS (Data Management system) etc. The assessment was based on the feedback received during onsite /48/ visit while interviewing /47/

the site personnel-end users which is coupled with the documentation in VKU.F62W.Field Assessment Checklist for Sample Selected by VVB for Energy Demand & Distribution Projects/49/.

During Onsite Visit/47/, Assessment team also interviewed the local stakeholders/46/ and end users/46/ involved in the projects to verify the implementation of grievance mechanism and process of grievance resolution mentioned in the Monitoring report/1/ (refer section 1.11, & 2.2 of MR/1/) by the PP. The assessment team confirmed the sustainable development claims and assessed the socio-economic impact of the project on the local community. Assessment Team also checked the records and observed that the PP provided opportunities for the locals to express their opinions and grievances, with efforts to resolve any issues through consultation with stakeholders. Assessment team thus verified all the above statements via focused group discussions and personal interview/46/ with stakeholders and with end users/46/ as tabulated below

Table no: 07: Details of Personnel Interview/Focussed Group Discussion with Stakeholders

S.no	Name	Designation	Category	Topic of Discussion
1.	Bibek Bora	SEWA (Chairman)	Local Stakeholder	- Implementation Status, Training to maintain LEDs, - Social and Environmental Impacts - Local Stakeholders meeting process - Benefits of the project
2.	Bitopan Das	SEWA (Field Manager)		

Table no: 08: Details of Personnel Interview/Focussed Group Discussion with end users

Topic of Discussion that was conducted with the end-users included:

- Average annual operating hours of project LEDs (O_i project)
- Number of group i project LEDs that are operational during time interval 't' (n_i operational)

S. No.	Dates	Names of Registered User	DISCOM Service Number of the end users
1.	18-April-2023	RAKHAL NATH	3021041680887313213
2.	18-April-2023	SUBAL DEBNATH	3021041850965310213
3.	18-April-2023	RAKHAL NATH	3021042771227121640
4.	20-April-2023	MD JAHARUDDIN ALI	176000034476
5.	19-April-2023	PARAN BARUAH	172000005552
6.	19-April-2023	MD IKRAMUL HUSSAIN	172000011243
7.	20-April-2023	MD SALIMUDDIN	188000003958

8.	20-April-2023	Mohini Handique	176000016473
9.	18-April-2023	NADIA CHAND DEBBARMA	3021041911058510635
10.	18-April-2023	HARIDAS GOWSAMI	3021041140705309168
11.	18-April-2023	Subash Ch. Das	3022021170416905654
12.	18-April-2023	SUSHANTA CHAKRABORTY	3022020550220809034
13.	18-April-2023	NARAYAN NATH.	3021041901054131580
14.	20-April-2023	PRANAB KANTI DAS	3021041110677209202

The VKU Assessment Team meticulously documented the information obtained during the interview with site personnel/46/. This data was recorded using VKU's dedicated form, specifically VKU.F46W, known as the Attendance Sheet of Onsite Audit/47/. Similarly, the interviews conducted with selected end-users were individually documented in VKU's specialized form called VKU.62W: Appendix-2 of Field Assessment Checklist for Sample Selected by VVB for Energy Demand & Distribution Projects. Through a comprehensive process involving documentation, desk review, document verification, and interviews with site personnel and end-users of the distributed or replaced LED lighting, the VKU Assessment Team affirms that no negative comments were received during the on-site interviews conducted by the team. For further details, please refer to [section 4.2.2](#) of this report.

2.4 Site Visits

VKU audit team have conducted an on-site inspection from **17-April-2023 to 20-April-2023** following sampling approach as explained below:

PP's sampling approach:

The proposed sampling plan by the PP follows a simple random sampling approach with a confidence/precision ratio of 95/10. This plan aligns with the requirements stated in Section 4, paragraph 13 of the applied methodology/13/ as well as the registered monitoring plan/3/. The determination of the sample size for each parameter adheres to the guidelines outlined in Appendix 1, Section 2.1.1 of the Sampling and Surveys for CDM Project activities and Programme of Activities Ver. 4.0 (EB86, Annex 4) /17/ and the registered monitoring plan/3/. The identified monitoring parameter(s) that were included in the sampling plan are:

- (a) Number of operating unit (LEDs) under the grouped project activity.

Development of the Verification/Sampling Plan:

The audit team has diligently documented its verification and sampling plan, ensuring a comprehensive approach to gathering evidence. The verification plan has been formulated by

considering crucial elements of the verification process, aligning with the criteria of engagement. The plan takes into account and effectively addresses the following aspects:

- a) Level of Assurance
- b) Materiality
- c) Standards of evaluation & reporting for the verification including the assessment criteria
- d) Scope and objectives
- e) Assessment team and the roles of team members
- f) Schedule of verification activities

Verification Approaches:

- g) ASP: Acceptance Sampling
- h) SPL: Sampling Approach (100% Data is made available)
- i) CDC: Complete Data Check of data including all data aggregation steps
- j) COM: Full data check at higher data aggregation levels and sampling at original data levels

Sampling/Verification Plan-

To ensure a comprehensive, transparent, and timely execution of the assessment task, the team leader has carefully crafted a detailed sequence of events that encompasses all the necessary steps to arrive at a substantiated final opinion. This meticulous planning allows for a systematic and organized approach to the assessment, ensuring that no crucial aspects are overlooked or neglected. In addition to the structured sequence of events, the team has implemented various tools and methodologies to facilitate the assessment planning process. These tools serve as aids in gathering and analysing the required information, ensuring the effectiveness and accuracy of the assessment. This approach guarantees that all relevant factors are taken into consideration and that the assessment is conducted in a rigorous and objective manner.

Step 1- Identification of Materiality threshold

Check the relevant box against applicable threshold level	Threshold as per Section 4.1.8 of VCS Standard v4.4/08/	Related to
☒	10%	The principle of quantitative materiality dictates that the threshold for determining materiality, considering errors, omissions, and

		misrepresentations, whether individually or in combination, in relation to the total reported GHG emission reductions and/or removals, should be set at a maximum of two percent. This requirement was thoroughly examined during the sampling survey conducted by PP and verified through the acceptance sampling carried out by the VVB. The findings indicated that the proportion of non-working LEDs was lower than expected, resulting in a reduction of uncertainty. As a result, the assessment determined that the reported data met the criteria for acceptance, as the level of materiality was within the permissible limits. Therefore, based on the results of the sampling survey and acceptance sampling, it can be concluded that the achieved proportion of non-working LEDs fell within an acceptable range, reducing uncertainty and confirming compliance with the principle of quantitative materiality.
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Table no. 9; Step 2- Identification of risks, their level and assessment

S.No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the potential risk		Assessment of the records/information/interview with personnel to check controls/ mitigation measures
		Risk level	Justification	
1	Monitoring parameters			
1.1	η _i baseline (60W) & (100W)	High	These parameters in question poses a high level of risk as they directly contribute to the calculation of emission reductions and is measured ex-post. To assess these parameters, sampling techniques were employed by the Verification Body, which involved the identification of 11 samples for each type of LED (7W, 9W, 12W, and 14W), resulting in a total of 44 LED samples for the current verification. The use of sampling techniques in	

1.2	Pi baseline scrapped (60 W & 100 W)	High	measuring this parameter allows for a representative assessment of the LED samples, considering their characteristics and performance. By selecting a sufficient number of samples, the VVB aims to obtain reliable data that can be used to evaluate the effectiveness of the LED technology in achieving emission reductions. Given the importance of this parameter and the application of sampling techniques, the verification process can provide valuable insights into the performance and impact of the LED samples, contributing to a comprehensive assessment of the project's emission reduction outcomes.	
1.3	Pi project (7 W, 9W, 12 W, 14W)	High	To mitigate the risk associated with these parameters, a thorough review process is conducted, which includes examining 100% of the data available. This comprehensive review encompasses various aspects, such as conducting interviews with end-users for all 44 LED samples, analysing the Monitoring Report (MR/1/) and the Emission Reduction Calculation spreadsheet (ER Calculation spreadsheet/2/), and referring to supporting documents. The supporting documents utilized in the review process include the project installation database /32/, Sampling Survey sheet /36/, End-user Agreement /29/, Destruction/Recycling/ICL handling Certificates /44/, and Sample survey forms /34/. These documents provide valuable information and evidence related to the project, its implementation, and the performance of the LED samples. By thoroughly examining these documents and conducting interviews with end-users, the verification team can gain insights into the effectiveness of the LED technology, ensure the accuracy of the data recorded in the MR and ER Calculation spreadsheet, and validate the reported emission reductions.	
1.4	Pi , operational (7 W, 9W, 12 W, 14 W)	High		
1.5	Pi (baseline 60 W, 100 W)	High	This comprehensive review process significantly reduces the risk associated with the parameter, as it enables the verification team to verify and validate the data through multiple sources and ensure the reliability and credibility of the reported results.	
1.6	Pi (project 7W, 9W, 12W, 14W)	High	The rated power parameter poses a high level of risk due to the methodology employed by PP for data collection using a smart phone or tablet app module connected to a data cloud during LED distribution. To mitigate this risk, a sampling technique was utilized, with the VVB selecting	The risk associated with data collection via smart phone or tablet app module connected to a data cloud is effectively mitigated by conducting thorough reviews. The audit team carefully examines 100% of the data, including conducting on-site interviews with end-users for all 44 LED samples. Additionally, the team meticulously scrutinizes the MR/1/ and ER Calculation

			11 samples for each LED type (7W, 9W, 12W, and 14W), totalling 44 LED samples for the current verification. This rigorous approach ensures thorough scrutiny and verification of the parameter, enhancing the accuracy and reliability of the assessment process.	spreadsheet/2/, cross-referencing them with supporting documents such as the project installation database/32/, Sampling Survey sheet/36/, End-user Agreement/29/, Screenshot of Data Management System/43/, and Sample survey forms/34/. These comprehensive review processes ensure the accuracy and reliability of the collected data and minimize the potential for errors. It is important to acknowledge that this diligent approach contributes to the robustness of the verification process.
1.7	Ly	Low	The parameter in question poses a low level of risk due to the adherence of PP to the prescribed value of 10% as per the methodology. This value is utilized in the calculation of both baseline and project emission reductions, which are measured ex-post. Furthermore, the verification of the methodology by the VVB provides additional confirmation of the accuracy and validity of the approach taken by PP. This alignment with established guidelines and verification processes ensures a reliable assessment of the emission reductions achieved by the project.	The risk associated with this parameter is effectively managed through a comprehensive review of the data, including on-site interviews with end-users for all 44 LED samples. Additionally, the MR/1/ and ER Calculation spreadsheet/2/ are carefully examined along with supporting documents such as the project installation database/32/ and Sampling Survey sheet/36/. The applied methodology/13/ is also considered during the review process. Furthermore, during the on-site visit and interview with the PP representative, it was discovered that PP took steps to verify the technical losses specific to the electricity distribution companies in the project area. This was achieved by referring to the T&D loss values provided and confirmed by the electricity regulator commissions overseeing these distribution companies. Although the published tariff orders did not explicitly define technical and non-technical

				losses separately, PP made the reasonable decision to consider a 10% value based on the applied methodology. These meticulous verification and data analysis procedures contribute to mitigating the risks associated with this parameter, ensuring the accuracy and reliability of the emission reduction calculations for the project.
1.8	oi project (7W)/(9W)/(12W)/(14W) /baseline (60W)/(100W)	Low	This parameter has low risk as it is estimated once during baseline survey and used in calculation of baseline and project emission reduction calculation which is measured ex-post. This is further confirmed by VVB through verification of the Average annual operating hours sheet /33/ submitted by PP	The risk is mitigated by reviewing the 100% of the data including the interviews at site with the end-users for 44 LED samples and reviewing the MR/1/ and ER Calculation spreadsheet/2/ with the help of supporting documents such as project installation database/32/, Sampling Survey sheet/36/, End-user Agreement/29/, Destruction/Recycling/ICL handling Certificates/44/ and Sample survey forms/34/ and average annual operating hours survey sheet/33/ submitted by PP.
2.	Project design: Information on project design without adequate controls related to data, evidences (project/sector related)	High	When the project design is inaccurately described, it can result in incorrect delineation of the baseline scenario, causal change, and threats to the project. This can have significant implications for the validity and credibility of the project's assessment and verification process.	To mitigate the risk of incorrectly described project design and its potential consequences, a rigorous review process is employed. The assessment team carefully examines the claims presented in the VCS PD/3/ and CDM-CPA-DD/4/ documents, evaluating their compliance with relevant VCS requirements. This ensures that the project design aligns with established standards. Additionally, the team conducts a thorough cross-checking of background documents, such as the monitoring survey report/31/, against project-specific evidence. Interviews with stakeholders/47/ further

				contribute to clarifying any inconsistencies or ambiguities. By employing these comprehensive measures, the assessment team mitigates the risk of inaccuracies in the project's description, baseline scenario, causal change, and potential threats. This robust approach maintains the verification process's integrity and provides reliable information to stakeholders.
3.	Accuracy of the monitoring survey	Medium	Insufficiently detailed or unclear monitoring plans can result in non-compliance with the principles of the Verified Carbon Standard (VCS). The VCS is a recognized standard for measuring and verifying greenhouse gas emissions reductions or removals achieved by projects. When a monitoring plan is inadequately delineated, it can lead to issues such as incomplete data collection, inaccurate reporting, or inconsistent measurement methodologies. These deficiencies can undermine the reliability and credibility of the reported emission reductions, potentially resulting in non-compliance with the VCS principles.	To mitigate the risk associated with the accuracy of the monitoring plan, a thorough review of relevant documents such as the VCS Project Design Document (PD) and Clean Development Mechanism (CDM) Certified Emission Reduction (CER) Program Activity (CPA) Design Document (DD) is conducted. This review ensures that the monitoring plan complies with the requirements and guidelines specified by the VCS. Additionally, the assessment team carries out onsite interviews with the project proponent (PP), their associates, and the end users. These interviews help verify the feasibility and appropriateness of the monitoring plan. By directly engaging with the stakeholders involved in the project and gathering their insights, the assessment team ensures that the monitoring plan accurately captures the necessary data and is aligned with the project's objectives and operational realities. The use of sampling tools further enhances the accuracy of the monitoring plan. By selecting representative

				samples from the project activities, the assessment team can assess the effectiveness of the monitoring approach and identify any potential discrepancies or gaps in the data collection and reporting processes. Overall, through a combination of document review, onsite interviews, and the use of sampling tools, the risk associated with the accuracy of the monitoring plan is mitigated. This comprehensive approach ensures that the monitoring plan is reliable, feasible, and aligned with the requirements of the VCS and other relevant standards or guidelines.
4.	Competence of personnel involved in conducting monitoring like surveys	Medium	Interview of the onsite-personnel involved and cross-check/verification of the training records conducted by the PP or the implementing agencies for the personnel involved in data archiving, distribution, replacement, destruction of ICL, monitoring, spot check and for conducting the survey for the project activity	The risk is mitigated by reviewing the training records/41/ of the personnel involved in the conducting such surveys and by following the monitoring responsibilities. The training records will be reviewed which will also be confirmed during the interviews/47/. The assessment team conducted interviews with onsite personnel who were involved in various aspects of the project, including data archiving, distribution, replacement, destruction of ICL, monitoring, spot checks, and survey activities. The purpose of these interviews was to gather information and cross-verify the training records of the personnel. The interviews aimed to confirm that the personnel involved had received appropriate training and were knowledgeable about their respective roles and responsibilities. By examining

				the training records provided by the PP or implementing agencies, the assessment team ensured that the personnel had undergone the necessary training to effectively carry out their assigned tasks. This thorough verification process helped validate the competence and expertise of the onsite personnel, ensuring that they were well-prepared and equipped to perform their duties related to data management, distribution, monitoring, and survey activities for the project.
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Sampling Plan

In cases where there are a large number of project activity instances like in this project activity there are six project activity instances under this grouped project, based on the electricity division and subdivision in Assam and Tripura that make it impractical to assess each instance individually, the verification team adopts appropriate sampling methods. These methods are carefully selected to ensure statistical validity and reliability. The team documents and explains the chosen sampling methods in detail, providing transparency and clarity to the verification process. The number of instances included in the project, eligible for monitoring, and the generation of Verified Carbon Units (VCUs) is determined proportionally based on the compliance rate observed among the sampled instances. This approach allows for a representative assessment of the project activity while maintaining efficiency and accuracy in the verification process.

☐	No sampling approach has been used by the VVB to verify the project's compliance with SD Vista requirements.
☒	A sampling approach has been applied by the VVB to verify the project's compliance with VCS requirements for the aspects derived in step 2 above. The statistical approach of sample size (i.e., 11) calculation is provided below.

AS: Acceptance Sampling

VKU's Assessment Team has diligently employed a sampling methodology during the onsite interviews as an integral part of their assessment process, in strict accordance with the specifications outlined in paragraph 26 of the esteemed Standard for Sampling and Surveys for CDM project activities and programmes of activities, Version 09.0/18/. Embracing the principles of precision and reliability, the team has consciously opted for acceptance sampling, a well-established technique that facilitates a systematic and representative sampling of project instances. By attentively adhering to these esteemed sampling guidelines, VKU's Assessment Team ensures a robust, accurate, and comprehensive assessment of the project activities,

thereby upholding the highest standards of evaluation. From the PP's sampling survey sheet performed by random sampling/36/ of Verification team has opted for **AQL of 0.5 %** and **UQL of 20%**; **producer risk of 10%** and **consumer risk of 10%** as per VVBs professional judgement according to **para 30** and **para 31** of Sampling and surveys for CDM project activities and programme of activities version 09.0/18/ in determining the **VVB's selected sample size of 11** (11 LEDs of each type; 7W, 9W,12 and 14W, Total = 44 LEDs) with acceptance number (c) as 0. This is also in line with VKU's internal procedure.

Sample size and acceptance number based on AQL, UQL, and producer and consumer risks as per Sampling and Survey Standard v09.0/18/

Producer Risk		5%		5%		5%		5%	
Consumer Risk		5%		10%		15%		20%	
AQL	UQL	Sample Size (n)	Acceptance Number (c)	Sample Size (n)	Acceptance Number (c)	Sample Size (n)	Acceptance Number (c)	Sample Size (n)	Acceptance Number (c)
0.5%	10%	46	1	38	1	33	1	29	1
0.5%	15%	30	1	25	1	22	1	10	0
0.5%	20%	22	1	18	1	9	0	8	0
1.0%	10%	61	2	52	2	33	1	29	1
1.0%	15%	30	1	25	1	22	1	19	1
1.0%	20%	22	1	18	1	16	1	14	1
Producer Risk		10%		10%		10%		10%	
Consumer Risk		5%		10%		15%		20%	
AQL	UQL	Sample Size (n)	Acceptance Number (c)	Sample Size (n)	Acceptance Number (c)	Sample Size (n)	Acceptance Number (c)	Sample Size (n)	Acceptance Number (c)
0.5%	10%	46	1	38	1	19	0	16	0
0.5%	15%	19	0	15	0	12	0	10	0
0.5%	20%	14	0	11	0	9	0	8	0

1.0%	10%	46	1	38	1	33	1	29	1
1.0%	15%	30	1	25	1	22	1	10	0
1.0%	20%	22	1	18	1	9	0	8	0

Verification team based on its professional judgement and observation during acceptance sampling, derived its assessment including conclusions as discussed later in the following section of this report. The verification team selected **11 LEDs** samples of each type from the PP's sample list for each LED type separately by using random number generator thus random samples from PP's sample list/36/ were selected. The LED details (Date of installation, type of LED, DISCOM Service number, name of user and address) were checked and found to be consistent with that reported in the installation database. No inconsistency was observed for any of the 11 samples (**11 LEDs of each type;7W, 9W,12 and 14W, Total = 44 LEDs**) with respect to on-site inspection & document review. This assessment of the selected samples was done to ascertain the implementation status of the grouped project activity with. the LED types, serial number, location, operation etc. of LED

2.5 Resolution of Findings

The objective of this phase of the verification is to resolve any outstanding issues which need to be clarified for VKU's positive conclusion on the project description. To guarantee transparency a verification protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of verification and the results from verifying the identified criteria. The verification protocol consists of three situations in tables; the different columns in these tables are described below.

A corrective action request (CAR) is raised if one of the following occurs:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient.
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions.
- Issues identified in a FAR during previous assessment i.e., in validation or verification report to be cross verified during verification have not been resolved by the project participants.

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

A forward action request is also raised in cases where any required deviation/information is not fulfilled in current verification and thus needs to be taken up in consequent verification for better transparency thus holding the applicability of the methodology eligible to the project activity and there is no impact of the same on additionality, baseline scenario & emission reduction calculation of project.

In summary, **00 FARs, 03 CLs and 04 CARs** were raised during this verification which were closed successfully and details are provided under Appendix B of this report.

2.5.1 Forward Action Requests

Based on the review of the VCS Validation Report/5/ and previous VCS Verification Report /6/, no FAR was raised during Validation and previous Verification which needs to be closed during this verification and **no FAR has been raised during current verification, (01-June-2022 to 31-December-2022; Inclusive of both start and end dates).**

2.6 Eligibility for Validation Activities

VKU has not undertaken any validation activities as part of the verification. Moreover, VKU has not conducted the validation for this project activity.

VKU has only conducted second VCS Verification for monitoring period i.e., 01-June-2022 to 31-December-2022 (both dates inclusive) of first crediting period i.e., (12-August-2018 to 11-August-2028, including both days) for this project activity.

VKU does not hold accreditation for validation of any relevant sectoral scope Hence this section is not applicable.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project has not applied under any other GHG program except VCS for the current monitoring period, 01-June-2022 to 31-December-2022 (inclusive of both dates). The project is registered under VCS with project ID: 2608¹ and under CDM with registration ID: CPA 10484-P1-0002-CP1². This was confirmed by checking VERRA registry website and CDM registry website and similar exercise was performed for GS/GCC/UCR registries with similar project title/capacity and Project Proponents but the assessment team was not able to trace any such project registered under any of the above stated registries or under any other similar mechanisms except CDM. This was supported from the declaration/43/ submitted by PP in which they claimed that same GHG emission reductions of the project from VCS for the current monitoring period will not be claimed under other registries except VCS. Similar exercise of independently searching for such project registration or claim for current monitoring period was performed for other GHG related benefits such as REC and I-REC benefits and based on both independent assessment and declaration submitted by PP/43/, the assessment team accepted the claim that there is no double counting

¹ <https://registry.terra.org/app/projectDetail/VCS/2608>

² https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/AEY3HMDL0F95RCP6SWIGVNZU82TKBQ/view

from this project activity for current monitoring period. Thus, ensuring emission reduction generated from the project activity will not be double counted hence accepted by the assessment team. The details of the registries checked are as follows:

- 1) <https://www.recregistryindia.nic.in/>
- 2) <http://cdm.unfccc.int/>
- 3) <http://www.goldstandard.org/>
- 4) <https://verra.org/verra-standards-and-programs/>.
- 5) [I-REC Standard - The International REC Standard Foundation \(irecstandard.org\)](http://www.irecstandard.org/)
- 6) <https://cri.nccf.in/>
- 7) [International Carbon Registry - International Carbon Registry](http://www.internationalcarbonregistry.org/)
- 8) [GCC PROJECTS PORTAL \(globalcarboncouncil.com\)](http://www.globalcarboncouncil.com/)

Rejection by other GHG programs

The Project is not rejected by other GHG programs. A declaration/43/ for the same is checked and found correct by the assessment team. Also, assessment team independently verified with the following registries and checked projects from the PP matching the same project design and found that no such project either exists or were rejected by the registries.

The details of the registries checked are as follows:

- 1) <https://www.recregistryindia.nic.in/>
- 2) <http://cdm.unfccc.int/>
- 3) <http://www.goldstandard.org/>
- 4) <https://verra.org/verra-standards-and-programs/>.
- 5) [I-REC Standard - The International REC Standard Foundation \(irecstandard.org\)](http://www.irecstandard.org/)
- 6) <https://cri.nccf.in/>
- 7) [International Carbon Registry - International Carbon Registry](http://www.internationalcarbonregistry.org/)
- 8) [GCC PROJECTS PORTAL \(globalcarboncouncil.com\)](http://www.globalcarboncouncil.com/)

3.2 Methodology Deviations

No instances of methodology deviation have been identified throughout the current monitoring period, signifying the adherence and compliance of the project to the prescribed methodologies. Furthermore, it is noteworthy that no methodology deviations were observed during the VCS validation /5/ or the previous VCS verification/6/ processes, affirming the project's steadfast commitment to upholding the designated methodologies and ensuring accurate and reliable results.

3.3 Project Description Deviations

During the current monitoring period, no discrepancies or deviations in the project description have been identified. This finding aligns with the absence of any deviations detected during the VCS validation /5/ and previous verification processes /6/. To ensure accuracy and compliance,

the assessment team cross-references the project webpage /22/ to verify the consistent and accurate portrayal of the project's description.

3.4 Grouped Project

The "SHINE- Distribution of LED Lightbulbs in India -2" project (VCS ID 2608) is categorized as a grouped project, focusing on the distribution of energy-efficient LED lightbulbs to grid-connected households in the North-East Indian states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura. However, it is important to note that the actual distribution of LED lightbulbs has only taken place in two states: Assam and Tripura. This information has been verified and confirmed through the Monitoring Report (MR) document (MR/1/) as well as the distribution database/32/ and Emission Reduction (ER) sheet submitted (ER sheet/2/).

As of 31-July-2021, a total of 1,411,863 LED lightbulbs have been disseminated across 264,104 grid connected households. It is noteworthy that out of 1,411,863 LED lightbulbs only 1,366,198 LEDs are operational in grid connected households in Assam and Tripura during the current monitoring period, which has been verified through the Project Installation Database /32/ and ER Calculation sheet ER sheet/2/. These LEDs have been distributed across 246,104 grid-connected households in the states of Assam and Tripura. It is important to highlight that this first monitoring survey which was carried out from 07-July-2022 to 12-July-2022 is also applicable for the current monitoring period, which falls under the scope of the VCS requirements.

VKU assessment team confirmed from the database submitted by PP along with cross-verification by interview with PP-representative during the current monitoring period, that encompasses from (01-June-2022 to 31-December-2022), there have been no additional LED distributions to any households. Therefore, there is no need to assess or evaluate instances of the grouped project activity during this period, as per the VCS requirements. Consequently, the assessment of grouped project activity instances is not included in the scope of the current verification process, given the absence of new LED distributions during the specified monitoring period.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The grouped project, “**SHINE- Distribution of LED Lightbulbs in India -2**” is a LED distribution project with project ID **VCS 2608** applying the methodology AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0 /13/. This is the second periodic verification for the grouped project activity. The grouped project involves distribution of Light Emitting Diodes (LEDs) for domestic lighting in North-East Indian states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura as per the VCS PD version 2.2 dated 21-January-2022/03/ and CDM-CPA-DD version 03 dated 10-January-2020/4/ But the actual distribution has been done only in the two states which are Assam and Tripura as per MR/1/ and the distribution database and ER sheet submitted/2/. Thus, under this grouped project, **60W ICL** have been replaced with **7W/9W LED** and **100W ICL** with **12W/14W LED** as the lumen output is within the specified limit as per methodology/13/ mentioned in section 1.4 of this report above. Each household has received maximum six LEDs and minimum one LED under this grouped project. Total **1,411,863 LEDs** have been distributed in **246,104** grid connected households in the state of **Assam and Tripura** till 31-July-2021 which is already covers in the first monitoring period 01-January-2021 to 31-May-2022 (Inclusive of both start and end dates) under VCS and **no other LED** has been distributed to any household in the **current monitoring period** 01-June-2022 to 31-December-2022 (Inclusive of both start and end dates) as verified by assessment team in Project installation database/32/ and ER sheet/02/ submitted by PP.

The grouped project "SHINE- Distribution of LED Lightbulbs in India -2" has been divided into six project activity instances, each corresponding to a specific electricity division and subdivision where LED distribution has taken place. This division allows for a more focused assessment and analysis of the project's impact. It is important to note that the aggregate energy savings by a single project activity instance do not exceed the equivalent of 60 GWh per year, in accordance with the applicable methodology AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0/13/. The project proponent (PP) has provided detailed calculations related to the energy savings at the instance level. These calculations are documented in the emission reduction spreadsheet submitted by the PP. The spreadsheet summarizes the total number of LEDs distributed and the corresponding energy savings for each project activity instance.

Please refer to the table below for a summary of the LEDs distributed and the associated energy savings for each instance of the grouped project: These numbers provide an overview of the LED distribution and the corresponding energy savings achieved for each project activity instance within the grouped project.

Table no 10: LED distribution under the grouped project

Instance Number	State	Division and Subdivision	LED distributed				Total Energy Savings (GWh)
			7 W	9 W	12 W	14 W	
SHINE CPA 2 PAI 1	Tripura	Dhalai-Khowai	65,018	19,116	83,708	0	28.14
SHINE CPA 2 PAI 2	Tripura	Dharmanagar – Unakoti	34,912	85,499	116,207	4,648	40.53
SHINE CPA 2 PAI 3	Assam	Amingaon, Ged (North), Ged (West), Kamrup, Mirza, Morigaon, Nalbari, Rangia, West Guwahati	146,367	0	156,388	0	51.20
SHINE CPA 2 PAI 4	Assam	Dibrugarh, Golaghat, Sivasagar	77,003	53,214	137,153	0	45.16
SHINE CPA 2 PAI 5	Assam	Division-Jorhat Subdivision-Majuli, Mariana, Teok, Titabor	77,485	41,755	130,281	0	42.33
SHINE CPA 2 PAI 6	Assam	Division-Dergaon, Jorhat ESD-I, Jorhat ESD-II, Jorhat-ESD III, Kakojan	35,548	55,162	92,399	0	30.80
Total LED distributed in all instances			436,333	254,746	716,136	4,648	238.16

The start date for the grouped project is **12-August-2018** which is the date when the first energy efficient LED was distributed and the last LED was distributed on **31-July-2021**, this was confirmed by the assessment team by cross-verifying the dates from the End-User Consent deed cum Invoice submitted to the verification team by the PP and no further distribution of project LEDs has been carried out or planned after 31-July-2021 as per MR/1/ as confirmed by PP representatives during on-site interview and has also been declared in MR/1/ by the PP also the installation database/32/ and ER sheet/02/ submitted by PP confirms the same.

Table no. 11; The relevant implementation dates for the Grouped project activity under VCS

Date of first LED installed	12-August-2018
Date of last LED installed	31-July-2021
First ex post VCS Monitoring Survey dates	07-July-2022 to 12-July-2022
First Monitoring Period under VCS for which VCU issuance has been received under VCS	<u>01-January-2021 to 31-May-2022</u> (Inclusive of both dates)
Second Monitoring Period under VCS	01-June-2022 to 31-December-2022 (Inclusive of both dates)

The verification team confirms that there is no change in the project activity from the registered VCS PD/03/ and CDM-CPA-DD/04/of the physical features which may impact the emission reductions of the project activity. This has been confirmed based on the review of project installation database /32/, monitoring survey forms /34/ and end user agreements /29/, conducting interviews with representatives of PP as well as by carrying out onsite visit interviews with end users/47/. Thus, the verification team concludes that all the structures of the CDM POA as defined in CDM-CPA-DD/4/ and registered VCS PD /3/ are in place as defined in these documents.

The verification team confirms that till the current monitoring period from **01-June-2022 to 31-December-2022** (Inclusive of both dates) the grouped project has distributed **1,411,863 LEDs**. This was confirmed based on the review of project installation database /32/, monitoring survey forms /34/ and end user agreements /29/ and further based on interviews with representatives of PP through onsite visit interviews/47/.

During the onsite visit interviews verification, QA/QC procedures were identified which demonstrate that:

- Operational and management system of the grouped project is in place; data were centralized;
- Monitoring data were crosschecked with the sales records stored and confirmation that all staff were trained before taking up positions.
- The verification team thus confirmed that the monitoring of the project activity has been implemented in accordance with the monitoring plan in the registered VCS PD/3/ and CDM-CPA-DD/4/.
- The registered VCS PD/3/ and CDM-CPA-DD/4/ clearly describes the monitoring plan and responsibility of monitoring and maintenance which is done by PP.

VKU verification team verified 11 samples (**11 LEDs of each type;7W, 9W, 12W and 14W, Total = 44 LEDs**) which is required number of samples as explained in [section 2.4](#) above to ascertain accuracy of information. VKU confirms that the project **LEDs** are operating in all samples interviewed/47/, and each LEDs has unique identification number (ID)-DISCOM Service number

which has been provided in the end user agreement/29/ which was also cross-verified by the assessment team during site-visit to VVB randomly selected project implemented households and it is consistent as per project installation database/32/. Along with the serial numbers, LED types, end user name, address, installation date, location etc. had also been noted which were found to be consistent on ground during the site visit/48/ with the sampling survey sheet /36/ and project installation database/32/ submitted.

Table No. 12: Wattage wise LEDs' actual distribution figures under VCS 2608

7W	9W	12 W	14 W	Total LED Distributed
436,333	254,746	716,136	4,648	1,411,863

During the current monitoring period, no incident or event occurred, that could affect GHG emissions reduction and implementation of the approved monitoring plan.

Specifications of LED Lamps –

The technical specifications for all four types of distributed LEDs are detailed in tables from **Table no. 13 to Table no. 16**. These specifications underwent a rigorous verification process by the assessment team, including a comprehensive examination of the technical records provided by the project proponent (PP), specifically the life test reports of the LEDs /45/. Furthermore, during the onsite visit, the assessment team conducted a meticulous visual inspection of each LED bulb at the project site /48/ to ascertain their conformity with the documented technical specifications. Please refer to the following revised tables for the comprehensive technical specifications of the distributed LED bulbs:



Image of LED Bulb with Shine LOGO

Table no. 13; Showing Technical specification of 7W LED Bulb

Technical Specification of 7W LED bulb as per the technical specification report submitted by PP/45/	
Rated Wattage	7 W
Working Voltage	220-240 V, 50 Hz
Colour Temperature	5700 K - 6500 K
Initial Lumen	740 lm
Service level as compared to baseline lamp of 60W (715 lm as per methodology)	103% of lumen output
CRI	>80
Power Factor	0.90
Average Life	25,000 hrs
BIS compliant as per IS 16102 (Part 2): 2012	Yes

Table no. 14; Showing Technical specification of 9W LED Bulb

Technical Specification of 9W LED bulb as per the technical specification report submitted by PP/45/	
Rated Wattage	9 W
Working Voltage	100 V-300 V, 50 Hz
Colour Temperature	6500 K
Initial Lumen	820 lm
Service level as compared to baseline lamp of 60W (715lm as per methodology)	115% of lumen output
CRI	>80
Power Factor	0.90
Average Life	25,000 hrs
BIS compliant as per IS 16102 (Part 2): 2012	Yes

Table no. 15; Showing Technical specification of 12W LED Bulb

Technical Specification of 12W LED bulb as per the technical specification report submitted by PP/45/	
Rated Wattage	12 W
Working Voltage	230 V, 50 Hz
Colour Temperature	6000 K – 7000 K
Initial Lumen	1340 lm
Service level as compared to baseline lamp of 100W (1350lm as per methodology)	99% of lumen output
Power Factor	0.90
Average Life	25,000 hrs
BIS compliant as per IS 16102 (Part 2): 2012	Yes

Table no. 16; Showing Technical specification of 12W LED Bulb

Technical Specification of 14W LED bulb as per the technical specification report submitted by PP/45/	
Rated Wattage	14 W

Working Voltage	220 V-240 V, 50 Hz
Colour Temperature	6500 K
Initial Lumen	1400 lm
Service level as compared to baseline lamp of 100W (1350lm as per methodology)	104% of lumen output
Power Factor	0.90
Average Life	25,000 hrs
BIS compliant as per IS 16102 (Part 2): 2012	Yes

It is important to note that during the onsite visit, no changes impacting the project's additionality, such as the addition or extension of components or technologies, changes in project sites, or alterations to the operational parameters relevant to emission reductions within the project proponent's control, were observed or identified. Furthermore, there were no observed or identified changes that would affect the scale of the grouped project activity or the applicability of the baseline and monitoring methodology (AMS-II.C, Version 15.0).

All the ex-ante parameters used in calculating emission reductions remain consistent with the CDM-CPA-DD/4/. The ex-ante parameters specified in section 4.1 of the monitoring report (MR/1) align with those stated in the VCS PD/3/ and CDM-CPA-DD/4/. Additionally, the monitoring plan was followed, and the ex-post parameters are presented in section 4.2 of the monitoring report (MR/1).

Assessment team concludes the following:

- The assessment team has conducted a thorough review and found no significant discrepancies between the implementation of the project and the project description provided in the registered project design document (PD/3/).
- The monitoring plan has been diligently executed, and the monitoring system, encompassing the data collection, recording, compilation, and analysis processes, is deemed appropriate and comprehensive.
- Materiality threshold applied is 10% as per 4.1.27 of VCS Standard v4.4. It was concluded that the materiality threshold applicable to the project activity based on the type of project i.e., grouped project is 10%, since the PP has applied 95/10 precision level. This effectively means that there is uncertainty inherent in the estimation of emission reduction of 10%. This is consistent with the section 4.1.27 of VCS standard v4.4 and CDM VKU.F24W. Onsite Audit and Sampling Plan Standard: Sampling and surveys for CDM project activities and programmes of activities, version 9.0.
- There are no material variances between the actual monitoring system and the monitoring plan outlined in the project description and the applied methodology/13/.
- The greenhouse gas (GHG) emission reductions or removals generated by the project have not been included in any emissions trading program or other mechanisms that involve GHG allowance trading/43/.
- The project has not received or pursued any other form of environmental credit, nor has it become eligible to do so since VCS Validation/05/ or the previous VCS Verification/06/. The

assessment team has verified that the project proponent (PP) has appropriately addressed the guideline in section 3.23.9 of the VCS Standard, version 4.4/8/, as stated in section 1.10 of the monitoring report (MR). According to this guideline, the producer(s) or retailer(s) of the impacted goods or services are known but not involved in the project or do not have a website.

- The PP has informed the distribution agent that Verified Carbon Units (VCUs) may be issued for the greenhouse gas emission reductions and removals achieved through this grouped project. The PP will be claiming carbon credits under VERRA. Evidence in the form of emails and a public statement has been submitted by the PP for the current verification of the project, as presented in Appendix-B of the monitoring report (MR/1). This evidence confirms that the PP has communicated with suppliers to avoid any double counting of emission reductions.
- The project is registered under CDM and validated on 11-January-2020 by Carbon Check (India) Private Limited³ and received CDM Credits from 12-January-2020 to 31-December-2020 under three different monitoring periods covering the time period of (0.97 years, 11 Months 20 Days). Then project got registered under VERRA on 22-February-2022 and validated by Carbon Check (India) Private Limited since then project is getting credits from VCS and no double counting has been observed as seen from audit history assessment by assessment team and Table-2 provided in MR/1/. Currently the project is undergoing second verification under VCS from 01-June-2022 to 31-December-2022 (both dates included).

VCS 2608 (Audit Type)	Period	Program	VVB Name	Number of years
Validation- CDM	11- January 2020 (date of CPA inclusion)	CDM	Carbon Check (India) Private Limited	7 Years (renewable crediting period)
Verification (first)- CDM	12- January 2020 to 15-March-2020 (both days included)	CDM	Earthood Services Private Limited	0.17 year or 2 months, 4 days
Verification (second)-CDM	16-March-2020 to 31-July-2020 (both days included)	CDM	Earthood Services Private Limited	0.37 year or 4 months, 16 days
Verification (third)- CDM	01-August-2020 to 31-December- 2020	CDM	Earthood Services Private Limited	0.42 year or 5 months

³ CDM-POA-VAL-FORM (unfccc.int)

	(both days included)			
Validation-VCS	22-February-2022(Date of registration)	VCS	Carbon Check (India) Private Limited	10 years (fixed crediting period)
Verification (first)-VCS	01-January-2021 to 31-May-2022 (both days included)	VCS	Carbon Check (India) Private Limited	1.41 year or 1 year, 5 months
Verification (second)- VCS	01-June-2022 to 31-December-2022 (both days included)	VCS	VKU Certification Private Limited	-
Total	-	-	-	2 years (under VCS verification)

- The project is registered under VCS and CDM, however PP has submitted the declaration/43/stating, they will not claim same GHG emission reductions of the project from CDM or any other GHG programme for the current monitoring period when project is seeking to get GHG emission reduction from VCS. Audit team verified the same by checking in other GHG programs including GS Registry, CDM, GCC, UCR & CR-I & to support the same claim PP has submitted the declaration/43/ for the same
- The grouped project activity complies with three indicators for sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India as discussed under section 1.11 of MR /1/. Assessment team has verified the same during on site visit/48/ and found all the indicators to be effective and applicable for the grouped project activity.

As per the VCS Standard Version 4.4⁴, projects registered on or after 20-January-2023, must demonstrate contributions to a minimum of three Sustainable Development Goals (SDGs). Projects registered with VERRA before this date must show contributions to three SDGs by 20-January-2025⁵, as stated in the Quarter 1 VCS Program Update released on 20-January-2022. This project's fifth Periodic Verification for the Monitoring Period 01-June-2022 to 31-December-2022, is registered before 20-January-2023, so the Project Proponent (PP) must demonstrate contributions to at least three SDGs by 20-January-2025. For the current monitoring period, the PP is voluntarily showing contributions to three SDGs, as indicated below:

⁴ <https://verra.org/documents/vcs-standard-v4-4/>

⁵ [VCS-Summary-of-Effective-Dates-2022-Q1.pdf \(verra.org\)](#)

- ✓ **7.1.2 i.e. (Proportion of population with primary reliance on clean fuels and technology)**
During the initial monitoring period of the project, a total of **1,366,198 energy efficient LEDs** were successfully operational, replacing the existing incandescent lamps (ICLs), **in 246,104 grid connected households** situated in the Indian states of Assam and Tripura. In the current second monitoring period, it has been verified that the LEDs remain operational and functional, as confirmed through the monitoring survey conducted. This significant achievement has facilitated the provision of affordable, reliable, and sustainable modern energy access to the aforementioned households in Assam and Tripura throughout the project's lifespan. This was cross-verified by the assessment team from the Project Implementation/Distribution database/32/ Replacement Database/31/ and also through interview with PP representatives during on-site visit/48/ and thus VKU found the above claimed Proportion of population with primary reliance on clean fuels and technology authentic & correct.
- ✓ **12.5. i.e. (Volume of ICL generated); Project Specific Indicator**
By replacing each failed incandescent lamp (ICL) with a single LED in each grid connected household over the second monitoring period, the project is estimated to reduce the generation of waste from approximately 1,366,198 ICLs. This reduction in waste generation is a significant contribution of the project. The assessment team has verified the calculation provided by the project proponent (PP) in Appendix-C of the Monitoring Report (MR/1/) and cross-referenced it with the DELP toolkit reference provided by the PP. The information obtained from the Project Implementation and Distribution Database/32/ and Replacement Database/31/ further confirms the accuracy of the values. Consequently, it is deemed accurate by the verification team and aligns with the project's objective of distributing LEDs with higher working hours to grid connected households, thereby reducing the volume of failed ICLs generated in the project region.
- ✓ **13.0 i.e. (Tonnes of greenhouse gas emissions avoided or removed)** The implementation of this project activity has successfully resulted in the avoidance of approximately 121,546 metric tons of carbon dioxide equivalent (tCO₂e) emissions during the current monitoring period. This substantial reduction in greenhouse gas (GHG) emissions is a significant achievement. The project's contributions to GHG emission reduction over its entire lifetime are equivalent to the emissions avoided during the second monitoring period. This confirms the project's effectiveness in mitigating climate change impacts. The assessment team has thoroughly reviewed and verified the emissions reductions using the Emission Reduction (ER) spreadsheet/2/ and the Monitoring Report (MR/1/). The team has determined that the reported value is accurate, reliable, and aligned with the project's objectives.

In view of the information as verified above the assessment team is able to conclude that the grouped project has been implemented as described in the registered VCS PD/3/ and CDM-CPA-DD/4/, All the above stated information was verified by VVB during onsite visit/48/ and site personnel interviews /47/ and found to be acceptable.

4.2 Safeguards

4.2.1 No Net Harm

Within the framework of this grouped project, an initiative was undertaken to provide grid connected households with highly subsidized LED bulbs, replacing inefficient Incandescent Conventional Lamps (ICLs) and fluorescent lamps. This transition resulted in a significant reduction in greenhouse gas (GHG) emissions, as the usage of fossil fuels for electricity consumption decreased. Not only does this program contribute to GHG emission reductions, but it also addresses the issue of waste generation. LED bulbs have a much longer lifespan compared to ICLs, resulting in reduced waste generation. Furthermore, LED bulbs do not contain toxic mercury, which is commonly found in compact fluorescent lamps.

To ensure the effective management of hazardous wastes, the project proponent (PP) has taken measures to collect and dispose of the replaced ICLs in a scientific and responsible manner. The ICLs from the LED recipient households were transferred to designated storage facilities under the supervision of PP. A contractual agreement was established with a reputable waste disposal agency, Auctus E-Recycling Solutions (P.) Ltd./27/, to safely destroy the collected ICLs. This agency followed the legal guidelines set by the Government of India for the proper disposal of hazardous wastes. Stringent handling and disposal procedures were implemented to prevent any negative environmental impact during the destruction process. PP has obtained Recycling/Destruction/ICL-Handling certificates from the disposal agency, which are being submitted to the Verification Body as evidence of the safe and appropriate disposal.

Consequently, the distribution of LED bulbs under this project not only offers significant environmental benefits wherever they are implemented but also ensures that no adverse environmental impacts have been identified during the monitoring period. As a result, the grouped project activity demonstrates a net positive impact and contributes to sustainable development objectives.

4.2.2 Local Stakeholder Consultation

The Project activity “SHINE- Distribution of LED Lightbulbs in India -2” ([VCS ID 2608](#)) is already registered with VCS and registered VCS PD/03/; sections 2.2 describe the Local Stakeholder Consultation Process as in-line with VCS requirement. The Local Stakeholder Meetings were organized for local stakeholder consultation and informed local stakeholder regarding the meeting. The followings are the local stakeholders for the project activity:

- Local community
- Local village administration
- Technology suppliers
- Local vendors

A comprehensive stakeholder engagement process was carried out by the project proponent (PP) through a public notice inviting all stakeholders to attend the stakeholders meeting. The stakeholder consultation took place during the validation phase of the project activity, which was validated by CCIPL/5/. As the project operates at a national level, the local stakeholder consultation was deemed not applicable for the project proponent during verification.

The stakeholder consultation at the Program of Activities (PoA) level was conducted prior to the registration of the PoA. The PP identified key institutional stakeholders such as standard-making bodies, LED manufacturers, and electricity regulatory bodies, along with prominent non-governmental organizations (NGOs) active in the field. In order to maximize participation, a list of invitees was prepared, and extensive efforts were made to contact them through phone calls, emails, public advertisements, and word-of-mouth follow-ups.

The stakeholder meeting, held on 07-March-2018 in Hyderabad, India, witnessed a strong turnout and active involvement from the participants. During the meeting, it became evident to the PP representatives that stakeholders not only embraced the concept of the project but also expressed a desire to be educated about the product and kept informed about its success. The engagement between the PP and stakeholders was robust, resulting in positive feedback and appreciation for the PP's efforts in implementing this community-based project. Stakeholders recognized the project's potential to reduce greenhouse gas emissions and improve living conditions through better lighting facilities.

Overall, the stakeholder meeting proved to be beneficial for all parties involved, fostering dialogue and collaboration to ensure the project's success. The PP representatives are satisfied with the level of engagement and believe it has contributed to the project's positive outcomes. The outcomes from the local stakeholder consultation are available in Section F of the CDM PoA-DD⁶.

A comprehensive feedback and grievance redressal mechanism has been implemented as part of the project to address any issues or challenges faced by the beneficiaries. This mechanism operates under the project's oversight, ensuring that all concerns raised by the stakeholders are effectively resolved. To maintain ongoing communication with local stakeholders, the project proponent (PP) conducts regular surveillance to monitor the proper functioning of the distributed LEDs and to gather feedback on their usage and benefits. LED users can also contact the PP through a consumer care number to express any concerns or provide comments on the project

⁶ https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/MN26BFZ0CHPIR47G01L3YES9XVKTUD/view (PoA)

or the LEDs themselves. It is worth noting that the distributed LEDs come with a three-year warranty, and in case of any non-functioning bulbs within this period, the project implementer will replace them free of charge at LED Replacement Centers.

The process for exchanging LEDs under warranty involves several steps. Firstly, the end user must contact the Distribution Agency or their designated representative using the provided consumer care number. They will then be directed to bring the faulty LED(s) and a copy of the electricity bill for service number verification to the service counter at the replacement center. The agent at the centre will examine the faulty LEDs for failure and verify the service number against the installation database to ensure that the user is covered and that the claim falls within the warranty period. If all conditions are met and the claim is valid, the agent will replace the faulty LED(s) with a new equivalent LED and record the exchange in a grievance register. This process ensures that users receive a satisfactory resolution to their issues with minimal inconvenience.

During the current monitoring period, nine grievances were reported by end users regarding fused LEDs. All complaints were duly communicated to the Distribution Agency, which promptly provided new LEDs to the affected users in accordance with the outlined grievance redressal process. The assessment team verified the grievance records and confirms that all concerns related to fused LEDs were adequately addressed by the PP. Additionally, feedback from the end users was recorded upon resolution of the grievances. It is important to note that no project design changes were made by the PP during the current monitoring period.

The verification team has examined the engagement procedures, documentation of outcomes from local stakeholders' consultations, and compilation of all received inputs or feedback. The team confirms that the project proponent has appropriately considered all input or feedback received during the monitoring process, whether positive or negative. This was verified through the survey results spreadsheet, onsite interviews, and review of the grievance records. Therefore, the verification team deems the ongoing communication with local stakeholders as satisfactory and in line with the project requirements.

4.3 AFOLU-Specific Safeguards

The project is a non-AFOLU project hence this section is not required.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The equations and choices provided in the methodology and all other methodological tools are correctly quoted in the MR /1/. The emission reductions of the grouped project activity are calculated using the formulae mentioned in the applied methodologies; AMS-II.C, Version 15.0/13/. The verification team has reviewed the emission reduction spread sheets (ER sheets)/2/ and checked all the formulae and found that they are correct and are in accordance with the monitoring plan of the VCS PD/3/ and CDM-CPA-DD/4/ and the applied monitoring methodology.

Baseline Emissions

According to paragraphs 20 and 21 of the applied methodology, Option 1 i.e. 'Constant Load Equipment's' is applicable for the present project. Baseline emission is calculated using the following equations:

$$BE_y = E_{BL,y} \times EF_{CO2,ELEC,y} + Q_{ref,BL} \times GWP_{ref,BL}$$

As the project entails replacement of LED in place of ICLs hence no refrigerant is involved. The above equation is then modified as:

$$BE_y = E_{BL,y} \times EF_{CO2,ELEC,y}$$

BE_y = Baseline emissions in year y (tCO₂e)

$E_{BL,y}$ = Energy consumption for the baseline (ICLs) in year y (kWh)

$EF_{CO2,ELEC,y}$ = Electricity emissions factor. If electricity displaced is grid, the emission factor in year y shall be calculated in accordance with the provisions in AMS-I.D (tCO₂/MWh). If electricity displaced is captive electricity, the emission factor in year y shall be calculated in accordance with the "Tool to calculate baseline, project and/or leakage emission from electricity consumption"

Energy consumption for baseline in year y is calculated as:

Where,

$$E_{BL,y} = 0.95 * \sum_i (n_i \times \rho_i \times o_i / (1 - l_y))$$

- n_i = Number of pieces of equipment of the group of 'i' baseline equipment (ICLs) replaced. For calculating baseline emissions per ICL in the current monitoring period, the value considered is as follows⁷-
60 W ICL replaced by 7 W LED= 0.9595
60 W ICL replaced by 9 W LED= 1.00
100 W ICL replaced 12 W LED= 0.9609
100 W ICL replaced by 14 W LED= 1.00
- ρ_i = Electrical power demand (kW) of the group of 'i' baseline equipment (e.g. 60W or 100W incandescent lamps). (0.06 kW and 0.1 kW)
In the case of more than one type of ICLs are replaced, electrical power demand is the weighted average of the rated power (kW) of group i baseline equipment (ICLs).
- o_i = Average annual operating hours of the group of 'i' baseline equipment (ICLs) (2346.95 hours)
The operating hours of the baseline equipment in year y can be determined using surveys by continuous measurement of usage hours of baseline equipment for a minimum of 90 days. For a large population of baseline equipment: (a) Use a representative sample (sampling determined by a minimum 90% confidence interval and 10% maximum error margin); (b) Apply correction for seasonal variation, if any; and (c) Ensure that sampling is statistically robust and relevant, i.e. the selection of the equipment to be analysed for operating hours has a random distribution and is representative of target population (size, location).
- l_y = Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g. theft). The average annual technical grid losses will be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. The reliability of the data used (e.g. appropriateness, accuracy/uncertainty, especially exclusion of non-technical grid losses) will be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable. (Default Value has been considered-10%)
- 0.95 = Net to gross adjustment factor

⁷ When calculating baseline emissions per ICL, the use of decimal value (for example, 0.9595) instead of proportion value (95,95%) has been considered more appropriate to ensure accurate calculations and maintain consistency throughout the analysis.

For 100 W ICLs replacing 12 W

$$E_{BL,y} = 0.95 \times (0.9609 \times 0.1 \times 2346.95) / (1 - 0.10)$$

$$= 238.07 \text{ kWh}$$

$$BE_y = 238.07 \times 0.92 / 1000$$

$$= 0.219 \text{ tCO}_2\text{e/ICL/year}$$

For 100 W ICLs replacing 14 W

$$E_{BL,y} = 0.95 \times (1.00 \times 0.1 \times 2346.95) / (1 - 0.10)$$

$$= 247.73 \text{ kWh}$$

$$BE_y = 247.73 \times 0.92 / 1000$$

$$= 0.228 \text{ tCO}_2\text{e/ICL/year}$$

For 60 W ICL replacing 7 W

$$E_{BL,y} = 0.95 \times (0.9595 \times 0.06 \times 2346.95) / (1 - 0.10)$$

$$= 142.55 \text{ kWh}$$

$$BE_y = 142.55 \times 0.92 / 1000$$

$$= 0.131 \text{ tCO}_2\text{e/ICL/year}$$

For 60 W ICL replacing 9 W

$$E_{BL,y} = 0.95 \times (1.00 \times 0.06 \times 2346.95) / (1 - 0.10)$$

$$= 148.64 \text{ kWh}$$

$$BE_y = 148.64 \times 0.92 / 1000$$

$$= 0.137 \text{ tCO}_2\text{e/ICL/year}$$

Project Emissions

Project emissions on account of electricity used by the project equipment shall be calculated according to following equations:

$$PE_y = E_{PE,y} \times EF_{CO_2,ELEC,y} + PE_{ref,y}$$

Where,

$$PE_y = \text{Project emissions in year } y \text{ (tCO}_2\text{e)}$$

$$EP_{PJ,y} = \text{Energy consumption in project activity in year } y. \text{ This shall be determined ex post based on monitored values}$$

$$EF_{CO_2,y} = \text{Emission factor for electricity or thermal baseline energy. The emissions associated with grid electricity consumption should be calculated in accordance with the procedures of AMS-I.D. For fossil fuel displaced reliable local or national data for the emission factor shall be used; IPCC default values should be used only when country or project-specific data are not available or difficult to obtain}$$

$PE_{ref,y}$ = Project emissions from physical leakage of refrigerant from the project equipment in year y (tCO₂e/y)

As the project entails replacement of LED in place of ICLs hence no refrigerant is involved. The above equation is then modified as:

$$E_{PE,y} = 0.95 * \sum_i (n_i \times \rho_i \times o_i / (1 - l_y))$$

Where,

- n_i = Number of group 'i' project devices operating during time interval t in year y.
For calculating project emissions per LED in the current monitoring period, the value considered for the number⁸ of project LED operating is given below:
7 W LED = 0.9595
9 W LED = 1.00
12 W LED = 0.9609
14 W LED = 1.00
For more details, please refer to $n_{i, operational}$ (7 W, 9W, 12 W, 14 W) under section 4.2 of this MR
- ρ_i = Electrical power demand (kW) of the group 'i' project devices measured during the time interval t in year y.
- o_i = Operating hours of group of 'i' project devices in the time interval t in year y

For calculating the project emissions for the current monitoring period, project emission per LED has been calculated for each type (i.e., each for 7W, 9W, 12W, 14W) of project lamp and then apportioned according to the working days for each household as per the database in the ER calculation spreadsheet/2/.

For 14 W LEDs

$$\begin{aligned} &= 0.95 \times (1.00 \times 0.012 \times 2346.95 / (1 - 0.10)) \\ &= 34.68 \text{ kWh} \\ &= 34.68 * 0.92 / 1000 \\ &= 0.032 \text{ tCO}_2\text{e/LED/year} \end{aligned}$$

For 12 W LEDs

$$= 0.95 \times (0.9609 \times 0.012 \times 2346.95) / (1 - 0.10)$$

⁸ When calculating project emissions per LED, the use of decimal value (for example, 0.9595) instead of proportion of operating LED devices (95.95%) has been considered more appropriate to ensure accurate calculations and maintain consistency throughout the analysis.

$$= 28.57 \text{ kWh}$$

$$= 28.57 * 0.92 / 1000$$

$$= 0.026 \text{ tCO}_2\text{e/LED/year}$$

For 9 W LEDs

$$= 0.95 \times (1.00 \times 0.009 \times 2346.95) / (1 - 0.10)$$

$$= 22.30 \text{ kWh}$$

$$= 22.30 * 0.92 / 1000$$

$$= 0.021 \text{ tCO}_2\text{e/LED/year}$$

For 7 W LEDs

$$= 0.95 \times (0.9595 \times 0.007 \times 2346.95) / (1 - 0.10)$$

$$= 16.63 \text{ kWh}$$

$$= 16.63 * 0.92 / 1000$$

$$= 0.015 \text{ tCO}_2\text{e/LED/year}$$

Leakage Emissions

As per the AMS II.C., Version 15.0, leakage emissions need to be taken into account when the energy efficiency technology involves equipment transferred from another activity. However, in the proposed project, the LEDs being distributed to consumers are not transferred from another activity. Therefore, the concept of leakage emissions does not apply to this project.

The calculation of emission reductions in this project has been conducted in accordance with the applied methodology, namely AMS II.C version 15/13/, VCS PD/3/, and CDM-CPA-DD/4/. The project proponent (PP) has utilized both monitored data and predetermined data, including default values as required or allowed by the methodology. The verification team has thoroughly reviewed the values used for calculating GHG emission reductions and found them to be suitable and accurate, aligning with the registered documents.

Table no. 17: - Parameters Determined ex-ante.

Parameter	Unit	Value	Description	Assessment
EF _{CO2,ELEC,y}	tCO ₂ /MWh	0.92	Combined margin emission factor for Indian grid calculated according to equation 16 of methodological tool 07- <u>Tool to calculate the emission factor for an</u>	The Project Proponent has applied the latest grid emission factor database available on the CEA website and fixed the value ex-ante sourced from CO ₂ Baseline

			<u>electricity_system_9</u> '; version 07	Database for the Indian Power Sector, User Guide; Version 13.0 (June 2018) ¹⁰
Li _{14w} ¹¹	Hours	25,000	Rated average operating hours for LED type i	The value has been determined from independent life-test reports/45/ of the LEDs as per national standard IS 16012 (Part 2): 2017 or any other admissible test. The value has been fixed ex-ante
Li _{12w}	Hours	25,000		
Li _{7w}	Hours	25,000		
Li _{9w} ¹²	Hours	25,000		

⁹ <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v7.0.pdf>

¹⁰ <https://cea.nic.in/cdm-co2-baseline-database/?lang=en>

¹¹ As per the registered POA-DD (Page 16-17, section H.3 and H.4) and CPA-DD (Page 5, section A.3), the project proponent (PP) has the authority to decide the wattage of the project lamp to replace the baseline lamp, as long as it adheres to the methodology's applicable criteria. According to the methodology, the lumen output of the 7W LED falls within the acceptable range of 90 to 150 percent of the lumen output of the 60W baseline ICL being replaced. Furthermore, the 7W LED has a rated average operating hour of 25,000, in line with the methodology requirements. Thus, the parameter Li 7W is justified for inclusion in the current monitoring period.

¹² Same as above footnote

Data mentioned in the above table is checked through below steps:

- Applied methodology
- Distribution records
- Third party reports
- National/ international Guidelines

Additionally, according to section 4.3 of the MR/1/, the monitoring survey for this project was conducted using questionnaires and physical observations by CPASS Services LLP, a competent third party hired by the project proponent (PP) /30/. This approach ensures reliability and accuracy in data collection, minimizing the risk of manual transposition errors. The submitted spreadsheet by the PP provides clear and transparent information on the data and parameters used for calculating emission reductions. These input values have been cross-verified with reliable and authentic sources, including monitoring records, MR/1/, and the applied methodology /13/. The calculated emission reductions were compared with the emission reduction spreadsheet /2/ and found to be accurate. No significant reporting risks have been identified, indicating the credibility and integrity of the reported data.

The details of monitoring parameters used for calculation of emission reductions are provided below:

Table no. 18: - Data & Parameters Monitored: ni baseline (60W) & (100W): Number of pieces of 60 W and 100 W baseline Incandescent Lamps replaced. (ni baseline (60W) & (100W));

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	Number of pieces of 60 W and 100 W baseline Incandescent Lamps replaced. (ni baseline (60W) & (100W))
Measuring Reporting frequency/Time Interval:	Once at the time of project installation
Reported value:	60 W- 691,079 100 W- 720,784
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency was in accordance with the registered monitoring plan as stated in VCS PD/3/, and CDM-CPA-DD/4/ and also in-line with methodology AMS II.C. Version 15.0 defined in the monitoring plan and in the MR/1/. This is verified by the assessment team by thorough desk-review, on-site visit to selected households, cross-verification of supporting evidences and interview with PP representatives.
Details of monitoring equipment:	Not Applicable, as no monitoring equipment is used in this project activity.

Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD VVBs not specify the accuracy of the monitoring equipment, VVBs the monitoring equipment represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Calibration frequency /interval: Is it monitoring methodology /CDM guidance / local or national standards / manufacturers specification	Not Applicable, as no monitoring equipment is used
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD VVBs not specify the frequency of calibration, VVBs the selected frequency represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Company performing the calibration (internal or external calibration):	Not Applicable, as no monitoring equipment is used
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not Applicable, as no monitoring equipment is used
Is (are) calibration(s) valid for the whole reporting period?	Not Applicable, as no monitoring equipment is used
If applicable, has the reported data been cross-checked with other available data?	Yes, the reported data in MR/1/ has undergone a thorough comparison with the monitoring survey records /28/ and the ER sheet /2/. Additionally, the total number of replaced LEDs has been cross-checked with the project installation database /32/ provided by the project proponent (PP). The verification team confirms that an on-site assessment of the monitoring parameter ni baseline (60W) and (100W) was conducted using two methods. Firstly, during site visits /48/, confirmation was obtained from households/end users regarding whether the PP had performed monitoring/measurement campaigns and surveys on LED operation for these parameters. Secondly, the competence of the personnel involved in conducting the monitoring survey was diligently cross-verified to ensure the authenticity and accuracy of the project's implementation.
How were the values in the monitoring report verified?	The values in MR are verified through the ER sheet/02/ which is cross verified from project installation database/32/ and monitoring survey records /31/, monitoring survey forms/34/ and training records/41/ of the personnels.
VVBs the data management (from data generation to emission reduction calculation) ensure correct transfer of	The data management system in place ensures the accurate transfer and reporting of emission reductions, and it incorporates robust QA/QC

data and reporting of emission reductions and are necessary QA/QC processes in place?	processes. Specifically, for this parameter, QA/QC procedures involve the collection of data through a smart phone or tablet app module connected to a data cloud. This setup enables validation checks to be implemented during the data collection process, reducing the likelihood of errors. By enforcing quality controls at the point of collection, the system minimizes inaccuracies and ensures the reliability of the reported data.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable

Table no. 19: - Data & Parameters Monitored: ni baseline scrapped (60 W & 100 W); Number of pieces of 60 W and 100 W baseline Incandescent Lamps destroyed.

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	Number of pieces of 60 W and 100 W baseline Incandescent Lamps destroyed. (ni baseline scrapped (60 W & 100 W) Baseline lamps were replaced one-to-one with project lamps, and records were maintained during the exchange process. The collected baseline lamps were stored in separate boxes at a central facility, labelled with relevant information such as lamp type and wattage. When it came time for destruction, the contracted entity ensured proper recording and independent verification of the disposal of the baseline lamps. This careful documentation and verification process ensured the appropriate handling and elimination of the baseline lamps.
Measuring Reporting frequency/Time Interval:	Once at the time of project installation
Reported value:	60 W- 691,079 100 W- 720,784

Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency was in accordance with the registered monitoring plan as stated in VCS PD/3/, and CDM-CPA-DD/4/ and also in-line with methodology AMS II.C. Version 15.0 defined in the monitoring plan and in the MR/1/. This is verified by the assessment team by thorough desk-review, on-site visit to selected households, cross-verification of supporting evidences and interview with PP representatives.
Details of monitoring equipment:	Not Applicable, as no monitoring equipment is used
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD VVBs not specify the accuracy of the monitoring equipment, VVBs the monitoring equipment represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Calibration frequency /interval: Is it monitoring methodology /CDM guidance / local or national standards / manufacturers specification	Not Applicable, as no monitoring equipment is used
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD VVBs not specify the frequency of calibration, VVBs the selected frequency represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Company performing the calibration (internal or external calibration):	Not Applicable, as no monitoring equipment is used
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not Applicable, as no monitoring equipment is used
Is (are) calibration(s) valid for the whole reporting period?	Not Applicable, as no monitoring equipment is used
If applicable, has the reported data been cross-checked with other available data?	Yes, the reported data in MR has been compared with the ER sheet /02/ and the Recycling/ Destruction/ICL-Handling Certificates/20/ and the agreement is also verified between PP and destruction company/39/.
How were the values in the monitoring report verified?	The values in MR are verified through the ER sheet/02/ which is cross verified from ICL

	Collection and Destruction Certificate records submitted by PP/44/.
VVBs the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable

Table no. 20: - Data & Parameters Monitored: ni, project (7 W, 9W, 12 W, 14 W): Number of pieces of 7W, 9W, 12 W and 14 W project lamps distributed.

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	Number of pieces of 7W, 9W, 12 W project lamps distributed (ni project (7 W, 9W, 12 W, 14 W))
Measuring Reporting frequency/Time Interval:	Once at the time of project installation
Reported value:	7 W- 436,333 9 W- 254,746 12 W- 716,136 14 W- 4,648
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency was in accordance with the registered monitoring plan as stated in VCS PD/3/, and CDM-CPA-DD/4/ and also in-line with methodology AMS II.C. Version 15.0 defined in the monitoring plan and in the MR/1/. This is verified by the assessment team by thorough desk-review, on-site visit to selected households, cross-verification of supporting evidences and interview with PP representatives.
Details of monitoring equipment:	Not Applicable, as no monitoring equipment is used
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD VVBs not specify the accuracy of the monitoring equipment, VVBs the	Not Applicable, as no monitoring equipment is used

monitoring equipment represent good monitoring practise?	
Calibration frequency /interval: Is it monitoring methodology /CDM guidance / local or national standards / manufacturers specification	Not Applicable, as no monitoring equipment is used
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD VVBs not specify the frequency of calibration, VVBs the selected frequency represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Company performing the calibration (internal or external calibration):	Not Applicable, as no monitoring equipment is used
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not Applicable, as no monitoring equipment is used
Is (are) calibration(s) valid for the whole reporting period?	Not Applicable, as no monitoring equipment is used
If applicable, has the reported data been cross-checked with other available data?	Yes, the reported data in MR has been compared with the installation database /32/ ICL Collection and Destruction Certificates/44/. Which is found to be consistent and authentic.
How were the values in the monitoring report verified?	The values in MR are verified through the project implementation database/32/which is further cross verified from ICL Collection and Destruction Certificate records submitted by PP/44/ and finally value was cross-checked in sampling survey sheet and replacement database/31/
VVBs the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The data management system in place ensures the accurate transfer and reporting of emission reductions, and it incorporates robust QA/QC processes. Specifically, for this parameter, QA/QC procedures involve the collection of data through a smart phone or tablet app module connected to a data cloud. This setup enables validation checks to be implemented during the data collection process, reducing the likelihood of errors. By enforcing quality controls at the point of collection, the system minimizes inaccuracies and ensures the reliability of the reported data.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable

Table no. 21: - Data & Parameters Monitored: n_i, operational (7 W, 9W, 12 W, 14 W): Total number of 7W, 9W, 12 W and 14 W project lamps that are operational during monitoring period

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	Total number of 7W, 9W, 12 W and 14 W project lamps that are operational during monitoring period
Measuring Reporting frequency/Time Interval:	Annually
Reported value:	7 W- 418,643 9 W- 254,746 12 W- 688,161 14 W- 4,648
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency was in accordance with the registered monitoring plan as stated in VCS PD/3/, and CDM-CPA-DD/4/ and also in-line with methodology AMS II.C. Version 15.0 defined in the monitoring plan and in the MR/1/. This is verified by the assessment team by thorough desk-review, on-site visit to selected households, cross-verification of supporting evidences and interview with PP representatives.
Details of monitoring equipment:	Not Applicable, as no monitoring equipment is used
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD VVBs not specify the accuracy of the monitoring equipment, VVBs the monitoring equipment represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Calibration frequency /interval: Is it monitoring methodology /CDM guidance / local or national standards / manufacturers specification	Not Applicable, as no monitoring equipment is used
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD VVBs not specify the frequency of calibration, VVBs the selected frequency represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Company performing the calibration (internal or external calibration):	Not Applicable, as no monitoring equipment is used
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not Applicable, as no monitoring equipment is used

Is (are) calibration(s) valid for the whole reporting period?	Not Applicable, as no monitoring equipment is used
If applicable, has the reported data been cross-checked with other available data?	Yes, the reported data in MR/1/ has been compared with the ER sheet /2/ which is further cross verified with the help of Monitoring survey report/31/ and monitoring survey forms/34/. VVB confirms here that on-site assessment of Monitoring parameter ni, operational (7 W, 9W, 12 W) was conducted based on following two methods: Confirmation with the household/end user during site visit/48/ whether or not the PP has performed monitoring/measurement campaign, survey on LEDs operation (for the parameter ni, operational (7 W, 9W, 12 W & 14W). Assessment of Competence of personnel involved in conducting the monitoring survey was diligently cross-verified to ensure the authenticity and accuracy of the project's implementation
How were the values in the monitoring report verified?	The values in MR are verified through the ER sheet/02/ which is cross verified from project installation database/32/ and monitoring survey records /31/, monitoring survey forms/34/ and training records/41/ of the personnel. The values of ni, operational (7 W, 9W, 12 W, 14 W) is used to calculate the VCUs by checking the following formula: The ni operational value is determined through the following process: - Calculate the ratio of the number of project lamps of type 'i' with the SHINE logo that are installed and operating in the sampled households to the number of lamps of type 'i' claimed to be distributed in the sampled households. - Multiply this ratio by the total number of lamps of type 'i' claimed to be distributed in the CPA area. - However, it is important to note that the claimed number of lamps is limited by the number of ICLs that have been destroyed. This ensures that the calculation is based on the actual number of lamps that have been replaced and installed, taking into account the proper disposal of the baseline lamps.
VVBs the data management (from data generation to emission reduction	Yes, the data management ensures correct transfer of data from monitoring survey

calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	record/31/ and reporting of emission reductions and all necessary QA/QC processes are in place involves, the monitoring survey to be carried out by a reputable and experienced third-party agency, ensuring that the estimation of operational parameter n_i was unbiased and reliable. The agency's qualifications and expertise aligned with the requirements of the methodology, ensuring the accuracy and credibility of the survey results. By entrusting the monitoring survey to a qualified third-party agency, the project proponent ensured the integrity and objectivity of the data collected.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable

Table no. 22: - Data & Parameters Monitored: ρ_i (baseline 60 W, 100 W): Rated power of 60 W and 100 W baseline lamps replaced

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	Rated power of 60 W and 100 W baseline lamps replaced, Watts (ρ_i (baseline 60 W, 100 W))
Measuring Reporting frequency/Time Interval:	Once at the time of project installation
Reported value:	60 W and 100 W
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency was in accordance with the registered monitoring plan as stated in VCS PD/3/, and CDM-CPA-DD/4/ and also in-line with methodology AMS II.C. Version 15.0 defined in the monitoring plan and in the MR/1/. This is verified by the assessment team by thorough desk-review, on-site visit to selected households, cross-verification of supporting evidences and interview with PP representatives.
Details of monitoring equipment:	Not Applicable, as no monitoring equipment is used

Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD VVBs not specify the accuracy of the monitoring equipment, VVBs the monitoring equipment represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Calibration frequency /interval: Is it monitoring methodology /CDM guidance / local or national standards / manufacturers specification	Not Applicable, as no monitoring equipment is used
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD VVBs not specify the frequency of calibration, VVBs the selected frequency represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Company performing the calibration (internal or external calibration):	Not Applicable, as no monitoring equipment is used
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not Applicable, as no monitoring equipment is used
Is (are) calibration(s) valid for the whole reporting period?	Not Applicable, as no monitoring equipment is used
If applicable, has the reported data been cross-checked with other available data?	The reported data in MR/1/ has been thoroughly compared to the monitoring survey records /28/ and the ER sheet /2/. The verification team also cross-checked the total number of replaced LEDs with the project installation database /32/ provided by the project proponent (PP). To ensure accuracy, the on-site assessment of the monitoring parameter ni baseline (60W) and (100W) was conducted through two methods. Firstly, during site visits /48/, households/end users were consulted to confirm whether the PP had conducted monitoring/measurement campaigns and surveys on LED operation for these parameters. Secondly, the competence of the personnel involved in the monitoring survey was carefully verified to ensure the credibility and precision of the project's implementation.
How were the values in the monitoring report verified?	The values in MR are verified through the ER sheet/2/ which is cross verified from project

	installation database/32/ and monitoring survey records /31/, monitoring survey forms/34/
VVBs the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management system in place guarantees the precise transfer and reporting of emission reductions, and it incorporates rigorous QA/QC processes. Specifically, for this particular parameter, QA/QC procedures involve the utilization of a smart phone or tablet app module connected to a data cloud for data collection. This setup enables the implementation of validation checks during the data collection process, effectively reducing the occurrence of errors. By enforcing quality controls at the point of data collection, the system minimizes inaccuracies and ensures the reliability of the reported data.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable

Table no. 23: - Data & Parameters Monitored: pi (baseline 60 W, 100 W): Rated power of 7W, 9W, 12W, 14 W project LEDs (Watts)

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	Rated power of 7W, 9W, 12W, 14W project LEDs (Watts) pi (project 7W, 9W, 12W, 14W)
Measuring Reporting frequency/Time Interval:	Once at the time of project installation
Reported value:	7W, 9W, 12W, 14W
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency was in accordance with the registered monitoring plan as stated in VCS PD/3/, and CDM-CPA-DD/4/ and also in-line with methodology AMS II.C. Version 15.0 defined in the monitoring plan and in the MR/1/. This is verified by the assessment team by thorough desk-review, on-site visit to selected households, cross-verification of supporting evidences and interview with PP representatives.

Details of monitoring equipment:	Not Applicable, as no monitoring equipment is used
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD VVBs not specify the accuracy of the monitoring equipment, VVBs the monitoring equipment represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Calibration frequency /interval: Is it monitoring methodology /CDM guidance / local or national standards / manufacturers specification	Not Applicable, as no monitoring equipment is used
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD VVBs not specify the frequency of calibration, VVBs the selected frequency represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Company performing the calibration (internal or external calibration):	Not Applicable, as no monitoring equipment is used
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not Applicable, as no monitoring equipment is used
Is (are) calibration(s) valid for the whole reporting period?	Not Applicable, as no monitoring equipment is used
If applicable, has the reported data been cross-checked with other available data?	The reported data in MR/1/ has undergone a comprehensive comparison with the monitoring survey records /28/ and the ER sheet /2/. Additionally, the total number of replaced LEDs has been cross-checked with the project installation database /32/ provided by the project proponent (PP). To ensure accuracy, the verification team conducted on-site assessments of the monitoring parameter ni baseline (60W) and (100W) using two methods. Firstly, during site visits /48/, households/end users were consulted to confirm whether the PP had conducted monitoring/measurement campaigns and surveys on LED operation for these parameters. Secondly, the competence of the personnel involved in the monitoring survey was diligently verified to ensure the reliability and precision of the project's implementation.
How were the values in the monitoring report verified?	The values in MR are verified through the ER sheet/02/ which is cross verified from project installation database/32/ and monitoring survey records /31/, monitoring survey forms/34/, life test reports/45/ and training records/41/ of the personnel

VVBs the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data from monitoring survey record/31/ and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable

Table no. 24: - Data & Parameters Monitored Ly: Average annual technical grid losses

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	Average annual technical grid losses Percent, (Ly)
Measuring Reporting frequency/Time Interval:	Yes, Fixed for crediting period
Reported value:	10%
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency was in accordance with the registered monitoring plan as stated in VCS PD/3/, and CDM-CPA-DD/4/ and also in-line with methodology AMS II.C. Version 15.0 defined in the monitoring plan and in the MR/01/. This is verified by the assessment team by thorough desk-review, on-site visit to selected households, cross-verification of supporting evidences and interview with PP representatives.
Details of monitoring equipment:	Not Applicable, as no monitoring equipment is used
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD VVBs not specify the accuracy of the monitoring equipment, VVBs the monitoring equipment represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Calibration frequency /interval: Is it monitoring methodology /CDM guidance / local or national standards / manufacturers specification	Not Applicable, as no monitoring equipment is used

Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD VVBs not specify the frequency of calibration, VVBs the selected frequency represent good monitoring practise?	Not Applicable, as no monitoring equipment is used
Company performing the calibration (internal or external calibration):	Not Applicable, as no monitoring equipment is used
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not Applicable, as no monitoring equipment is used
Is (are) calibration(s) valid for the whole reporting period?	Not Applicable, as no monitoring equipment is used
If applicable, has the reported data been cross-checked with other available data?	Yes, the value is a default value from methodology AMS- II.C. – version 15/13 / and it is correctly referred and used in ER sheet/2/.
How were the values in the monitoring report verified?	The values in MR/1/ and ER/2/ are verified through the applied methodology/13/
VVBs the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management system ensures accurate transfer and reporting of emission reductions, and all necessary quality assurance and quality control (QA/QC) processes are in place. The project proponent (PP) has checked the technical transmission and distribution (T&D) loss values specific to the individual electricity distribution companies within the project area. These values have been confirmed by the electricity regulatory commissions responsible for overseeing these distribution companies. Since the published tariff orders do not define technical and non-technical losses separately, the PP has considered a 10% value as per the applied methodology.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable

Table no. 25: - Data & Parameters Monitored: oi project (7W)/(9W)/(12W)/(14W) Average annual operating hours of type 'oi' project/baseline lamp

Monitoring Parameter Requirement	Assessment/ Observation by the VVB
Data / Parameter:	Average annual operating hours of type 'i' project or baseline lamp (Hours)oi project (7W)/(9W)/(12W)/(14W) or baseline

	(60W)/(100W) as calculated from the baseline survey of the Shine CPA-2 (North-east). For this parameter: Operating hours were measured consistently over a 90-day period using run time meters installed on a sample of lighting points. To accommodate seasonal variations, a correction factor was applied. The measured data was used to calculate the average daily operating hours. This value was then multiplied by 365 days to determine the average annual operating hours of the baseline and project lamps. The sample size for the measurement was determined in accordance with the guidelines for Sampling and surveys for CDM project activities and programmes of activities, version 09.
Measuring Reporting frequency/Time Interval:	Once, prior to or concurrent with the first ex-post monitoring
Reported value:	2346.95
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency was in accordance with the registered monitoring plan as stated in VCS PD/3/, and CDM-CPA-DD/4/ and also in-line with methodology AMS II.C. Version 15.0 defined in the monitoring plan and in the MR/1/. This is verified by the assessment team by thorough desk-review, on-site visit to selected households, cross-verification of supporting evidences and interview with PP representatives.
Details of monitoring equipment:	Run Time Meters
Is accuracy of the monitoring equipment as stated in the VCS PD? If the VCS PD VVBs not specify the accuracy of the monitoring equipment, VVBs the monitoring equipment represent good monitoring practise?	Yes. QA/QC procedures stated in MR comply with VCS PD /3/ and CDM-CPA-DD/4/.
Calibration frequency /interval: Is it monitoring methodology /CDM guidance / local or national standards / manufacturers specification	As verified by the assessment team from the PP representatives during on-site visit that the run time meter consists of a remote unit having tele metering circuit which receives the signals generated by the electronic meters fitted with an external device at the consumer 's premises. The remote units are connected to the server through a dedicated communication link, the GPRS module which needs a SIM card to work, just like the mobile phone. These meters are non- resettable to avoid accidental resetting. The operating hour recording is triggered when the connected bulb

	is switched on, sending signal to the server. The server stops receiving the signal, the moment the device is switched off. The time lapse between the start of receipt of signal and the moment it stops receiving it, is recorded and is the operating time for that particular event. The instrument does not require calibration as it does not measure any parameter, rather just sends signals to the server. Prior to the start of deployment, meters are sent back to the manufacturer, are refurbished and the sims are reconfigured for the particular location.
Is the calibration interval in line with the monitoring plan of the VCS PD? If the VCS PD VVBs not specify the frequency of calibration, VVBs the selected frequency represent good monitoring practise?	Not Applicable as no metering equipment used in current monitoring period
Company performing the calibration (internal or external calibration):	Not Applicable as no metering equipment used in current monitoring period
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not Applicable as no metering equipment used in current monitoring period
Is (are) calibration(s) valid for the whole reporting period?	Not Applicable as no metering equipment used in current monitoring period
If applicable, has the reported data been cross-checked with other available data?	Yes, the reported data in MR /1/ has been compared with monitoring survey records /31/ and the ER sheet /2/. The total operating hours were also verified by assessment team through the annual operating hours sheet/24/ submitted by PP.
How were the values in the monitoring report verified?	The values in MR are verified through the ER sheet/02/ which is cross verified from project monitoring survey records /28/, monitoring survey forms/21/ and annual operating hours sheet/33/. The reported value is 2346.95.
VVBs the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place. While noting that the PP did not have control over the logging of data for operating hours, as it was done automatically. However, after receiving the downloaded data, manual data cleaning was performed. Readings that were less than 90 days and high-value readings indicating errors or malfunction were excluded from the calculations. A conservative approach was taken, and such data points were not considered. An upper and lower cutoff range

	was also determined to eliminate outliers from the dataset.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable

Sampling approach: -

As assessed in this section, emission reductions for the project “SHINE- Distribution of LED Lightbulbs in India -2” has being claimed for this monitoring period and the total population of the LED for this monitoring period 01-June-2022 to 31-December-2022 (Inclusive of both dates) is 1,411,863 LEDs.

The sampling plan implemented by the PP is in accordance with the applied approved monitoring methodology /13/ and the VCS PD /3/. The PP has appropriately performed Simple random Sampling procedure, reliability levels were set at 95% confidence and 10% precision in line with the applied methodology AMS-II.C, Version 15.0/13/. As the VCS PD /3/and CDM-CPA -DD/4/ mentions the option for Simple random Sampling procedure, it is acceptable to the verification team.

The sampling surveys have been carried out by the well-trained personnel /41/. Monitoring parameters $\phi_{project}$ and $n_{operational}$. are monitored through monitoring sample surveys. Monitoring of the parameters ensures compliance with the applied methodology AMS- II.C. – version 15 /13/. Verification team has checked the survey records /31/ &/34/ and sample size calculation/36/. Parameter ϕ_i project monitors the average annual operating hours of project LEDs and the parameters $n_{operational}$ are used to calculate number of group i project LEDs that are operational during time interval ‘t’.

PP has applied sampling for the current monitoring period. A confidence/precision level of 95/10 has been used by the PP for all the monitoring parameters determined through applying simple random sampling. Survey has been carried out. This is in accordance with the sampling plan provided in the registered VCS PD /3/. The sample size calculations for each of the monitoring parameters monitored through the sampling have been provided in the table below. The sample size was calculated using the formula provided by Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (Version 04.0)/17/.

PP has provided the detailed sample size calculation under section 4.3 of the MR calculated applying the formula /1/.

$$n \geq \frac{1.96^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.96^2 p(1-p)}$$

Here,

n= Sample Size

N= Number of Households

p= Expected proportion – conservative assumption of 90% has been applied for sample size calculation

1.96= Represents the 95% confidence required

0.1= Represents the 10% precision required

For mean value parameters (operational hours of LED), monitoring survey/31/ was carried out as part of first verification under CDM CPA-2 and the same values are used in calculation.

To Demonstrate whether the required confidence/precision has been met.

As part of the quality control on the data collected, the reliability calculation was performed, Reliability levels were set at 95% confidence and 10% precision. Precision levels were determined using the equation¹³ below:

$$\frac{\frac{1}{2} \text{width of confidence interval}}{\text{estimated proportion}} * 100\%$$

A spreadsheet detailing the sampling calculations as well as the survey results for the monitoring parameter- Number of LED found ni-operational are being submitted to VERRA for consideration.

The resultant applied sample size by the PP is summarized in Table no.-26 below.

Grouped Project SHINE CDM-CPA-DD/03/	Responded Samples			
	7W LED	9W LED	12 W LED	14 W LED
Sample Size	43	43	43	43
Number of LED Surveyed	74	102	128	44
Number of LED found operational- ni	71	102	123	44
LED loss rate for this MP	4.05%	0%	3.91%	0%
Precision achieved	0.05%	0%	3.49%	0%

Assessment Team used acceptance sampling during verification for checking the operational status in the households. The sampling done by VVB reflects the population of the project activity. Applying paragraph 39 (c) of the sampling standard, version 09 /18/, a sample size of 11 LEDs of each type;(**7W, 9W, 12W and 14W, Total = 44 LEDs**) was chosen (with no discrepant records). A sample size of 11 LEDs of each type;(7W, 9W, 12W and 14W, Total = 44 LEDs) was determined, based on an AQL of 0.5% and UQL of 20%, producer risk 10% and consumer risk

¹³ Equation 8, Page 72 of Guidelines for Sampling and Surveys in CDM Project Activities and Programme of Activities (version 04.0)

10%. Acceptance number (c) thus determined for the sample is 0. It was observed that out of the 11 samples of each LED type, all the **11 LEDs (11 LEDs of each type; (7W, 9W, 12W and 14W, Total = 44 LEDs)** were found to be operational and this matched with the PP's records and hence no discrepant records were observed with the MR /1/ and ER sheet /2/ and thus $c=0$. Thus, PP's set of records has been accepted in line with para 33 of the sampling standard, version 09 /18/. Verification team has cross verified these sample documents.

The monitoring parameters to be monitored through the sampling plan are:

- a. Number of operational project lamps during the monitoring period ($n_{i \text{ operational}}$)
- b. Operating hours of replaced ICL lamps or installed LEDs using run time meters ($O_{i \text{ project}}$)

Simple random sampling was applied by the PP for selection of the monitoring samples with 95/10 confidence/precision for determining the sampling for all the parameters which is deemed acceptable as per the VCS PD /3/.

On-site assessment of Monitoring parameters (namely $n_{i \text{ operational}}$ and $O_{i \text{ project}}$) was conducted based on following two methods:

- Confirmation with the household/end user whether or not the PP has performed monitoring/measurement campaign (or parameter **ni operational**) and survey on LED bulbs operation (for the parameter **Oi project**).
- Assessment of Competence of personnel involved in conducting standardized tests viz., **ni operational** and **Oi project** and surveys: Verification team has reviewed the abilities, qualifications and recognition of involved personnel and institutions of the measuring team involved in the **ni operational** and **Oi project**. The verification team based on onsite visit interviews confirms that the team was qualified to carry out the **ni operational** and **Oi project** in line with the methodology.

PP has explained the process of conducting measurement campaign. surveys were done via data loggers. The operating hours (**Oi project**) was measured continuously for a period of 90 days with the help of run time meters installed on a sample of lighting points. On-site surveys were conducted by third party monitoring team to estimated the number of operational LEDs. This was done by visiting the premises, visual inspection, and interview with the LED user to assess whether the LEDs have project logo and were operational.

During the onsite visit interviews with PP's representative, VVB was able to understand the process in line with the methodology AMS II-C version 15/13/ and the PP monitoring procedure in line with the registered VCS PD /3/ and CDM-CPA-DD/4/.

VKU's sample for acceptance sampling was the same for both the parameters. VVB could verify the original survey forms /34/ and data/information flow to sampling sheet and ER spread sheet. No discrepancy was found in the data/information flow. As per the section 2.3 above the end users were not interviewed in a single day. Moreover, PP has conducted the monitoring survey/31/ from 10-July-2022 to 11-July-2022 (Inclusive of both dates). Hence, the survey process deemed acceptable to the verification team. Furthermore, the database and sample sales record /20/ was also checked/cross verified to confirm the number LEDs for the parameter **ni operational**.

As per paragraph 25 of the Sampling Standard, version 09 /18/, the verification team has to verify whether the project participants entity have implemented the sampling and surveys according to the sampling plan in the registered monitoring plan. The verification includes determining:

- a) Whether the required confidence/precision has been met;
- b) Whether the selected sample was representative of the population.

As per the applied methodology, and registered VCS PD /3/ and CDM-CPA-DD/4/. The necessary confidence / precision of 95/10 each of the parameters are met. This has been cross verified by the verification team from the supporting documents submitted. 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 registered VCS PD /3/ and CDM-CPA-DD/4/. The total number of emission reductions for the monitoring period from 01-June-2022 to 31-December-2022 (inclusive of both dates) is **121,546 tCO₂e**.

The verification team has checked and confirmed the calculations in the spreadsheet and found to be accurate. The monitoring report is supported by emission reduction spreadsheet. The consistency and formula were verified and found to be accurate.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

When verifying the reported emission reduction, VKU ensured that there was a clear audit trail that contained the evidence and records that validate the stated figures. All source documents that form the basis for assumptions and other information underlying the GHG data are shown above.

When assessing the audit trails, VKU also examined:

1. Whether sufficient evidence was available, both in terms of frequency and in covering the full monitoring period
2. The source and nature of the evidence
3. if comparable information was available from sources other than that used in the monitoring report/1/, VKU cross-checked the monitoring report against the other sources to confirm that the stated figures were correct. The sources and the data referenced are shown in Section 2.2 above.

All records needed for monitoring are archived in line with the requirements of the registered monitoring plan. No significant, lack of evidence and missing data were detected during verification. Hence, the verification team confirms that the monitoring system ensures required quality of the monitoring system to ensure the quality of the monitored data. All internal data are subjected to QA/QC measures.

The operational status of project LEDs is monitored through sample survey following UNFCCC sampling and survey guideline/17/ follows 95/10 confidence precision. 95/10 is a methodological choice. The survey forms/34/ and photographs/48/ were checked to ascertain the monitoring results reported in survey/31/. For enhancing the survey reliability and QA/QC, training has been provided to the data collector during survey /31/ which was further verified from the training details provided by the PP/41/. It is also noted the achieved precision is less

than 10% and hence meets the desired confidence precision. The monitored results are found consistent with on-site audits.

Also, PP has set up grievance/repair mechanisms/46/ and rectifies any issues for the operation of the project device. So, VKU is of the opinion that this method of calculation of emission reductions is accurate and results in conservative estimation of emission reduction and is line with the applicable VCS requirements and methodologies/13/.

4.6 Non-Permanence Risk Analysis

There is no discernible non-permanence risk that could potentially give rise to significant material errors, omissions, or misstatements in the context of the grouped project activity. The project proponent's evaluation of non-permanence risk signifies a minimal level of risk. Moreover, the audit/verification plan does not indicate any identified risks pertaining to this aspect, thereby rendering it irrelevant in this context.

5 VERIFICATION OPINION

M/s VKU Certification Pvt. Ltd. has performed second periodic verification of the emission reductions reported for the grouped project activity “SHINE- Distribution of LED Lightbulbs in India -2”, VCS Registry Project ID 2608, for the monitoring period from **01-June-2022 to 31-December-2022 (both dates included)** under **fixed crediting period from 12-August-2018 to 11-August-2018 (Inclusive of both dates)**, with regard to the relevant requirements for VCS activities with **a reasonable level of assurance**.

The project proponents of the **“SHINE- Distribution of LED Lightbulbs in India -2”** are responsible for:

- The preparation of greenhouses gas emissions data and the reported greenhouse gas emission reductions from the grouped project on the basis set out in the monitoring plan contained in the registered VCS PD /3/ and CDM-CPA-DD/4/.
- The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of greenhouse gas emission reductions of the grouped project.

As an independent verifier, it is VKU's duty to provide an unbiased verification opinion regarding the project's compliance with the stipulations of VCS Standard version 4.4/8/ and the applied GHG program, specifically concerning the reported greenhouse gas emission reductions attributed to the grouped project. Through a thorough review of documented evidence and validated by an on-site assessment, VKU is able to affirm the following findings:

- The grouped project has been implemented and operated as per the registered VCS PD/3/ and CDM-CPA-DD/4/;
- The monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS Standard version 4.4 requirements/8/;
- The monitoring is in place as per the applied baseline and monitoring methodology/11/;
- The monitoring plan in the registered VCS PD/3/ and CDM-CPA-DD/4/ is as per the applied baseline and monitoring methodology /13/.

VKU has formed the professional opinion that the GHG emission reduction figures presented in the **monitoring report version 3.0 dated 24-May-2023/01/** for the "SHINE- Distribution of LED Lightbulbs in India -2" project, covering the monitoring period from 01-June-2022 to 31-December-2022 (both dates inclusive), are deemed to be reliable and accurately represented.

The GHG emission reductions are derived based on the endorsed methodology AMS-II.C-Demand-side energy efficiency activities for specific technologies, Version 15.0/13/. The monitoring plan implemented in the "SHINE- Distribution of LED Lightbulbs in India -2" project aligns with the registered VCS PD /3/ and CDM-CPA-DD/4/. These authoritative frameworks ensure the integrity and reliability of the reported emission reductions.

Hence VKU is able to certify that the emission reduction from the grouped project during the monitoring period from 01-June-2022 to 31-December-2022 (both dates included) amounts to **121,546 tCO₂e**.

Table no. 20: The GHG emission reductions are calculated on the basis of approved methodology

Verification period: From 01-June-2022 to 31-December-2022 (both dates included):

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2022 From 01-June-2022 to 31-December-2022 (Inclusive of both dates)	152,777	31,231	0	121,546
Total	152,777	31,231	0	121,546

Comparison of Ex-Ante emission reductions/removals and Achieved emission reductions and removals under this grouped project are summarized in Table no. 18 below

Monitoring Period dates: From 01-June-2022 to 31-December-2022 (Inclusive of both dates)

Number of Days: 214

Table no. 21: Comparison of ex-ante and achieved ERR values under MONITORING PERIOD 02

Year	<u>Ex-ante emissions reductions/ removals</u>	<u>Achieved emissions reductions/ removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
Year 2022 From 01-June-2022 to 31-December-2022 (Inclusive of both dates)	131,534 tCO ₂ e	121,546 tCO ₂ e	08%	The achieved emission reductions in the "SHINE-Distribution of LED Lightbulbs in India -2" project are lower than the ex-ante emission reductions due to the inclusion of loss rates for LEDs. These loss rates, determined through monitoring surveys, account for 4.05% for 7 W LEDs and 3.91% for 12 W LEDs. The monitoring survey sheet has been provided to the assessment team /Validation-Verification body for reference, containing the calculated percentage of operational LEDs. For further details, please refer to section 4.2 of the MR documentation.

APPENDIX A: ABBREVIATIONS

Abbreviations	Full texts
BE	Baseline Emissions
BEF	Baseline Emission Factor
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CPA	Component Project Activities
CQC	C-Quest Capital
DNA	Designated National Authority
EF	Emission Factor
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
HH	Household
ICL	Incandescent Light Bulb
IPCC	Intergovernmental Panel on Climate Change
LEDs	Light Emitting Diodes
MoV	Means of Verification
MR	Monitoring Report
NA	Not Applicable
OSV	On Site Visit
PAI	Project Activity Instances
PD	Project Description
PP(s)	Project Proponent(s)
QA/QC	Quality Assurance /Quality Check
Ref.	Document Reference
SS(s)	Sectoral Scope(s)
TA(s)	Technical Area(s)
UNFCCC	United Nations Framework Convention on Climate Change
VCU	Verified Carbon Unit
VCS	Verified Carbon Standard
VKU	VKU Certification Ltd.
VVS	Validation and Verification Standard
VVB	Validation and verification body

APPENDIX B: AUDIT FINDINGS

CAR: Corrective Action Request; 04

CL: Clarification Request; 03

FAR: Forward Action Request; 00

Type	Date	04-May-2023
CL#01	Reference	Section of Ver protocol: Title Page and Section 1
Description of the Non-Conformance		
The following point required clarification in Monitoring report: 1. In Title Page & Table of Contents; 1. PP is requested to keep font consistent throughout the MR and also in-line with the guidance to fill VCS MR version 4.2 2. PP is requested to clarify that the monitoring period is including of both start and end dates or not. If yes please incorporate this into MR. 3. PP is requested to revise the Table of Contents. 2. In Section 1.1 of MR; 4. Since the project is claiming VCUs in Verra, Is the project's implementation in-line with the VCS standard Version 4.4 and set-guidelines Version 4.3 5. And minimum? 6. The total number of Grid connected households where LED distribution took place in other sections of MR notifies as 246,101, please clarify this inconsistency. Also, during the desk review and verification of the supporting documents, Assessment team found total households in database as 246,104. Please ensure corrections in required sections of MR. 7. PP to submit evidence i.e., Invoice cum Consent deed to support the claim that the first LED bulb under the PoA 10484 was distributed on 12-August-2018 under CPA 10484-P1-0002-CP1. Also help submit the validation report as the same was not found on Verra webpage. 8. If the LED were installed in this monitoring period why the date of implementation is inconsistent with the current monitoring period 01-June-2022 to 31-December-2022, both days including. PP to elaborate about how the distribution was done for the current monitoring period. 3. In section 1.9 of MR: 9. PP is requested to provide reference to claimed values in the MR in this section. 4. In section 1.10 of MR: 10. During desk review exercise by the assessment team no trace of any appendix referred in this section was found in the MR submitted by PP. Please clarify?		
1 st Response from PP	Date	15-May-2023
1. In Title Page & Table of Contents; 1. PP has updated the font size throughout the MR in-line with the guiding instructions mentioned in VCS MR version 4.2. 2. The monitoring period includes both the start date and end date. Same has been updated in all relevant sections of the revised MR. 3. Table of Contents has been updated in the revised MR. 2. In Section 1.1 of MR; 4. PP would like to clarify that the project's implementation is in-line with the VCS standard Version 4.4 and set-guidelines Version 4.3. Relevant details regarding gap validation of this project from CDM to VCS and subsequent verification under VCS has been added in section 1.1. of the revised MR. Further, the methodologies under CDM are applicable to be referred and applied under this grouped project.		

5. Minimum 1 LED (7W/9W or 12 W/14W) will be distributed under this grouped project. Same has been added in section 1.1 of the revised MR. 6. PP would like to clarify that 246,101 grid connected households was a typographical error. Total grid connected households wherein LEDs were distributed under this grouped project are equal to 246,104. Same can be cross verified from the LED distribution database. This value is now consistent throughout the revised MR. 7. Invoice cum consent deed for start date of the grouped project and validation report are being submitted to the VVB. 8. PP would like to clarify that no LEDs were distributed under this project under the current MP (01-June-2022 to 31-December-2022). The last date on which the LED was distributed was 31-July-2021. Same correction has been made in the revised MR. 3. In section 1.9 of MR: 9. References to claimed values of CERs issued under CDM have been provided in the revised MR. 4. In section 1.10 of MR: 10. PP would like to clarify that it was mentioned that the evidence of avoiding Scope 3 emissions will be provided to the VVB and subsequently added in the MR as part of verification process. Further evidence has now been added in the appendix B of the revised MR and being submitted to the VVB.				
1 st Assessment by Audit Team	Status	Open	Date	18-May-2023
1. For Title Page & Table of Contents; 1. Assessment Team confirms that the PP has updated the font size throughout the MR in-line with the guiding instructions mentioned in VCS MR version 4.2. 2. Assessment Team confirms that the PP has mentioned that the monitoring period includes both the start date and end date in all relevant sections of the revised MR. 3. PP to update the page numbers in Table of Contents. [OPEN] 2. In Section 1.1 of MR; 4. Assessment Team confirms that PP has clarified the project's implementation is in-line with the VCS standard Version 4.4 and set-guidelines Version 4.3. Relevant details regarding gap validation of this project from CDM to VCS and subsequent verification under VCS has been added in section 1.1. of the revised MR. Also, the methodologies under CDM are valid to be referred and applied under this grouped project. 5. Assessment Team confirms that PP has elaborated that minimum 1 LED (7W/9W or 12 W/14W) is distributed under this grouped project & has also updated section 1.1 of the revised MR accordingly. 6. Assessment Team confirms that PP clarified that 246,101 grid connected households was a typographical error & Total grid connected households wherein LEDs were distributed under this grouped project are equal to 246,104. Which was cross checked by the assessment team from the LED distribution database, & the value is now consistent throughout the revised MR. 7. Assessment Team confirms that Invoice cum consent deed for start date of the grouped project and validation report are being submitted to the assessment team which is being cross verified and found to be authentic and correct. 8. PP clarified that no LEDs were distributed under this project under the current MP (01-June-2022 to 31-December-2022). The last date on which the LED was distributed was 31-July-2021. Same correction has been made in the revised MR, this was verified by Team Leader during the on-site visit and personnel interview with the respective PP and its representatives involved in implementation of the project activity. Hence acceptable to the assessment team. 3. In section 1.9 of MR: 9. PP to specify that the CERs referred in this section actually belongs to which project? 3. In section 1.10 of MR:				

10. PP has justified along with evidence of avoiding Scope 3 emissions and subsequently updated the MR as part of verification process. Additionally PP has updated /added appendix B in the revised MR along with relevant information & evidences submitted to the assessment team.

Hence CL#01 is Open

2 nd Response from PP	Date	19-May-2023
1. For Title Page & Table of Contents; 3. Table of Contents has been updated in the revised MR. 3. In section 1.9 of MR: 9. PP would like to clarify that details regarding previous issuances of Certified Emission Reductions (CERs) received specifically for the CPA titled <u>SHINE – Distribution of LED Lightbulbs in India-2</u> with UNFCCC reference number- <u>CPA 10484-P1-0002-CP1</u>¹⁴ under CDM have been mentioned ready reference in Table 4 of the revised MR. Same description has been added section 1.9 of the revised MR being submitted to the VVB.		
2 nd Assessment by Audit Team	Status	Closed
	Date	19-May-2023

1. For Title Page & Table of Contents;

3. Assessment Team confirms that the table of Contents has been updated in the revised MR version

3. In section 1.9 of MR:

9. Assessment team confirms that the has updated the issuances of Certified Emission Reductions (CERs) received specifically for the CPA titled SHINE – Distribution of LED Lightbulbs in India-2 with UNFCCC reference number- CPA 10484-P1-0002-CP1¹⁵ under CDM along with relevant weblinks in the footnotes as cross checked from the revised MR.

Hence CL#01 is closed successfully.

Type	Date	04-May-2023
CL#02	Reference	Section of Ver protocol: 2 Section of Ver protocol: 3
Description of the Non-Conformance		
PP is requested to provide the clarification on the below point: 1. In section 2.1 of MR: PP to clarify if the process of destruction is seamless enough that it does not have any impact on the environment. 2. In Section 2.2 of MR; 1. PP is requested to clarify, which date or time frame is PP referring to in this section. 2. PP is requested to provide the sample feedback forms. 3. PP is requested to provide the supporting documents for the verification or provide justification for mentioned value. As the submitted supporting document i.e. Replacement Database does not indicate the mentioned value. 3. In Section 3.1 of MR; Please elaborate how the implementation of the project activity impacts the energy savings with replacement of ICLs with LEDs.		
1 st Response from PP	Date	15-May-2023
1. In section 2.1 of MR: PP has ensured proper collection and scientific disposal of baseline ICLs that are eligible to be replaced under the grouped project leading to effective management of hazardous wastes and no negative impact on the environment. The process has been elaborated in section 2.1 of the revised MR. Destruction Certificate and Contractual Agreement with the waste management entity are being submitted to the VVB.		

¹⁴ https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/AEY3HMDLOF95RCP6SWIGVNZU82TKBQ/view

¹⁵ https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/AEY3HMDLOF95RCP6SWIGVNZU82TKBQ/view

2. In Section 2.2 of MR; 1. PP would like to state that section 2.2 of the MR has been revised to include number and type of grievances received under the current monitoring period (01-June-2022 to 31-December-2022). 2. Grievance Redressal Records wherein the number of LEDs replaced under the current MP can be referred are being submitted to the VVB as part of response. 3. LED replaced under the grievance redressal records is being submitted to the VVB.				
3. In Section 3.1 of MR; The calculated energy savings with replacement of ICLs with LEDs have been added in section 3.1 of the revised MR against each project activity instance under this MP/.				
1st Assessment by Audit Team	Status	Closed	Date	18-May-2023
1. In section 2.1 of MR: PP has ensured proper collection and scientific disposal of baseline ICLs that are eligible to be replaced under the grouped project leading to effective management of hazardous wastes and no negative impact on the environment. The process has been elaborated in section 2.1 of the revised MR. PP has also submitted the Destruction Certificate and Contractual Agreement with the waste management entity to the Verification team.				
2. In Section 2.2 of MR; 1. Assessment Team confirms after verifying from the MR, evidences i.e., Grievance register/replacement database that section 2.2 of the MR has been revised to include number and type of grievances received under the current monitoring period (01-June-2022 to 31-December-2022). 2. Assessment Team confirms that Grievance Redressal Records wherein the number of LEDs replaced under the current MP can be referred are submitted to the verification team & are further verified by the team hence acceptable. 3. Assessment Team confirms that LED replaced under the grievance redressal records is being submitted to the verification team that was verified from the Replacement database submitted and was found to be authentic and correct.				
3. In Section 3.1 of MR; Verification Team confirms that the calculated energy savings with replacement of ICLs with LEDs have been added in section 3.1 of the revised MR against each project activity instance under this monitoring period.				
Hence CL#02 is closed successfully.				

Type	Date	04-May-2023
CL#03	Reference	Section of Ver protocol: 4 Section of Ver protocol: 5
Description of the Non-Conformance		
1. In Section 4.1 of MR; PP to justify in which verification/validation was this parameter included in ex-ante since the same was not tracked either in CDM-DD or VCS Registered PD. Also note that validation report is not available at Verra's webpage.		
2. In Section 4.2 of MR; 1. PP to specify name of the agency. 2. Elaborate the short form		
3. In Section 4.3 of MR; 1. PP is requested to provide the certificate of destruction 2. PP is requested to mention the name of third party involved. 3. What about current monitoring period? Is 1st Monitoring survey applicable to current MP? 4. PP to specify if the monitoring survey is applicable to current monitoring period?		

5. PP is requested to clarify, is there any other party authorized by PP to implement/monitor this project activity? PP to elaborate the respective agency responsible for the role. 6. Is there any particular platform used the please specify the platform used for the recording purposes. Also specify if the database if prepared by the third party acting as the monitoring agency or done by PP itself?		
1st Response from PP	Date	15-May-2023
1. In Section 4.1 of MR; PP would like to clarify that in reference to the registered documents- POA- DD¹⁶ and CPA-DD¹⁷, the decision on the wattage of project lamp to replace a specific wattage of baseline lamp shall be with PP as long as it is in compliance with applicability criteria set out in the methodology namely the service level of project equipment(which for lighting project is light output) being between 90 to 150 percent of the service level of baseline equipment. PP had clearly stated in the verification report under CDM that the 9W and 12 W LED types are indicative and project lamps maybe out of this range (please refer to footnote 6 on Page 11 of the verification report¹⁸). Further, the lumen output of the 7 W and 14 W LED being distributed under this grouped project is within the required range (90% to 150% of lumen output of 60 W ICL and 100 W ICL respectively) and the ex-ante value average operating hours has been determined as 25,000 hours as per independent life tests. Therefore, the PP had considered the ex- ante parameter, i.e., average operating hour for LED type of 7W and 14 W in compliance with the applied methodology¹⁹. 2. In Section 4.2 of MR; 1. PP would like to state that the name of third parties has not been specified in the MR due to confidentiality reasons. However, supporting agreements have been submitted to the VVB for reference. 2. DMS stands for Database Management System. It refers to the online application which is being used under this grouped project to manage the LED distribution data. The short form has been elaborated in Section 4.2 of the MR accordingly. 3. In Section 4.3 of MR; 1. Certificates of destruction are being submitted to the VVB. 2. PP would like to state the name of third party involved in the project has not been specified because of confidentiality reasons. However, supporting agreements with third parties involved in the project have been provided to the VVB for reference. 3. The first monitoring survey conducted is also applicable for the second monitoring period. Justification regarding the same has been added in section 4.3 of the revised MR. 4. The first monitoring survey conducted is also applicable for the second monitoring period. Justification regarding the same has been added in section 4.3 of the revised MR. 5. PP would like to state that name of third parties involved in the project has not been specified due to confidentiality reasons. However, supporting contractual agreements have been provided to the VVB for reference. 6. Platform which is used to manage the LED distribution database is called Database Management System or DMS as mentioned in section 4.2 of the MR. Same has been added in section 4.3 of the MR as part of this response. Further PP would like to clarify that there are separate agencies involved in developing DMS and conducting monitoring survey. Supporting agreements and screenshots from DMS have been submitted to the VVB for reference.		

¹⁶ https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/MN26BFZ0CHPIR47G01L3YES9XVKTUD/view

¹⁷ https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/AEY3HMDL0F95RCP6SWIGVNZU82TKBQ/view

¹⁸ <https://cdm.unfccc.int/UserManagement/FileStorage/PB4VG5OR7UX8C10KJEHFZ192DLYQ6W>

¹⁹ <https://cdm.unfccc.int/methodologies/DB/7Y44EN2RTD02AJ78JWVCGARE8W64KP> AMS-II.C.- Demand-side energy efficiency activities for specific technologies, Version 15.0

1 st Assessment by Audit Team	Status	Open	Date	18-May-2023
1. In Section 4.1 of MR; PP to quote relevant section of CPA-DD referred above. Also add brief note in the MR w.r.t to the CPA-DD.				
2. In Section 4.2 of MR;				
1. Assessment Team confirms that PP has submitted the supporting agreements in support of the third party mentioned in the MR which has been verified by the verification team.				
2. Assessment team confirms that PP has elaborated that the DMS stands for Database Management System & that it refers to the online application which is being used under this grouped project to manage the LED distribution data. Also the short form has been elaborated in Section 4.2 of the MR accordingly, which was verified by the Team Leader during site visit while interviewing the PP representatives.				
3. In Section 4.3 of MR;				
1. Assessment team confirms that Certificates of destruction have been submitted to the assessment team.				
2. Assessment Team confirms that the third-party name has been verified from the supporting agreements with third parties involved in the project submitted to the assessment team to the assessment team for reference.				
3. PP has stated that the first monitoring survey conducted in July 2022 is also applicable for the second monitoring period & also justification regarding the same has been added by the in section 4.3 of the revised MR. Hence acceptable.				
4. PP has stated that the first monitoring survey conducted in July 2022 is also applicable for the second monitoring period & also justification regarding the same has been added by the in section 4.3 of the revised MR. Hence deemed satisfactory.				
5. The Assessment Team has confirmed the validity of a third-party name by reviewing supporting agreements with the involved third parties. These agreements were submitted to the team as a point of reference during the assessment process.				
6. Assessment Team confirms that PP has mentioned that Platform which is used to manage the LED distribution database is called Database Management System or DMS as mentioned in section 4.2 of the MR & has incorporated the same in section 4.3 of the revised MR. Additionally PP has stated that there are separate agencies involved in developing DMS and conducting monitoring survey. Assessment team also confirms that relevant supporting agreements and screenshots from DMS have been submitted to the Verification Body for better reference.				
Hence CL#03 is Open.				
2 nd Response from PP			Date	19-May-2023
1. In Section 4.1 of MR;				
Complete response is being resubmitted along with the requested references to the sections of the registered CDM documents pertaining to this project below-				
PP would like to clarify that in reference to the section H.3. and H.4 of the registered POA- DD ²⁰ titled SHINE- Distribution of LED Lightbulbs in India (page 16-17) and section A.3. of the registered CPA-DD ²¹ titled SHINE- Distribution of LED Lightbulbs in India -2 (page 5), the decision on the wattage of project lamp to replace a specific wattage of baseline lamp shall be with PP as long as it is in compliance with applicability criteria set out in the methodology namely the				

²⁰ Please refer to section H.3. and H.4., page 16-17 of the registered PoA-DD titled SHINE- Distribution of LED Lightbulbs in India. Document can be accessed through the link: https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/MN26BFZ0CHPIR47G01L3YES9XVKTUD/view

²¹ Please refer to section A.3., page 5 of the registered CPA-DD titled SHINE- Distribution of LED Lightbulbs in India -2. Document can be accessed through the link: https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/AEY3HMDLOF95RCP6SWGIVNZU82TKBQ/view

service level of project equipment(which for lighting project is light output) being between 90 to 150 percent of the service level of baseline equipment. PP had clearly stated in the verification report under CDM that the 9 W and 12 W LED types are indicative and project lamps maybe out of this range (please refer to footnote 6 on Page 11 of the verification report²²). Further, the lumen output of the 7 W and 14 W LED being distributed under this grouped project is within the required range (90% to 150% of lumen output of 60 W ICL and 100 W ICL respectively) and the ex-ante value average operating hours has been determined as 25,000 hours as per independent life tests. Therefore, the PP had considered the ex- ante parameter, i.e., average operating hour for LED type of 7W and 14 W in compliance with the applied methodology²³. This justification has also been summarised briefly in comments section of the parameter- Li 7w and Li 14w in section 4.1 of the revised MR being submitted to the VVB.

2nd Assessment by Audit Team	Status	Closed	Date	19-May-2023
1. In Section 4.1 of MR; Going through the justification provided by PP to the feedback shared for quoting relevant section of CPA-DD in the above stated section. Assessment team confirms that the PP has added brief note in the MR w.r.t to the CPA-DD and has also quoted required justification in the MR. Thus, acceptable to the verification team. Hence CL#03 is closed successfully				

Type	Date	04-May-2023
CAR#01	Reference	Section of Ver protocol: Title Page, Content Table, Section 1
Description of the Non-Conformance		
The following correction required in MR: 1. In Section 1.1 of MR; - PP is requested to briefly mention about six project activities instances based on the electricity division and subdivision In table 01: PP to hyperlink the respective CER issuance with respective MR/FVR updated on respective websites for thorough referencing and better clarity. - PP is requested to mention the total days/months in table 2(Audit History of the grouped project) according to the VCS Monitoring Report Template version 4.2 - PP to justify of the monitoring period is including of both start and end dates? 2. In Section 1.2 of MR; - PP is requested to indicate whether the project is AFLOU or not according to VCS MR current version 4.2 3. In Section 1.4 of MR; - PP is requested to kindly mention the designation of contact person for Korea Impact Carbon Corporation 4. In Section 1.9 of MR; - PP is requested to incorporate the weblink/references of the mentioned documents 5. In Section 1.10 of MR; - PP is requested to update this section and provide evidence of the public statement(s) and email(s) in this report or as an appendix as per the VCS MR template Version 4.2 6. In Section 1.11 of MR; - What is the implemented activity aiming to increase in all the SDGs?		

²² Please refer to footnote 6 on page 11 of the Monitoring report for SHINE-Distribution of LED Lightbulbs in India. Document can be accessed through the link: <https://cdm.unfccc.int/UserManagement/FileStorage/PB4VG5OR7UX8C1OKJEHFZ192DLYQ6W>

²³ AMS-ILC- Demand-side energy efficiency activities for specific technologies, Version 15.0. Document can be accessed through this link: <https://cdm.unfccc.int/methodologies/DB/7Y44EN2RTD02AJ78JWCGARE8W64KP>

10. "The project proponent (PP) is requested to submit evidence that verifies the completion of the Vocational Training and project-related training as outlined in Table 5 of the project's Monitoring Report (MR).". 11. PP to justify how there is no changes referred in this monitoring period for SDG 8.3 & 12.5 12. PP to submit the evidences for the claimed SDG 8.3 13. Required supporting documents is not submitted by PP to verify this SDG. PP to clearly elaborate about the SDG 12.5 that they wish to claim. 14. As per VERRA the "Contributions Over Project Lifetime" column can only include contributions that have been reported in current and previous SDGs contributions reports. Since PP didn't claim any SDGs in previous monitoring period 01-January-2021 to 31-May-2022(both days including). Please make required alterations.in SDG 13.0		
1st Response from PP	Date	15-May-2023
1. In Section 1.1 of MR; 1. Details about six project activities instances have been added in Section 1.1 of the revised MR. 2. In table 01: CER issuances have been hyperlinked with respective MR/FVR updated on respective websites for ready reference in Table 01 of the revised MR. 3. Total days/months have been mentioned in Table 02(Audit History of the grouped project) according to the VCS Monitoring Report Template version 4.2. 4. PP would like to clarify that the current monitoring period (01-June-2022 to 31-December-2022) is inclusive of both the MP start date and MP end date. Same has now been mentioned in the revised MR. 2. In Section 1.2 of MR; 5. PP would like to clarify that the grouped project is not AFLOU and same has been added in section 1.2 of the revised MR. 3. In Section 1.4 of MR; 6. PP would like to state that the designation of contact person for Korea Impact Carbon Corporation has been added in the revised MR. Same has been added in section 1.4 of the revised MR. 4. In Section 1.9 of MR; 7. The weblink/references of the mentioned documents have now been added in Section 1.9 of the revised MR. 5. In Section 1.10 of MR; 8. Evidence of the public statement and email to avoid double claiming for Scope 3 Emissions has been added in the appendix section B of the revised MR as well as being provided to the VVB. 6. In Section 1.11 of MR; 9. PP would like to clarify that the statement, "implemented activity aiming to increase" has been mentioned in reference to the SDG indicator in the first column. This format followed in column 2 is in line with the instructions given in MR template version 4.2. 10. Training Records are being submitted to the VVB. 11. There was no new training conducted as well as employment generated in the current monitoring period. Therefore, it has been stated that there is no significant contribution to SDG 8.3 and SDG 12.5 in the current monitoring period. However, contribution to the SDG 8.3 and SDG 12.5 done by the PP previously has been added in the next project lifetime contribution of Table 5 for reference. 12. Employment records are being submitted to the VVB to prove contribution to SDG 8.3. 13. Explanation regarding the calculation of failed ICL waste avoided has been added in appendix C of the revised MR. 14. Required alterations in the Project Lifetime Contributions column have been done to include the contributions to stated SDGs.		

1 st Assessment by Audit Team	Status	Open	Date	18-May-2023
1. In Section 1.1 of MR; 1. Assessment Team confirms that PP has incorporated the details about six project activities instances in Section 1.1 of the revised MR. 2. In table 01: Please re-check/update the Weblinks/footnotes inserted [OPEN] 3. PP has updated/added Total days/months have been mentioned in Table 02 (Audit History of the grouped project) according to the VCS Monitoring Report Template version 4.2, confirms the assessment team. 4. PP has mentioned in the revised MR that the current monitoring period (01-June-2022 to 31-December-2022) is inclusive of both the MP start date and MP end dates, confirms the assessment team. 2. In Section 1.2 of MR; 1. PP has clarified that the grouped project is not AFLOU and same has been added in section 1.2 of the revised MR, as confirmed by the Assessment Team. 3. In Section 1.4 of MR; 1. PP has stated that the designation of contact person for Korea Impact Carbon Corporation has been added in the revised MR, confirms the assessment team of VKU. 4. In Section 1.9 of MR; 1. Assessment Team confirms that the weblink/references of the quoted documents has been added in Section 1.9 of the revised MR. 5. In Section 1.10 & 1.11 of MR; 1. Assessment Team confirms that the evidence of the public statement and email to avoid double claiming for Scope 3 Emissions has been made available/incorporated in the appendix section B of the revised MR. 2. Assessment Team confirms PP would like to clarify that the statement, “implemented activity aiming to increase” has been mentioned in reference to the SDG indicator in the first column is as per MR template and that the relevant description has been added in column 04 of the SDG Table. 3. Assessment Team confirms that the Training Records are submitted to the Verification Team and are cross checked by the verification team for their authenticity deemed satisfactory. 4. Assessment Team confirms that there was no new training conducted as well as employment generated in the current monitoring period as stated by the PP. Hence stating that there is no significant contribution to SDG 8.3 and SDG 12.5 in the current monitoring period. 5. Assessment Team confirms that the Employment records are being submitted to the Verification Body by PP to prove contribution to SDG 8.3 and are cross checked by the verification team for their authenticity deemed satisfactory. 6. Assessment Team confirms that the PP has incorporated the explanation regarding the calculation of failed ICL waste avoided in appendix C of the revised MR version 2.0. 7. PP to note that as per Verra guidelines PP cannot claim the SDG with cumulative value of waste generation for current and previous monitoring period. As per Verra guidelines the Contributions Over Project Lifetime can only be claimed for current monitoring period, if in previous verification the MR was submitted with SDG table and the stated SDG was claimed in previous verification. If not then only contributions to current monitoring period are applicable to contributions over project Lifetime sections. If PP still wishes to claim this section with MPO1 and MPO2 data then they will have to ensure revisions in previous MRs and then they can proceed to claim under current verifications. Please make the required corrections accordingly. [OPEN] 8. Please Justify the text and provide a brief description that includes the following (no more than 100 words). Please correct accordingly. [OPEN] Hence CAR#01 is Open				

2nd Response from PP		Date	19-May-2023
1. In Section 1.1 of MR; 2. Weblinks have been updated in Table 01 of the revised MR. 5. In Section 1.10 & 1.11 of MR; 7. PP would like to clarify that the contributions over project lifetime have been revised and are now being kept as equivalent to the project contribution in the second monitoring period since SDG contributions from MP 1 (01-January-2021 to 31-May-2022) were not included in the previously approved VCS monitoring report v1.2 dated 22-October-2022²⁴. Therefore, SDGs contributions, only the current, i.e., second monitoring period specific data has been reported in Section 1.11 -Table 5 of the MR. This has also been added in section 1.11 of the revised MR. 8. Description in section 1.11 of the MR has now been revised to briefly mention the alignment of project activities with the SDGs stated in this grouped project.			
2nd Assessment by Audit Team	Status	Closed	Date 19-May-2023
1. In Section 1.1 of MR; 2. Assessment team confirms after cross checking the revised MR that PP has updated the Weblinks in Table 01 of the revised MR. 5. In Section 1.10 & 1.11 of MR; 7. The Assessment Team has verified and confirmed, following a cross-verification process, that the Project Proponent (PP) has made updates to the contributions throughout the project's duration. These updated contributions are now considered equivalent to the project contribution during the second monitoring period. This update was necessary due to the omission of SDG contributions from Monitoring Period 1 (January 1, 2021, to May 31, 2022) in the previously approved VCS monitoring report, version 1.2, dated October 22, 2022. As a result, only the current, second monitoring period-specific data has been included in Section 1.11 - Table 5 of the revised MR. 8. Assessment Team confirms that the Description in section 1.11 of the MR has now been revised by PP to briefly mention the alignment of project activities with the SDGs stated in this grouped project. Hence CAR#01 is closed successfully.			
Type		Date	04-May-2023
CAR#02		Reference	Section of Ver protocol: 2 Section of Ver protocol: 3
Description of the Non-Conformance			
1. In Section 2.2 of MR; 1. PP is requested to update the grievance mechanism as per the actual practice at site. 3. In Section 3.1 of MR; 1. PP to include technical specifications of the LEDs installed/replaced as a part of this project activity as per a guideline to fill MR template section 3.1 2. Total Number of households mentioned in Database of VCS 2608 is 246,104 and not 246,101. Also, the numeric value of Total Grid connected households is not consistent throughout the MR. PP is requested to update and remain constant the font size throughout the MR 3. PP is requested to update the value of LED distributed as assessment team found inconsistent with the supporting documents			

²⁴ Please refer to section 1.11 on page 7 of the Monitoring Report for VCS MP 1. Document can be accessed here <https://registry.terra.org/app/projectDetail/VCS/2608>

4. PP is requested to update the font size and make it consistent throughout the MR as per VCS guidelines to fill MR. 5. In table 06 of MR: PP is requested to update the value of 12W LED as assessment team found inconsistent with the supporting documents 4. In Section 3.2.1 & 3.2.2 of MR; PP is required to indicate whether any deviations were taken during the previous verification and validation processes. 5. In Section 3.3 of MR; 1. PP to either specify instances referred here or provide a description of the same in a section of MR and cross-reference the same here in this section, since the interpretation will become more apparent. 2. In table 07 of MR: Sno: 1 & 3; PP to clarify if the project is now registered as an individual project in Verra and also claiming VCUs in VCS so can the methodology be confirmed from registered VCS PD version 2.2 dated 21-01-2022 3. In table 07 of MR: Sno: 2; PP to provide description of the document i.e., Test Reports/Test Certificates referred along with the issuing authority as submitted to the VVB. 4. In table 07 of MR: Sno: 5 & 9; PP to modify the statements since assessment team was not able to mark any geocoordinates in the Database for the particular VCS registered project id VCS 2608 as submitted by the PP. 5. In table 07 of MR: Sno: 7; PP to submit the Invoice cum consent deed of the first LED installed.				
1 st Response from PP		Date	15-May-2023	
1. In Section 2.2 of MR; 1. Grievance redressal mechanism has been updated as per the actual practice at site in section 2.2 of the revised MR. 2. In Section 3.1 of MR; 1. Technical specifications of the LEDs installed (7W/9W, 12W/14W) under this grouped project have been added in the revised MR in line with the guideline mentioned in MR template section 3.1. 2. Value corresponding to the total grid connected households wherein LEDs have been distributed is 246,104. This value is corrected throughout the revised MR. Font size has been corrected throughout the revised MR. 3. This value of total LEDs distributed under this grouped project is corrected throughout the revised MR. 4. Font size has been corrected in revised MR. 5. Value of total number of 12 LEDs distributed under SHINE CPA 2 PAI 3 under this this grouped project has been corrected in Table 6 of the revised MR. 4. Section 3.2.1 & 3.2.2 of MR- No deviations were taken during the previous verification and validation processes. Same has been added in section 3.2.1 and 3.2.2 of the revised MR. 5. In Section 3.3 of MR; 1. Instances have been described in section 3.3 of the revised MR. 2. In table 07 of MR: Sno: 1 & 3; PP would like to clarify that the methodology under CDM is also applicable to be referred under projects being developed under VERRA. Therefore, direct methodology has referred rather than giving an indirect reference to the the registered VCS PD version 2.2 dated 21-01-2022. 3. In table 07 of MR: Sno: 2; Test Reports/Test Certificates referred along with the issuing authority as submitted to the VVB. 4. In table 07 of MR: Sno: 5 & 9; Statement has been revised accordingly. 5. In table 07 of MR: Sno: 7; Invoice cum consent deed of the first LED installed has been submitted to the VVB.				
1 st Assessment by Audit Team		Status	Open	Date 18-May-2023

1. In Section 2.2 of MR; Assessment Team confirms that the Grievance redressal mechanism has been updated by PP as per the actual practice at site in section 2.2 of the revised MR.

2. In Section 3.1 of MR;

1. Assessment Team confirms that technical specifications of the LEDs installed (7W/9W, 12W/14W) under this grouped project have been added in the revised MR by the PP which were cross checked by the assessment team during site visit and with the supporting documents submitted by PP.
2. PP has revised in MR version 2.0 the value corresponding to the total grid connected households wherein LEDs have been distributed is 246,104. & has also made the font size consistent throughout the revised MR, confirms the assessment team.
3. The value of total LEDs distributed as per Database is 1411863 submitted to assessment team with MR version 02, please correct the values and required calculations accordingly [OPEN]
4. PP has made the Font size consistent in revised MR version 2.0 confirms the assessment team.
5. Assessment Team confirms that the PP has corrected the value of total number of 12 LEDs distributed under SHINE CPA 2 PAI 3 under this this grouped project in Table 6 of the revised MR.

4. Section 3.2.1 & 3.2.2 of MR- PP has declared in the MR version 2.0 that no deviations were taken during the previous verification and validation processes & PP has added the required justification in section 3.2.1 and 3.2.2 of the revised MR.

5. In Section 3.3 of MR;

1. PP has added the described instances in section 3.3 of the revised MR version 2.0, confirms the assessment team.
2. **In table 07 of MR: Sno: 1 & 3;** (1) PP to incorporate the above-mentioned reason either in footnotes or in the section. [OPEN]
(3) PP to mention required section of the CPA-DD/VCS PD that mentions about the baseline scenario [OPEN]
3. **In table 07 of MR: Sno: 2;** PP is requested to elaborate the description in this section w.r.t to the evidences submitted to the assessment team. [OPEN]
4. **In table 07 of MR: Sno: 5 & 9;** PP has made required changes in the statement, hence acceptable to the VKU assessment team.
5. **In table 07 of MR: Sno: 7;** Assessment Team confirms that PP has submitted the Invoice cum consent deed of the first LED installed to the Verification Body.

Hence CAR#02 is Open

2 nd Response from PP		Date	19-May-2023	
2. In Section 3.1 of MR; 3. The value of total LEDs distributed has been revised to 1,411,863 in section 3.3 of the revised MR. 5. In table 07 of MR: Sno: 1 & 3; (1) The methodology under CDM is also valid to be applied and referred under VCS project (gap validated from CDM to VCS) and being pursued under VERRA. Same has been added as a footnote in section 3.3 of the revised MR. (3) Baseline Scenario can be confirmed from the section B.3. (Page 10) of the registered CPA-DD¹¹. Same has been added in section 3.3 of the revised MR as a footnote for ready reference. Section 3.1 of the revised MR can be referred to for the technical specifications of the project LEDs. Further, the issuing authority has been specified for test report along with the specifications covered for each LED type in table 7 of the revised MR.				
2 nd Assessment by Audit Team	Status	Closed	Date	19-May-2023
2. In Section 3.1 of MR; 3. The value of total LEDs distributed has been revised to 1,411,863 in section 3.3 of the revised MR cross verified by the assessment team from the Project database.				

5. In table 07 of MR: Sno: 1 & 3;

(1) PP clarifies that the methodology under CDM is also valid to be applied and referred under VCS project (gap validated from CDM to VCS) and being pursued under VERRA. To support the same PP has added as a footnote in section 3.3 of the revised MR which was cross verified by the assessment team.

(3) PP justifies in the MR that the Baseline Scenario can be confirmed from the section B.3. (Page 10) of the registered CPA-DD²⁵. To support the same PP has added in section 3.3 of the revised MR as a footnote for ready reference.

Also stated that Section 3.1 of the revised MR has information related to the technical specifications of the project LEDs. Additionally, PP has specified the issuing authority for test report along with the specifications covered for each LED type in table 7 of the revised MR as cross verified by the assessment team.

Hence CAR#02 is closed successfully.

Type	Date	04-May-2023
CAR#03	Reference	Section of Ver protocol: 4 Section of Ver protocol: 5
Description of the Non-Conformance		
1. In Section 4.3 of MR; - PP is requested to update font size throughout this section. - PP to incorporate the following as per VCS guidelines to Fill MR: - Competencies of the personnel that carried out the monitoring activities. - The procedures used for handling any internal auditing performed and any non-conformities identified. - PP to elaborate a bit on the implementation of sampling approaches, sample site locations (Please refer Instances here), stratification, frequency of measurement and QA/QC procedures. - Elaborate the shortform - PP is kindly requested to furnish evidence in order to verify the spot-checking procedures implemented for household selection carried out during the current monitoring period. The evidence requested should include photographs capturing the spot-checking activity, along with screenshots demonstrating the process employed for selecting samples for spot-checking. 2. In Section 5.4 of MR; An additional justification is required to support the percent difference. A more detailed documentation or evidence to substantiate this claim is needed. A same update in the ER sheet will be highly appreciated.		
1 st Response from PP	Date	15-May-2023
1. In Section 4.3 of MR; - Font size has been updated throughout the section. - Description regarding competencies of the monitoring personnel along with requested procedures for non-conformities identified, internal auditing has been added in the revised MR as part of this response. - Brief description regarding the aspects related to the implementation of sampling approach including the other requested details by the VVB has been added in the revised MR. - DA stands for Distribution Agency. Same has been elaborated in the revised MR.		

²⁵Reference to registered CPA-DD under CDM is valid as the project has been gap validated from CDM to VCS and now being pursued under VERRA. Please refer to section B.3., page 10, of the registered CPA-DD which can be accessed here https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/AEY3HMDLOF95RCP6SWGIVNZU82TKBQ/view

5. Spot Check Records are being submitted to the VVB.				
9. In Section 5.4 of MR; Justification has been provided in section 5.4 of the MR. Revised ER Sheet is being submitted as part of this response wherein the justification has been included for difference in estimated ERRs and actual ERRs related to this grouped project.				
1st Assessment by Audit Team	Status	Open	Date	18-May-2023
1. In Section 4.3 of MR; 1. Assessment team confirms that the font size has been updated throughout the section 2. PP has incorporated the description regarding competencies of the monitoring personnel along with requested procedures for non-conformities identified, internal auditing in section 4.3 of revised MR version 2.0 3. PP has incorporated the brief description regarding the aspects related to the implementation of sampling approach including the other requested details by the assessment team in section 4.3 of revised MR version 2.0 4. PP has clarified that DA stands for Distribution Agency & has elaborated in the revised MR version 2.0 5. PP has provided the Spot Check Records to the Verification body which is also cross checked by the assessment team.				
2. In Section 5.4 of MR; Assessment team confirms that required justification for lower ERs has been provided in section 5.4 of the revised MR version 2.0. Revised PP has also submitted the revised ER Sheet to the assessment team wherein the justification has been included for difference in estimated ERRs and actual ERRs related to this grouped project.				
3. In Section 5.1 & 5.2 of MR: However, the assessment team verified this value in the ER sheet, PP to specify and define the value in the MR for better clarity. [OPEN]				
4. In section 5.3 & 5.4 of MR; PP to quote the section of the methodology used in the project activity. [OPEN]				
Hence CAR#03 is Open				
2nd Response from PP	Date	19-May-2023		
3. In Section 5.1 & 5.2 of MR: Number of pieces of equipment of the group of 'i' baseline equipment (ICLs) replaced and number group 'i' project devices operating during time interval t in year y for the current monitoring period have been mentioned in section 5.1 and 5.2 of the revised MR.				
4. In section 5.3 & 5.4 of MR; Reference to section 5.6 of the applied methodology has been given in Section 5.3 of the revised MR. Further reference to section 5.7 of the applied methodology has been given in section 5.4 of the revised MR				
2nd Assessment by Audit Team	Status	Closed	Date	19-May-2023
3. In Section 5.1 & 5.2 of MR: PP has justified the values with definition i.e., "Number of pieces of equipment of the group of 'i' baseline equipment (ICLs) replaced and number group 'i' project devices operating during time interval t in year y" specifically for the current monitoring period and has also updated in section 5.1 and 5.2 of the revised MR cross-verified by the assessment team.				
4. In section 5.3 & 5.4 of MR; It is to clarify that PP has added relevant reference to section 5.6 of the applied methodology in Section 5.3 of the revised MR. Also, addition to that reference to section 5.7 of the applied methodology has also been provided by the PP in section 5.4 of the revised MR cross-verified by the assessment team.				
Hence CAR#03 is closed successfully.				

Type	Date	23-May-2023
CAR#04	Reference	Section of Ver protocol: 1, 2, 3, 4 and 5
Description of the Non-Conformance		
In Section 1.1 of MR; PP is requested to clarify "small-scale grouped project" with reference to VCS program definitions. In Section 1.1 of MR; PP is requested to clarify why the right column is left blank? How is the total number of years reconciled i.e., 2 years with the 1 Year 5 Months referred above. In Section 2.2 of MR; PP is requested to update the date DD/MM/YYYY format. In Section 3.3 of MR; PP is requested to clarify how the 6 PAIs whose energy savings exceed 0.6 GWh is not needed to be classified as clusters as per condition (3). In Section 4.2 of MR; PP is requested to state the cut off range based on the confidence interval/precision chosen during the current monitoring period. In Section 4.3 of MR; What is the procedure applied for conservative assumptions? In Section 4.3 of MR; PP is requested to state how this adjusted values were arrived at. Based on the data shared by PP, please clarify the basis for the higher values chosen: 72%,137%,198% and 2% for 7W,9W,12W and 14 W respectively against the calculated value of 43 each. In Section 4.3 of MR; PP is requested to provide/Incorporate the formula/equation stated in spreadsheet here for traceability purposes towards determination of the precision level achieved. In Section 5.1 of MR; This sampling confidence interval is not consistent with the previous confidence interval of 95/10.Please clarify. In Section 5.1 of MR; PP is requested to use decimal digits as per international conventions. In Section 5.4 of MR; PP is requested to clarify how the loss rate of less than 5% results in cumulative drop of 22% ER from the estimated ER of PD.		
1 st Response from PP	Date	24-May-2023
In Section 1.1 of MR; PP would like to clarify that in reference to the VCS program definitions v4.3, the grouped project can be classified either into "project" or "large project". Therefore term "small-scale" has been removed from section 1.1. of the MR. In Section 1.1 of MR; PP would like to clarify that the time period corresponding to second MP under VCS has been added in Table 2 of the revised MR. Total years under VCS verification has been stated as two years as it is inclusive of the second verification period, i.e., 01-June-2022 to 31-December-2022(both start date and end date included). In Section 2.2 of MR; Since there is no specific format for dates to be mentioned in section 2.2 of the MR, the date format has been kept as DD-Month-YYYY in line with format recommended for other relevant sections of the MR template version 4.2. In Section 3.3 of MR; PP would like to clarify that the grouped project has been divided into six project activity instances based on the electricity division and subdivision in which LED distribution has been carried out by Project Proponent. These 6 PAIs which are exceeding 1% of the capacity limit (0.6 GWh) have been identified and given below- - SHINE CPA 2 PAI 1: This instance covers the Dhalai-Khowai division in Tripura. - SHINE CPA 2 PAI 2: This instance also pertains to Tripura but covers the Dharmanagar-Unakoti division.		

iii. SHINE CPA 2 PAI 3: This instance covers several divisions such as Amingaon, Ged (North), Ged (West), Kamrup, Mirza, Morigaon, Nalbari, Rangia, and West Guwahati in Assam.

iv. SHINE CPA 2 PAI 4: This instance covers the Dibrugarh, Golaghat, and Sivasagar divisions in Assam.

v. SHINE CPA 2 PAI 5: This instance covers several subdivisions such as Majuli, Mariana, Teok, and Titabor in Jorhat division of Assam.

vi. SHINE CPA 2 PAI 6: This instance covers the Dergaon, Jorhat ESD-I, Jorhat ESD-II, Jorhat-ESD III, and Kakojan subdivisions in Jorhat division of Assam.

As previously stated in Table 7, sub point 3 of point 8 under Capacity Limit, No PAIs have the same electricity subdivision. As per point 3 in section 3.6.9 of the VCS standard v4.4, "Instances that are not within one kilometer of any other instance shall not be assigned to clusters". These instances need not be divided into clusters as no two PAIs lie with one kilometer of each other.

5. **In Section 4.2 of MR;** In this case, the upper and lower cut-off range was identified to remove outliers. The upper cut-off range was calculated as 1.5 times the interquartile range (IQR) added to the third quartile. In this scenario, the upper bound is determined to be 14.4118. The lower cut-off range, on the other hand, was calculated as 1.5 times the IQR subtracted from the first quartile. In this case, the lower bound is determined to be -0.8271. Same can be verified from the operating hours calculation spreadsheet submitted to the VVB. Further, as part of the quality control on the data collected, the reliability calculation was performed, Reliability levels were set at 95% confidence and 10% precision. The required confidence and precision were met for this parameter.

6. **In Section 4.3 of MR;** PP would like to clarify that specific to the criteria mentioned for sampling frame, conservative assumptions that were envisaged to be applied in cases of mismatch are mainly elimination of entries with duplication, incomplete contact/address information and non-active accounts. This procedure ensured that only valid and relevant units are considered for analysis.

However, prior to freezing the database for sample frame, the information in the database was carefully checked thoroughly for duplications, and any true duplicate entries were either corrected or excluded from the database. Further the entries in the database were cross verified through spot checking with factual evidence in the field. Inconsistencies were promptly updated, and if LEDs were no longer in use, they were clearly marked and excluded from the database.

7. **In Section 4.3 of MR;** Steps followed for the calculation of sample size and instructions provided to the survey team regarding the monitoring survey of each LED wattage type have been updated in revised MR. Details regarding adjusted values based on non-response rate has also been added in the revised MR. Further PP would like to clarify that the higher values have been surveyed as the survey team was instructed to not only survey the sample LED of a particular wattage type (e.g., 12 W) but also cover the other project LEDs of different wattage types (e.g., 7 W/9 W) present in the household (as each household under this grouped project has received upto six project LEDs of wattage type – 7 W/9 W and/or 12 W/14 W). This approach allowed for assessment of operational status of LEDs across the different wattage categories within each surveyed household. For example, if the sample household has received three project LEDs (one LED of 12 W and two LEDs of 7 W), the survey team has collected data for the 12 W as well as the additional LEDs of 7 W. The

data for actual LEDs surveyed have been subsequently considered for analysis leading to more robust and reliable results.

8. **In Section 4.3 of MR;** PP has stated the equation along with the reference used for calculation of precision level in section 4.3 of the revised MR.
9. **In Section 5.1 of MR;** As per the requirement stated in AMS -II.C. version 15.0, i.e., a minimum of 90% confidence interval and 10% maximum error margin has to be considered for estimating the sample size to be surveyed. PP would like to clarify that a higher confidence level, such as 95%, provides a greater level of certainty that the estimated results from the survey will fall within the given interval. Similarly, maximum error margin of 10% indicates a smaller range of acceptable error in the estimated results. This implies that the desired level of precision is higher, and the PP aims to minimise the potential deviation from the true population parameter, i.e., average annual operating hours. Further as per sampling and surveys for CDM project activities and programmes of activities version 04, the higher the required confidence and the narrower the precision, the more samples are required to be surveyed. Therefore, to be more precise and taking a conservative approach, PP has considered 95% confidence interval and 10% maximum error margin.
10. **In Section 5.1 of MR;** The value for average annual operating hours has been updated as per the required decimal format. This format of the value has been updated in the ER spreadsheet and being resubmitted as part of this response.
11. **In Section 5.4 of MR;** PP would like to clarify that according to the VCS-PD, it was estimated that a total of 346,642 LEDs would be installed, resulting in an estimated annual average ERR of 55,082 tCO₂e per year. However, based on the LED distribution database, 1,411,863, were installed under this grouped project. As per actual LEDs installed, revised estimate of ex-ante ERR of 224,347 tCO₂e per year has been calculated. To make a fairer comparison, the number of days in the monitoring period inclusive of both start date and end date (01-June-2022 to 31-December-2022) was considered, which was 214 days. Using this information, the ex-ante (estimated) ERR for the reported period was calculated as 131,534 tCO₂e. Values have been summarised in table below:

Estimated LEDs Installed as per VCS-PD	Ex - ante tCO ₂ e/year as per VCS-PD (annual average)	Actual LEDs Installed as per MR	Ex - ante tCO ₂ e/year as per actual LED Installed	No. of days in MP (for comparable period)	Ex ante tCO ₂ e for current MP
346,642	55,082	1,411,863	224,347	214	131,534

Further, during the monitoring period, the actual emissions reductions (ERs) achieved were 121,546 tCO₂e. This value when compared to the amount estimated ex-ante for comparable period was 131,534 tCO₂e. The percent difference between the actual and estimated ERs has been recalculated as 8% as part of this response. The difference of 8% in achieved ER from the estimated ER is primarily a result of considering the loss rate. The loss rate accounts for the reduction in achieved emission reductions due to the non-operational LEDs, which were initially expected to contribute to the estimated ER which in this case is, 4.05% for 7 W LEDs and 3.91% for 12 W LED for the current monitoring period (approximately 8%). PP would like to clarify that in previous submission, the MP period considered for calculating the operational duration of LEDs was incorrect. Same has now been corrected and consistent with the considered MP and the difference of 8% is in line with the loss rate (8%) reported in the current MP. Revised emission reduction spreadsheet is being submitted as part of this response.

1 st Assessment by Audit Team	Status	Closed	Date	25-May-2023
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1. **In Section 1.1 of MR;** Assessment Team confirms that the PP has corrected that in reference to the VCS program definitions v4.3, the grouped project can be classified either into “project” or “large project”. Therefore term “small-scale” has been removed from section 1.1. of the MR.
2. **In Section 1.1 of MR;** Assessment Team confirms that the PP has corrected that the time period corresponding to second MP under VCS has been added in Table 2 of the revised MR. Total years under VCS verification has been stated as two years as it is inclusive of the second verification period, i.e., 01-June-2022 to 31-December-2022(both start date and end date included).
3. **In Section 2.2 of MR;** Assessment Team confirms that the PP has corrected that the since there is no specific format for dates to be mentioned in section 2.2 of the MR, the date format has been kept as DD-Month-YYYY in line with format recommended for other relevant sections of the MR template version 4.2.
4. **In Section 3.3 of MR;** Assessment Team confirms that the PP has corrected that the PP has made clarifications with evidences that how the 6 PAIs whose energy savings exceed 0.6 GWh is provided with all instances references and that previously stated in Table 7, sub point 3 of point 8 under Capacity Limit, No PAIs have the same electricity subdivision. As per point 3 in section 3.6.9 of the VCS standard v4.4, “Instances that are not within one kilometres of any other instance shall not be assigned to clusters”. These instances need not be divided into clusters as no two PAIs lie with one kilometre of each other
5. **In Section 4.2 of MR;** Assessment Team confirms that the PP has elaborated that the upper and lower cut-off range was identified to remove outliers. The upper cut-off range was calculated as 1.5 times the interquartile range (IQR) added to the third quartile. In this scenario, the upper bound is determined to be 14.4118. The lower cut-off range, on the other hand, was calculated as 1.5 times the IQR subtracted from the first quartile. In this case, the lower bound is determined to be -0.8271. Same can be verified from the operating hours calculation spreadsheet submitted to the VVB. Further, as part of the quality control on the data collected, the reliability calculation was performed, Reliability levels were set at 95% confidence and 10% precision. The required confidence and precision were met for this parameter. Hence acceptable to the assessment team
6. **In Section 4.3 of MR;** Assessment Team confirms that the PP has elaborated the procedure applied for conservative assumptions, better explanations have been provided in the MR.
7. **In Section 4.3 of MR;** Assessment Team confirms that the PP has confirmed that Based on the data shared higher values chosen: 72%,137%,198% and 2% for 7W,9W,12W and 14 W respectively is elaborated in MR and also the calculation was cross-verified by the VKU assessment team.
8. **In Section 4.3 of MR;** Assessment Team confirms that the PP has provided/Incorporated the formula/equation stated in spreadsheet here for traceability purposes towards determination of the precision level achieved.
9. **In Section 5.1 of MR;** Assessment Team confirms that the PP has updated & elaborated the sampling confidence interval with the previous confidence interval of 95/10. clarify.
10. **In Section 5.1 of MR;** Assessment Team confirms that the PP has used the decimal digits as per international conventions.
11. **In Section 5.4 of MR;** Assessment Team confirms that the PP has clarified how the loss rate of less than 5% results in cumulative drop of 08% ER from the estimated ER of PD. The required calculations have been provided in version 03 of ER Sheet submitted by PP to verification team.

Hence CAR#04 is closed successfully

Type		Date	DD/MM/YYYY	
FAR		Reference		
Description of the Non-Conformance				
1st Response from PP		Date	DD/MM/YYYY	
1st Assessment by Audit Team	Status	Open/Closed	Date	DD/MM/YYYY

APPENDIX C: COMPETENCE STATEMENTS

Team Leader



Certification Pvt. Ltd.

VKU.F50W. Competence Statement

COMPETENCE STATEMENT

Name	Barun Kumar
Nationality	Indian
Countries of Experience	India, South Africa, Kenya, Uganda, DR Congo, Zambia
Education Qualification	B.Sc. (Environmental Science & Water Management) M.Sc. (Ecology & Environmental Sciences)
Year of Experience	12 Years +
Area of Expertise	Climate Change & Environment
Eligible Sectoral Scope	TA 1.2 - Renewables TA 3.1 - Energy Demand TA 6.1 - Construction TA 7.1 - Transport

Roles

Project Trainee	NO
Validator/Verifier Trainee	NO
Validator	NO
Verifier	NO
Team Leader	YES
Technical Reviewer	YES
Local Expert (Country Wise)	NO
TA Expert (1.2, 3.1, 6.1, 7.1)	YES
Financial Expert	NO

Reviewed by	Vandana Gupta (Quality Manager)	Date	06/12/2022
Approved by	Vivek Kumar Ahirwar (Technical Manager)	Date	06/12/2022

Validator/Verifier-Trainee-



Certification Pvt. Ltd.

VKU.F50W. Competence Statement

COMPETENCE STATEMENT

Name	Niharika Kaushik
Nationality	Indian
Countries of Experience	India
Education Qualification	B.Sc. (Zoology Honours) M.Sc. (Environmental Sciences)
Year of Experience	2.5+ Years
Area of Expertise	Climate Change & Environment
Eligible Sectoral Scope	NA

Roles

Project Trainee	NO
Validator/Verifier Trainee	YES
Validator	NO
Verifier	NO
Team Leader	NO
Technical Reviewer	NO
Local Expert	NO
TA Expert (X.X)	NO
Financial Expert	NO

Reviewed by	Vandana Gupta (Quality Manager)	Date	02.02.2023
Approved by	Vivek Kumar Ahirwar (Technical Manager)	Date	02.02.2023

Project Trainee-



Certification Pvt. Ltd.

VKU.F50W. Competence Statement

COMPETENCE STATEMENT

Name	Anil Dhankar
Nationality	Indian
Countries of Experience	India
Education Qualification	B.Sc. (BCZ) M.Sc. (Environmental Science)
Year of Experience	NA, Fresher
Area of Expertise	Climate Change & Environment
Eligible Sectoral Scope	NA

Roles

Project Trainee	YES
Validator/Verifier Trainee	NO
Validator	NO
Verifier	NO
Team Leader	NO
Technical Reviewer	NO
Local Expert (Country Wise)	NO
TA Expert (X.X)	NO
Financial Expert	NO

Reviewed by	Vandana Gupta (Quality Manager)	Date	06/12/2022
Approved by	Vivek Kumar Ahirwar (Technical Manager)	Date	06/12/2022

Technical Reviewer-



Certification Pvt. Ltd.

VKU.F50W. Competence Statement

COMPETENCE STATEMENT

Name	Sanjay Kumar K
Nationality	Indian
Countries of Experience	India
Education Qualification	B.E. (Civil Engineering) M. Tech (Environmental Engineering)
Year of Experience	20 Years +
Area of Expertise	Climate Change & Environment Sustainable Development GHG Footprints
Eligible Sectoral Scope	TA 1.2 - Renewables TA 3.1 - Energy Demand TA 6.1 - Construction

Roles

Project Trainee	NO
Validator/Verifier Trainee	NO
Validator	YES
Verifier	YES
Team Leader	YES
Technical Reviewer	YES
Local Expert (Country Wise)	YES
TA Expert (1.2, 3.1, 6.1)	YES
Financial Expert	YES

Reviewed by	Vandana Gupta (Quality Manager)	Date	03.03.2023
Approved by	Vivek Kumar Ahirwar (Technical Manager)	Date	03.03.2023