



**Verified Carbon
Standard**

SHINE – DISTRIBUTION OF LED LIGHTBULBS IN INDIA -2

Brightspark Energy Private Limited

(Indian Subsidiary and Project Management Entity of CQC LLC)

Project Title	SHINE- Distribution of LED Lightbulbs in India -2
Version	3.0
Report ID	VCS 2608- MP02
Date of Issue	24-May-2023
Project ID	2608
Monitoring Period	01-June-2022 to 31-December-2022 (both dates inclusive)
Prepared By	Brightspark Energy Private Limited (Indian Subsidiary and Project Management Entity of CQC LLC)
Contact	Level 14 & 15, Concorde Towers, UB City, 1 Vittal Mallya Road, Bangalore, Karnataka Email: TGoswami@cquestcapital.com Email: cqc-operations@cquestcapital.com

CONTENTS

1	PROJECT DETAILS.....	4
1.1	Summary Description of the Implementation Status of the Project.....	4
1.2	Sectoral Scope and Project Type.....	7
1.3	Project Proponent	7
1.4	Other Entities Involved in the Project	7
1.5	Project Start Date	8
1.6	Project Crediting Period	8
1.7	Project Location.....	9
1.8	Title and Reference of Methodology	10
1.9	Participation under other GHG Programs	11
1.10	Other Forms of Credit and Supply Chain (Scope 3) Emissions	12
1.11	Sustainable Development Contributions.....	12
2	SAFEGUARDS	15
2.1	No Net Harm	15
2.2	Local Stakeholder Consultation	15
2.3	AFOLU-Specific Safeguards	17
3	IMPLEMENTATION STATUS	17
3.1	Implementation Status of the Project Activity	17
3.2	Deviations	22
3.3	Grouped Projects	22
4	DATA AND PARAMETERS.....	27
4.1	Data and Parameters Available at Validation.....	27
4.2	Data and Parameters Monitored.....	30
4.3	Monitoring Plan.....	36
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	45
5.1	Baseline Emissions	45
5.2	Project Emissions	48
5.3	Leakage.....	50
5.4	Net GHG Emission Reductions and Removals	50
	APPENDIX A: LIST OF ABBREVIATIONS	53

APPENDIX B: REQUIREMENTS UNDER SECTION 1.10 OF MR.....	54
APPENDIX C: CALCULATIONS FOR AVOIDANCE OF ICL WASTE BY DISTRIBUTION OF LED	58

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

A summary description of the implementation status of the technologies/ measures (e.g., plant, equipment, process, or management or conservation measure) included in the project.

The grouped project (henceforth referred to as SHINE CPA 2) has already been registered as CPA 10484-P1-0002-CP1¹ under registered CDM Programme of Activities (PoA) 10484 titled: "SHINE – Distribution of LED Lightbulbs in India" which envisaged distribution of Light Emitting Diodes (LEDs) for domestic lighting in North-East Indian states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. Further, CPA 10484-P1-0002-CP1² was a standalone CPA under CDM, and it was transitioned as a grouped project to VCS. The gap validation process was carried out in accordance with the requirements and relevant guidelines under VCS and the project was subsequently registered as VCS 2608³. Please refer to Table 2 in this section for more details on the audit history of this project.

The wattage of baseline lamps to be replaced has been at the sole discretion of the Project Proponent/ Implementer, as well as the decision on wattage of project lamp to replace a specific wattage of baseline lamp has also been with the Project Proponent/ Implementer as long as it is in compliance with applicability criteria set out in the applied CDM methodology namely the service level (which for lighting projects is light output) of the project equipment being between 90 to 150 per cent of the service level of baseline equipment.

Thus, under this grouped project, 60 W ICL have been replaced with 7 W/9 W LED and/or 100 W ICL with 12 W/14 W LED as the lumen output is within the specified limit. Each household has received maximum six LEDs and minimum one LED (7 W/9 W or 12 W/14 W) under this grouped project. Total 1,411,863 LEDs have been distributed to 246,104 grid connected households in the state of Assam and Tripura till 31-July-2021. No further distribution of project LEDs has been carried out or planned after 31-July-2021 under this grouped project. 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. The six project activity instances are briefly described below:

- i. SHINE CPA 2 PAI 1: This instance covers the Dhalai-Khowai division in Tripura.
- ii. SHINE CPA 2 PAI 2: This instance also pertains to Tripura but covers the Dharmanagar-Unakoti division.

¹ https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/AEY3HMDLOF95RCP6SWIGVNZU82TKBQ/view

² https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/AEY3HMDLOF95RCP6SWIGVNZU82TKBQ/view

³ <https://registry.terra.org/app/projectDetail/VCS/2608>

- 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.

Please refer Section 3.1 for details regarding each project activity instance under this grouped project.

The relevant implementation dates (e.g., dates of construction, commissioning, and continued operation periods).

Table 1: Implementation Dates for VCS 2608

Date of first LED installed	12-August-2018	A total of 9 LEDs were installed on 12-August-2018 in Dharmanagar-Unakoti division in Tripura. These included a total of 3 LEDs of 9 W and 6 LEDs of 14 W.
Date of last LED installed	31-July-2021	A total of 135 LEDs were installed on 31-July-2021 in lower Assam. These included a total of 66 LEDs of 7 W and 69 LEDs of 12 W.
First ex post VCS Monitoring Survey dates ⁴	07- July-2022 to 12-July-2022	Not Applicable
Monitoring Periods for which CER issuance has been received under CDM	<u>CDM MP 1: 12-January 2020 to 15-March-2020</u> ⁵ (inclusive of both dates)	Not Applicable

⁴ As per the monitoring requirement under the applied methodology, $n_{i \text{ operational}}$ is required to be monitored annually. Therefore first VCS Monitoring survey results are also applicable for the current monitoring period.

⁵ <https://cdm.unfccc.int/UserManagement/FileStorage/PB4VG50R7UX8CI0KJEHFZ192DLYQ6W>

	<u>CDM MP 2: 16-March-2020 to 31-July-2020⁶</u> (inclusive of both dates) <u>CDM MP 3: 01-August-2020 to 31-December-2020⁷</u> (inclusive of both dates)	
1 st Monitoring Period under VCS for which VCU issuance has been received under VCS	01-January-2021 to 31-May-2022 (inclusive of both dates)	A total 1,411,863 LEDs were installed till 31-July-2021 under the first monitoring period in Assam and Tripura.
2 nd Monitoring Period under VCS	01-June-2022 to 31-December-2022(inclusive of both dates)	No LED distribution has been carried out under the second monitoring period.

The total GHG emission reductions or removals generated in this monitoring period.

Total emission reduction achieved from all project activity instances under this grouped project is 121,546 tCO₂e over the monitoring period of 01-June-2022 to 31-December-2022(inclusive of both dates).

Table 2: Audit history of the grouped project -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 (both days included)	CDM	Earthood Services Private Limited	0.42 year or 5 months

⁶ <https://cdm.unfccc.int/UserManagement/FileStorage/2FBIPHVALR7KTW30QN9YX4EUZ106M8>

⁷ <https://cdm.unfccc.int/UserManagement/FileStorage/ZR721LXMAE3GBF8DS9K6HC5QYJNTU4>

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	0.65 year or 7 months
Total	-	-	-	2 years (under VCS verification)

1.2 Sectoral Scope and Project Type

Sectoral scope: 03 Energy Demand.

Project type: Type II – Energy Efficiency improvement project.

Grouped Project: Yes

The grouped project is a non-AFOLU project.

1.3 Project Proponent

Organization name	Brightspark Energy Private Limited (Indian subsidiary and project management entity of CQC LLC)
Contact person	Tridip Kumar Goswami
Title	Managing Director
Address	Level 14 & 15, Concorde Towers, UB City, 1 Vittal Mallya Road, Bangalore, Karnataka
Telephone	+ 91 8075519856
Email	TGoswami@cquestcapital.com cqc-operations@cquestcapital.com

1.4 Other Entities Involved in the Project

Organization name	Ecoeye Co., Ltd.
-------------------	------------------

Role in the Project	Project Financing
Contact person	Sangsun HA
Title	Executive Director
Address	61, Yeouinaru-ro, Yeongdeungpo-gu, Seoul, Republic of Korea
Telephone	+82-2-6480-7346
Email	Sangsun_ha@ecoeye.com

Organization name	Korea Impact Carbon Corporation
Role in the Project	Project financing
Contact person	Sangsun HA
Title	Chief Executing Officer
Address	#704(3rd room), 70 Dusan-ro, Geumcheon-gu, Seoul, Republic of Korea
Telephone	+82- 2-6480-7346
Email	Sangsun_ha@ecoeye.com

1.5 Project Start Date

Project start date refers to the date on which the project began generating GHG emission reductions or removals as per VCS Program Definitions v4.3.

The grouped project is a non-AFOLU project, and the first energy efficient LED has been distributed on 12-August-2018 under this grouped project. Thus, the project start date is considered as 12-August-2018.

1.6 Project Crediting Period

Project Crediting Period refers to the date on which the project began generating GHG emission reductions or removals; equal to "Project Start Date", as per VCS Program Definitions v4.3.

Fixed Crediting Period: 10 years

Crediting Period Start Date: 12-August-2018

Crediting Period End Date: 11-August-2028

1.7 Project Location

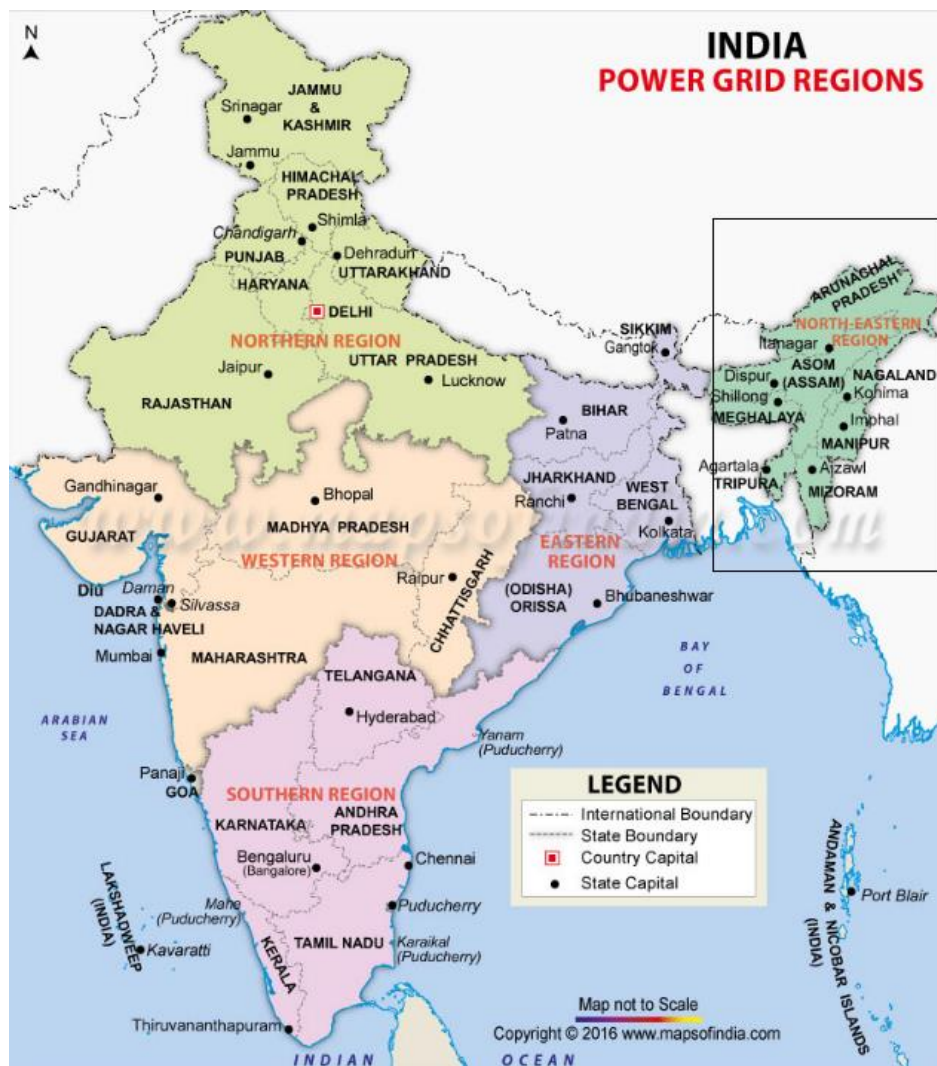
Under this grouped project, the LED distribution was envisaged to be carried out within the North-East Indian states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. These states comprise the Northeastern Grid circle in the grid map of India. The coordinates of each one of them are:

Table 3: Coordinates of Project Location

State	Latitude ⁸	Longitude
Arunachal Pradesh	27° 03' N	93° 22' E
Assam	26° 14' N	92° 32' E
Manipur	24° 44' N	93° 58' E
Meghalaya	25° 30' N	91° 00' E
Mizoram	23° 9' N	92° 56' E
Nagaland	26° 00' N	94° 20' E
Tripura	23° 45' N	91° 30' E

However, all the project activity instances under this grouped project have been implemented in the state of Assam and Tripura only. No further distribution of project devices has been planned under this grouped project by the Project Proponent.

⁸ https://www.mapsofindia.com/lat_long/



Grid Map of India

1.8 Title and Reference of Methodology

AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0.

The project has also referred to following documents:

- Methodology: AMS-I. D: Grid connected renewable electricity generation; Version 18.0⁹
- Standard: CDM project standard for Programmes of activities Version 02.0¹⁰
- Methodological tool 19: Demonstration of additionality of microscale project activities Version 09.0¹¹

⁹ <https://cdm.unfccc.int/UserManagement/FileStorage/2P7FS6ZQAR84LG3NMKYUH50WI90DBC>

¹⁰ https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20181221092036152/Reg_stan03v02.pdf

¹¹ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-19-v9.pdf>

- Methodological tool 21: Demonstration of additionality of small-scale project activities Version 12.0¹²
- Guideline: General guidelines for SSC CDM methodologies Version 22.1

1.9 Participation under other GHG Programs

The “SHINE – Distribution of LED Lightbulbs in India-2” is registered as a Small-Scale Component Project Activity under the Clean Development Mechanism (CDM) and under the Programme of Activities “SHINE – Distribution of LED Lightbulbs in India” (Ref. PoA 10484).¹³ Evidence has been provided to the VVB that the emissions reductions arising from this program are not double counted under the CDM and VCS, considering the issuance under VCS for the current monitoring period.

The project has not been submitted for validation/certification under any other GHG or environmentally related program or mechanism except CDM, so it is not eligible to create another form of GHG-related environmental credit other than CERs and VCUs. Details regarding previous 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-CP1¹⁴ under CDM have been mentioned below for ready reference.

Table 4: Previous issuance of CERs under CDM for CPA 10484-P1-0002-CP1¹⁵

1 st monitoring period (CDM)	12-January-2020 to 15-March-2020 (Including both days)	260 CERs Issued ¹⁶
2 nd monitoring period (CDM)	16-March-2020 to 31-July-2020 (Including both days)	3,027 CERs Issued ¹⁷
3 rd monitoring period (CDM)	01-August-2020 to 31-December-2020 (Including both days)	37,026 CERs Issued ¹⁸

¹² <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v12.pdf>

¹³ CDM documentation can be accessed through: https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/MN26BFZ0CHPIR47G01L3YES9XVKTUD/view (PoA) and https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/AEY3HMDLOF95RCP6SWIGVNZU82TKBQ/view (SHINE – Distribution of LED Lightbulbs in India-2).

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

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

¹⁶ Monitoring Report for SHINE- Distribution of LED Lightbulbs in India dated 26-March-2020, p.20, refer to CERs for 10484-P1-0002-CP1 <https://cdm.unfccc.int/UserManagement/FileStorage/PB4VG5OR7UX8CIOKEHFZ192DLYQ6W>

¹⁷ Monitoring Report for SHINE- Distribution of LED Lightbulbs in India dated 26-November-2020, p.28, refer to CERs for 10484-P1-0002-CP1 <https://cdm.unfccc.int/UserManagement/FileStorage/2FBIPHVALR7KTW30QN9YX4EUZ106M8>

¹⁸ Monitoring Report for SHINE- Distribution of LED Lightbulbs in India dated 17-September-2021, p.28, refer to CERs for 10484-P1-0002-CP1 <https://cdm.unfccc.int/UserManagement/FileStorage/ZR721LXMAE3GBF8DS9K6HC5QYJNTU4>

1.10 Other Forms of Credit and Supply Chain (Scope 3) Emissions

Emission Trading Programs and Other Binding Limits:

The project didn't reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading.

Other Forms of Environmental Credit:

The project has not sought or received another form of GHG-related environmental credit, including renewable energy certificates.

Further in line with section 3.23.9 of the VCS Standard, version 4.4, the "producer(s) or retailer(s) of the impacted good or service are known but not involved in the project or do not have a website".

PP has informed the distribution agencies that the Verified Carbon Units (VCUs) maybe issued for the greenhouse gas emission reductions and removals under this grouped project. For these VCUs, the PP will be claiming carbon credits under VERRA. Evidence of the emails and public statement has been submitted to the VVB during verification of the project as well as added in the Appendix B of the MR.

1.11 Sustainable Development Contributions

Under this grouped project, distribution of LED bulbs has been carried out in grid connected households located in Assam and Tripura. The distribution of LED bulbs aligns with SDG 7 (affordable and clean energy) by increasing LED adoption, reducing fossil fuel use in thermal power plants due to reduced electricity demand, and promoting affordability. It also aligns with SDG 12 (responsible consumption and production) by reducing failed ICL waste generation and SDG 13 (climate action) by resulting in emission reductions.

PP would like to clarify that the contributions over project lifetime are 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 for MP 1. Therefore, details regarding SDGs contributions for only the current, i.e., second monitoring period specific data has been reported in Table 5. Further evidence corresponding to the current project contributions have been submitted to the VVB at the time of verification.

Table 5: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1	7.1	7.1.2 Proportion of population with primary reliance on clean fuels and technology	Implemented activities to increase	Completed one-to-one replacement of ICLs with energy efficient LEDs in 246,104 grid connected households located in Assam and Tripura. Total 1,366,198 project LEDs are operational during the second monitoring period, further confirmed through monitoring survey.	Contributions over the project lifetime are equivalent to the project contribution in the second monitoring period. The project has cumulatively contributed to providing access to affordable, reliable, and sustainable modern energy by one-to-one replacement of ICLs with 1,366,198 operational energy efficient LEDs in 246,104 grid connected households located in Assam and Tripura.
2	12.5	Project Specific Indicator: Volume of ICL generated	Implemented activities to decrease	Approximately waste generation of 1 failed ICL is estimated to be reduced by use of 1 LED per grid connected household over the second monitoring period ¹⁹ . Contributed to reducing waste generation of approximately 1,366,198 ICLs under the second monitoring period. distribution of LEDs.	Contributions over the project lifetime are equivalent to the project contribution in the second monitoring period. The project has cumulatively contributed to reducing waste generation of approximately 1,366,198 ICLs by distribution of LEDs.

¹⁹ Please refer to appendix C of this MR for detailed calculations regarding volume of failed ICL avoided in this grouped project.

3	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	Contributed to GHG emission reduction of 121,546 tCO2e over the current monitoring period.	Contributions over the project lifetime are equivalent to the project contribution in the second monitoring period. The grouped project has contributed to GHG emission reduction of 121,546 tCO2e under VCS.
---	------	---	------------------------------------	--	---

2 SAFEGUARDS

2.1 No Net Harm

Under this grouped project, grid connected households were envisaged to be provided with highly subsidized LEDs as a replacement of the ICLs or fluorescent lamps, thereby leading to reduction in GHG emissions through avoided use of fossil fuels ensuing from reduced consumption of electricity. In addition to reduced GHG emissions, the program will also result in reduced waste generation as LEDs last 25-50 times longer than the ICLs²⁰ and do not contain toxic mercury as is the case with compact fluorescent lamp. Further, 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. The replaced ICLs from the LED recipient households were stored in boxes according to their wattage and clearly labelled. These boxes were then transferred to centrally designated storage facilities. PP has an agreement with the waste disposal agency for the safe destruction of the collected ICLs. This agency has collected the stored ICLs from the storage facility and destroyed them as per the legal norms of the Government of India. Proper handling and disposal procedures were implemented to ensure that the ICL destruction process has no negative impact on the environment. Further, ICL destruction certificates, certificate of taking over/handing over of ICL, inventory list of handling of ICLs were issued by the disposal agency which have been submitted to the VVB to ensure that the disposal was carried out in a safe and appropriate manner.

Therefore, the LEDs distributed under this project presents positive environmental impacts wherever they are applied, and no negative environmental impacts have been identified during this monitoring period.

2.2 Local Stakeholder Consultation

The local stakeholder consultation was done at PoA level, prior to the registration of the PoA. Key institutional stakeholders like Standard making bodies, Manufacturers of LEDs and Electricity regulatory bodies act at the National level, so do leading NGOs active in this field. Moreover, the CDM PoA covers pan India. In view of the above, the stakeholder opinion has been sought at PoA level. This has been done through stakeholder meeting that was organized on 07-March-2018 in Hyderabad, India.

A list of invitees was made prior to the stakeholder's consultation meeting. They were then contacted through calls, e-mails, public advertisements and follow-ups via word of mouth to ensure maximum participation. The stakeholder meeting was well attended, and the participants

²⁰ EESL Toolkit for DSM based Efficient Lighting Programme, p.12 which can be accessed here - [DELP Toolkit_final.pdf \(radiantharoti.com\)](#).

were actively involved. Through this meeting, it was evident to the PP representatives that not only did the stakeholders embrace the concept, but they also wanted to be educated about the product and kept in the loop regarding information about the success of project. Overall, the PP representatives believe the engagement was robust and beneficial to all parties involved. The program got positive feedback and participants appreciated the PP's efforts for this community-based project which in addition to reducing the GHGs would also lead to improvement in living condition owing to better lighting facilities.

The outcomes from the local stakeholder consultation are available in Section F of the CDM PoA-DD²¹.

A systematic feedback and grievance redressal mechanism is in place under the purview of the project to address all the issues and challenges experienced by the beneficiaries.

PP conducts regular surveillance to observe that project LEDs are functioning properly and to get feedback from stakeholders on LED usage and its benefits. Also, LED users can contact Project Proponent for any concerns /comments on the project or project LEDs through consumer care number. The distributed LEDs carry a warranty of three years. If within this period, the bulb becomes non-functional then the project implementer will replace it free of cost at LED Replacement Centers.

The process for exchanging LED(s) under warranty has been summarized in the following steps. Firstly, the end user must contact the Distribution Agency or their designated representative using the provided consumer care number. They will then be guided to bring the faulty LED(s) and a copy of the electricity bill for service number verification to the replacement center service counter. Upon receipt of the faulty LED(s), the agent will check them for failure and verify the service number in the bill against the distribution database to ensure that the user was covered and that the claim is within the warranty period. If all conditions are met and the claim is genuine, the agent will replace the faulty LED(s) with a new equivalent LED and record the exchange in grievance register. This ensures that the user receives a satisfactory resolution to their issue with minimal hassle.

In the current monitoring period, 9 grievances were received from end users regarding fused LEDs. All complaints were reported to the Distribution Agency which further provided new LED to the end-users, in line with the grievance redressal process elaborated above. Upon resolution of the grievances, feedback from the end user against each complaint was recorded. Grievance redressal records have been provided to the verifying VVB.

Further, no project design change has been made by the Project Proponent under the current monitoring period.

²¹ https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/MN26BFZ0CHPIR47GQ1L3YES9XVKTUD/view (PoA)

2.3 AFOLU-Specific Safeguards

This section is not applicable as the grouped project is a non-AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

Maximum number of six project LEDs have been distributed per grid connected household under this grouped project. Total 1,411,863 LEDs have been distributed to 246,104 grid connected households located in the state of Assam and Tripura, till 31-July-2021. The last date on which the LED was distributed under the current monitoring period was 31-July-2021. No further distribution of LEDs has been carried out or planned after 31-July-2021 by the Project Proponent under this grouped project. The aggregate energy savings by a single project activity instance does not exceed the equivalent of 60 GWh per year as mentioned in applicable methodology- AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0. Please refer emission reduction spreadsheet for detailed calculations related to instance level Energy Savings. Total number of LEDs distributed and corresponding energy savings under this grouped project have been summarised instance wise below for ready reference:

Table 6: 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	-

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-



Image of LED Bulb with Shine LOGO

Technical Specification of 7 W LED bulb	
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 60 W (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

Technical Specification of 9 W LED bulb	
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 60 W (715 lm 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

Technical Specification of 14 W LED bulb	
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 100 W (1350 lm 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

Technical Specification of 12 W LED bulb	
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 100 W (1350 lm as per methodology)	99% of lumen output

Power Factor	0.90
Average Life	25,000 hrs

3.2 Deviations

3.2.1 Methodology Deviations

The project did not apply any methodology deviation under the current monitoring period. Further, no methodology deviations were applied during the previous verification and validation under this grouped project.

3.2.2 Project Description Deviations

The project did not apply any project description deviation under the current monitoring period. Further no project description deviations were applied during previous verification and validation under the grouped project.

3.3 Grouped Projects

There are six project activity instances under this grouped project, based on the electricity division and subdivision in Assam and Tripura. The six project activity instances are briefly described below:

- i. SHINE CPA 2 PAI 1: This instance covers the Dhalai-Khowai division in Tripura.
- ii. 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.

Each instance under this grouped project meets the eligibility criteria for the current monitoring period as stated below-

Table 7: Compliance of eligibility criteria at instance level

S.No.	Criteria	Condition to be met	Supporting Evidence
-------	----------	---------------------	---------------------

1	Methodology	Meet the applicability conditions set out in the methodology applied to the project: The project activity instance shall use ~~AMS-II.C~~ Demand-side energy efficiency activities for specific technologies, Version 15.0. and shall meet all the applicability conditions.	Details of how each project activity instance meets the requirements of the methodology can be confirmed from the registered CPA-DD ²² .
2	Technology	Use the technologies or measures specified in the project description: New LEDs will replace existing incandescent lamp (ICL). The lumen output of the project LEDs would be between 90%-150% of the lumen output of the baseline incandescent lamps.	Technical Specifications of the LEDs provided by manufacturer have been mentioned in section 3.1 of this MR. Test Reports specifying the features such as rated Wattage, Working Voltage, Color Temperature, Initial Lumen, Service level as compared to baseline lamp, Power Factor, Average Life of the LEDs have been provided to the VVB. The issuing authority of the test reports are as follows: • For 12 W & 7 W- 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 12 W & 14 W: The report has been issued by HPL Electric & Power Limited.

²²The methodology under CDM is also valid to be applied and referred under this VCS project (gap validated from CDM to VCS) and being pursued under VERRA. Please refer to section B.1., page 8 of the registered CPA-DD which can be accessed here https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/AEY3HMDLOF95RCP6SWIGVNZU82TKBQ/view

3	Baseline Scenario	New project activity instances are subject to the baseline scenario determined in the project description for the specified project activity and geographic area: The baseline is “continued use of existing luminaries in the households”. This also conforms to paragraph 51 of applied methodology according to which, “assumed baseline scenario is that lighting by the project lamps would have been provided by the lamps collected and replaced by the project activity”.	Baseline Scenario can be confirmed from the section B.3. (page 10) of the registered CPA-DD ²³ .
4	Additionality	Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area: The financial indicator against which the Project activity instances will demonstrate investment barrier, shall be Net present value (NPV).	Project Activity Instance NPV calculation spreadsheet. Same has been submitted to the verifying VVB.
5	Defined geographic area	Occur within one of the designated geographic areas specified in the project description: North-East Indian states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura	Instances under this grouped project were implemented in Assam and Tripura only. No further distribution has been planned by the Project Proponent under this grouped project. Evidence: Project Activity Instance Database containing address of each consumer to which LEDs were distributed.

²³Reference 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/AEY3HMDLOF95RCP6SWIGVNZU82TKBQ/view

6	Ownership	Have evidence of project ownership, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance: A default Beneficiary Agreement for end users including the provision that emission reductions generated by the project activity are owned by the Project Proponent will be provided for project activity instance.	Copy of Consent letter / record of consent given from End user to Project Proponent regarding emission reduction claims.
7	Start Date	The project activity instance start date will be same as or later date than the grouped project start date.	Copies of signed consent letter/record of consent given by End user to PP for first LED distributed under the grouped project. This has been submitted to the verifying VVB.
8	Capacity limit	Where a capacity limit applies to a project activity included in the project, no project activity instance shall exceed such limit: 1. The aggregate energy savings by a single project activity instance shall not exceed the equivalent of 60 GWh per year as mentioned in applicable methodology AMS II-C: Demand-side energy efficiency activities for specific technologies, Version 15.0 2. Each project activity instance that exceeds one percent of the capacity limit (i.e., 0.6 GWh) shall be identified. 3. Such instances shall be divided into clusters, whereby each cluster is comprised of any system of instances such that each instance is within one kilometer of at least	The grouped project consists of six project activity instances based on the electricity division in which LED distribution has been carried out by Project Proponent. Energy Savings from each instance have been calculated and provided in Project Activity Instance ER Spreadsheet. 1. No project activity instance exceeds the equivalent of 60 GWh per year. Same can be verified by the Project Activity Instance ER Spreadsheet being submitted to the VVB. 2. Six Project Activity Instances that exceed

		one other instance in the cluster. Instances that are not within one kilometer of any other instance shall not be assigned to clusters.	one percent of capacity limit have been identified by the Project Proponent. Same can be verified by the Project Activity Instance ER Spreadsheet being submitted to the VVB. 3. The grouped project has been divided into six instances, based on the electricity division and subdivision in which LED distribution has been carried out by Project Proponent. No Project Activity Instance has same electricity subdivisions. Hence, no two Project Activity Instance lies within one kilometer of each other. Therefore, project activity instances under this grouped project are not required to be assigned to clusters. Same can be verified from respective project activity instance database being provided to the VVB.
9	Double counting	The LED distributed in any project activity instance shall be uniquely identifiable based on the distribution records. Each LED distributed will have corresponding end user details (i.e., name, geographical coordinates, address, Unique Identification number etc.).	Project Activity Instance Database containing combination of end user details, consumer number and address of each consumer to which LEDs are distributed.

For each new project activity instance, the above eligibility criteria have been confirmed within the project database at the time of verification.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF _{CO2, ELEC,y}
Data unit	tCO ₂ /MWh
Description	Combined margin emission factor for Indian grid calculated according to equation 16 of methodological tool 07- ' Tool to calculate the emission factor for an electricity system ²⁴ '; version 07
Source of data	CO ₂ Baseline Database for the Indian Power Sector, User Guide; Version 13.0(June 2018) ²⁵
Value applied	0.92
Justification of choice of data or description of measurement methods and procedures applied	The Project Proponent has applied the latest grid emission factor database available on the CEA website and fixed the value ex-ante.
Purpose of Data	Used in calculation of baseline emissions and project emissions
Comments	none

Data / Parameter	Li _{12W}
Data unit	Hours
Description	Rated average operating hours for LED type i
Source of data	Manufacturer 's specification
Value applied	25,000

²⁴ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

²⁵ <https://cea.nic.in/cdm-co2-baseline-database/?lang=en>

Justification of choice of data or description of measurement methods and procedures applied	The value has been determined from independent life-tests of the LEDs as per national standard IS 16012 (Part 2): 2017. The value has been fixed ex-ante.
Purpose of Data	Used in calculation of baseline emissions and project emissions
Comments	none

Data / Parameter	Li 7w
Data unit	Hours
Description	Rated average operating hours for LED type i
Source of data	Manufacturer 's specification
Value applied	25,000
Justification of choice of data or description of measurement methods and procedures applied	The value has been determined from independent life-test reports of the LEDs as per national standard IS 16012 (Part 2): 2017. The value has been fixed ex-ante.
Purpose of Data	Used in calculation of baseline emissions and project emissions
Comments	In reference to section H.3. and H.4 of the registered POA- DD ²⁶ (page 16-17) and section A.3. of the registered CPA-DD ²⁷ (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. The Lumen Output of 7 W LED is within 90 to 150 percent of the lumen output of baseline 60 W ICL being replaced which is in compliance with the applied methodology ²⁸ , and the rated average operating hours are 25,000 hours. Therefore, parameter Li 7w is justified to be considered in the current monitoring period.

Data / Parameter	Li 9w
-------------------------	-------

²⁶ 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

²⁷ 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

²⁸ AMS-II.C.- Demand-side energy efficiency activities for specific technologies, Version 15.0
<https://cdm.unfccc.int/methodologies/DB/7Y44EN2RTD02AJ78JVWCGARE8W64KP>

Data unit	Hours
Description	Rated average operating hours for LED type i
Source of data	Manufacturer 's specification
Value applied	25,000
Justification of choice of data or description of measurement methods and procedures applied	The value has been determined from independent life-test reports of the LEDs as per national standard IS 16012 (Part 2): 2017. The value has been fixed ex-ante.
Purpose of Data	Used in calculation of baseline emissions and project emissions
Comments	none

Data / Parameter	Li 14W
Data unit	Hours
Description	Rated average operating hours for LED type i
Source of data	Manufacturer 's specification
Value applied	25,000
Justification of choice of data or description of measurement methods and procedures applied	The value has been determined from independent life-tests of the LEDs as per national standard IS 16012 (Part 2): 2017. The value has been fixed ex-ante.
Purpose of Data	Used in calculation of baseline emissions and project emissions
Comments	In reference to section H.3. and H.4 of the registered POA- DD ²⁹ (page 16-17) and section A.3. of the registered CPA-DD ³⁰ (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. The Lumen Output of 14 W LED is within 90 to 150 percent of the lumen output of baseline 100 W ICL being replaced is in

²⁹ 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/MN26BFZ0CHPIR47GQ1L3YES9XVKTUD/view

³⁰ 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/AEY3HMDLOF95RCP6SWIGVNZU82TKBQ/view

compliance with the applied methodology³¹, and the rated average operating hours are 25,000 hours. Therefore, parameter Li_{14W} is justified to be considered in the current monitoring period.

4.2 Data and Parameters Monitored

Data / Parameter	n _i baseline (60W) & (100W)
Data unit	Number
Description	Number of pieces of 60 W and 100 W baseline Incandescent Lamps replaced.
Source of data	Actual collection record as stored in database
Description of measurement methods and procedures to be applied	At the time of the exchange of baseline ICL a record was kept of the number of replaced lamps. The data was recorded through a handheld device that relayed it in real time to a central Database Management System.
Frequency of monitoring/recording	Once at the time of project installation
Value applied	60 W- 691,079 100 W- 720,784
Monitoring equipment	none
QA/QC procedures to be applied	Data was collected via smart phone or tablet app module connected to data cloud. This allows data validation checks to be enforced at the point of collection, hence minimizing errors.
Purpose of data	Calculation of baseline emissions
Calculation method	none
Comments	Data will be stored in the Data Management System for at least two years after the crediting period or the last issuance.

Data / Parameter	n _i baseline scrapped (60 W & 100 W)
Data unit	Number
Description	Number of pieces of 60 W and 100 W baseline Incandescent Lamps destroyed.

³¹ AMS-II.C.- Demand-side energy efficiency activities for specific technologies, Version 15.0
<https://cdm.unfccc.int/methodologies/DB/7Y44EN2RTD02AJ78JVWCGARE8W64KP>

Source of data	Actual destruction record
Description of measurement methods and procedures to be applied	The project involved one to one replacement of baseline lamp with project lamp. At the time of the exchange of baseline lamp, a record was kept of the replaced equipment. The collected baseline lamps were stored in separate boxes according to their wattages at a central facility. Each box had suitable labels with information about the type, number and wattage of baseline lamps stored in it. At the time of destruction, the contracted entity has ensured recording and independent verification of scrapped baseline lamps.
Frequency of monitoring/recording	Once
Value applied	60 W- 691,079 100 W- 720,784
Monitoring equipment	None
QA/QC procedures to be applied	Number of baseline lamps that are destroyed will be cross checked with ni baseline (100 W) & (60 W)
Purpose of data	Requirement of the applied methodology
Calculation method	None
Comments	None

Data / Parameter	ni, project (7 W, 9W, 12 W, 14 W)
Data unit	Number
Description	Number of pieces of 7 W, 9 W, 12 W and 14 W project lamps distributed
Source of data	Actual collection record as stored in database
Description of measurement methods and procedures to be applied	Maximum six project LEDs and minimum one project LED have been distributed in each grid connected household of Assam and Tripura. The data was recorded through a handheld device that relayed information in real time to a central Database Management System.
Frequency of monitoring/recording	Once at the time of project installation
Value applied	7 W- 436,333

	9 W- 254,746 12 W- 716,136 14 W- 4,648
Monitoring equipment	Once at the time of project installation
QA/QC procedures to be applied	Data was collected via smart phone or tablet app module connected to data cloud. This allowed data validation checks to be enforced at the point of collection, hence minimizing errors.
Purpose of data	Calculation of project emissions
Calculation method	None
Comments	None

Data / Parameter	$n_{i, \text{operational}}$ (7 W, 9W, 12 W, 14 W)
Data unit	Number
Description	Total number of 7 W, 9 W, 12 W and 14 W project lamps that are operational during monitoring period
Source of data	Ex-post monitoring survey of sample of non-metered households
Description of measurement methods and procedures to be applied	The $n_{i, \text{operational}}$ value is calculated from the results of n_i survey, as follows: • Obtain the ratio of the number project lamps of type 'i' with SHINE logo found installed & operating in the sample households and the number of lamps of type 'i' claimed to be distributed in the sample households • Multiply the ratio obtained by the total number of lamps of type i claimed to be distributed in the CPA area The claimed number of lamps is capped by the number of ICLs destroyed.
Frequency of monitoring/recording	Annually
Value applied	7 W- 418,643 9 W- 254,746 12 W- 688,161 14 W- 4,648

Monitoring equipment	Not applicable
QA/QC procedures to be applied	Monitoring survey was conducted by qualified and experience third party agency in accordance with the requirement of methodology so that the estimate of n_i operational obtained is unbiased and reliable.
Purpose of data	Calculation of baseline and project emissions
Calculation method	None
Comments	None

Data / Parameter	ρ_i (baseline 60 W, 100 W)
Data unit	Watts
Description	Rated power of 60 W and 100 W baseline lamps replaced
Source of data	Actual collection record as stored in the database management system
Description of measurement methods and procedures to be applied	At the time of the exchange of baseline lamp, nameplate data of wattage was recorded for each replaced lamp. The data was recorded through a handheld device that relayed it in real time to a central DMS.
Frequency of monitoring/recording	Once at the time of project installation
Value applied	60 W and 100 W
Monitoring equipment	Once at the time of project installation
QA/QC procedures to be applied	Data was collected via smart phone or tablet app module connected to data cloud. This allowed data validation checks to be enforced at the point of collection, hence minimizing errors.
Purpose of data	Calculation of baseline emissions
Calculation method	none
Comments	none

Data / Parameter	ρ_i (project 7 W, 9 W, 12 W, 14 W)
Data unit	Watts

Description	Rated power of 7 W, 9 W, 12 W, 14 W project LEDs (Watts)
Source of data	Actual distribution record as stored in the database management system
Description of measurement methods and procedures to be applied	Nameplate data for each project lamp was recorded at the time of distribution and was stored in a central Database Management System (DMS)
Frequency of monitoring/recording	Once at the time of project installation
Value applied	7 W, 9 W, 12 W and 14 W
Monitoring equipment	Once at the time of project installation
QA/QC procedures to be applied	Data was collected via smart phone or tablet app module connected to data cloud. This allows data validation checks to be enforced at the point of collection, hence minimizing errors.
Purpose of data	Calculation of project emissions
Calculation method	none
Comments	none

Data / Parameter	Ly
Data unit	Percent
Description	Average annual technical grid losses
Source of data	Default value from methodology AMS- II.C. – version 15.
Description of measurement methods and procedures to be applied	Default value
Frequency of monitoring/recording	Fixed for crediting period
Value applied	10%
Monitoring equipment	Not Applicable
QA/QC procedures to be applied	PP checked technical T&D loss values specific to the individual electricity distribution companies within the project area, using the T&D loss values confirmed by the electricity regulator commissions that oversee these distribution companies. In the

	published tariff orders the technical and non-technical losses were not defined separately, therefore PP has considered 10% value as per the applied methodology.
Purpose of data	Calculation of baseline emissions and project emissions
Calculation method	none
Comments	This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage)

Data / Parameter	0i project (7W)/(9W)/(12W)/(14W) /baseline (60W)/(100W)
Data unit	Hours
Description	Average annual operating hours of type 'i' project/baseline lamp
Source of data	Result obtained from Baseline Survey of Shine CPA 2 (North East)
Description of measurement methods and procedures to be applied	The operating hours were measured continuously for a period of 90 days with the help of run time meters installed on a sample of lighting points. As per <u>SSC 740</u> , the PP is required to monitor either average annual operating hours of project lamps or baseline lamps and not both. The PP has accordingly monitored average operating hours of project lamps. Correction factor has been applied to account for the seasonal variation. The data thus measured was used for calculating average daily operating hours. The value obtained has been multiplied with 365 days to give average annual operating hours of baseline/project lamps. Sample size was determined in accordance to guidelines for Sampling and surveys for CDM project activities and programmes of activities, version 09.
Frequency of monitoring/recording	once, prior to or concurrent with the first ex-post monitoring
Value applied	2346.95
Monitoring equipment	Run Time Meters
QA/QC procedures to be applied	PP had no option for intervention in the logging of data for operating hours. Data cleaning was performed manually after receiving the downloaded data, excluding readings less than 90 days and high-value readings that may indicate errors or malfunction. The conservative approach was taken, and such data were not considered for calculation purposes. Further, The Upper

	& Lower cut off range was identified to remove the outliers and using formulae below: Upper Cut off Range= Third Quartile+ (1.5*Interquartile Range) = 14.4118 Lower Cut off Range= First Quartile- (1.5* Interquartile Range) = - 0.8271. 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.
Purpose of data	Baseline and project emission calculation
Calculation method	none
Comments	data will be stored in the project database for at least two years after the crediting period or the last issuance

4.3 Monitoring Plan

The following section elaborates upon the following key elements of the monitoring plan:

1. As per the applied methodology AMS-II.C.; Version 15.0. (ii), the monitoring plan has been implemented at the following levels:
 - i. Distribution of project LEDs
 - ii. Collection and destruction of baseline lamps
 - iii. Ex-post Monitoring Survey
2. Roles and Responsibilities of the parties
 1. **Monitoring requirements as defined in methodology AMS-II.C.; Version 15.0.**
 - i. **Distribution of project LEDs**

The project has adopted a two-way approach, i.e., kiosk-based approach and direct installations in households to replace the ICLs with LED lightbulbs as represented in the following Figure 1.

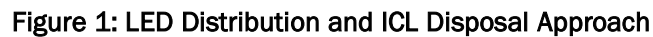


Table 8: Monitoring Parameters under the grouped project

37

	lamps replaced			cloud. This was relayed in real time to a central DMS.		
ρ_i (project 7W, 9W, 12W, 14 W)	Electrical Power Demand of project devices	Watts				
n_i project (7 W, 9W, 12 W, 14 W)	Number of project devices distributed	Number				

ii. Process of collection and destruction of baseline lamps and its documentation:

After the completion of LED installation stage, the collected ICLs were stored in separate boxes according to the wattage and clearly labelled as per their contents. These ICL boxes were transferred to centrally designated ICL storage facilities. Further arrangement was made with ICL waste disposal agency to collect ICLs from these centrally designated storage facilities (collection points) for the destruction of ICLs in safe manner.

At the beginning of the monitoring interval, the PP verified whether the number of distributed LEDs was equal to or less than the number of returned and destroyed ICLs in the grouped project. Following the Random ICL Inspection, all ICLs collected were transported from the collection point to a disposal facility which is qualified and authorized to destroy ICLs (ICL Destruction Facility). Upon arrival at the ICL Destruction Facility, the waste disposal agency has ensured that there has been no change in the total number of ICLs from that recorded at the Collection Point. After the completion of ICL destruction, waste management company issued a "Certificate of Destruction". Further, certificate of taking over/handing over of ICL, inventory list of handling of ICLs were issued by the disposal agency which have been submitted to the VVB to ensure that the disposal was carried out in a safe and appropriate manner.

iii. Ex-post Monitoring Survey and Implementation of Sampling approach:

Monitoring survey was conducted through questionnaires along with physical observations by a competent third party hired by PP.

The following parameters were monitored via ex-post monitoring survey:

Table 9: Monitoring Parameters under the grouped project

Parameter	Description	Data Unit	Monitoring Method	Data Collection Method	Frequency	Sampling
O_i project	Average annual	hours	Remote Survey via	The operating hours was	Once, concurrent	Random samples

	operating hours of project LEDs		data loggers	measured continuously for a period of 90 days with the help of run time meters installed on a sample of lighting points. The data thus measured was used for calculating average annual operating hours.	with the first ex-post monitoring	were collected from each using statistical tools. Sample size was determined to have at least 95% confidence level and 10% maximum margin of error
Number of operational LEDs	Number of group of project LEDs that are operational during time interval 't'	number	Survey through on-site visit by third party monitoring team	Visits to the premises, visual inspection, and interview with the LED user to assess whether: i. LEDs have project logo ii. LEDs were operational	Annual	Simple Random Sampling was carried out as per wattage of LEDs distributed using statistical tools. Sample size was determined to have at least 95% confidence level and 10% maximum

						margin of error
--	--	--	--	--	--	-----------------

Description of the implemented sampling plan:

(i) Sampling Design:

Due to the large number of LEDs distributed as part of the grouped project, it was not economically feasible to monitor each individual LED distributed. Therefore, representative sampling was undertaken that is designed in line with the requirements of the “Standard for sampling and surveys for CDM project activities and programme of activities”, version 09.0.

(ii) Objective and Reliability Requirements:

The objective of the 1st Monitoring Survey under VCS (conducted from 07- July-2022 to 12-July-2022) was to obtain an unbiased and reliable estimate of the proportion parameter $n_{i \text{ operational}}$. It is to be noted that as per the monitoring requirement specified in the applied methodology, $n_{i \text{ operational}}$ is required to be monitored annually. Therefore, the first VCS Monitoring survey conducted in July 2022 for parameter $n_{i \text{ operational}}$ are applicable till month of July 2023. Hence the first monitoring survey results are also applicable for the second monitoring period (01-June-2022 to 31-December-2022, both days included).

Table 10: Monitored Parameters

Parameter	Description of Parameter
$O_{i \text{ project}}$	Operating hours of replaced ICL lamps or installed LEDs using run time meters (monitored once, concurrent with first ex post monitoring survey under CDM)
$n_{i \text{ operational}}$	Number of operational project lamps during the monitoring period (conducted from 07- July-2022 to 12-July-2022)

(iii) Target Population:

The proposed project activities employ a homogenous technology with similar operating characteristics i.e., LED; but are dispersed amongst many DISCOM connected consumers. The target population is the end user representative of the project scenario using the LED technology. A list of end users with contact details is maintained in the Project Database.

(iv) Sampling Frame:

The sampling frame is representative of the population and consists of all households where incandescent bulbs have been replaced by the LEDs under the grouped project.

For each instance, the sample frame is developed from the respective state utility customer account records. The frame consists of currently active accounts with a unique service code. The units in the sampling frame shall meet the following criteria:

- All units will have an alpha/ numerical identifier
- All units can be easily traced –contact information, geographical location or other relevant information of beneficiary is present
- Every element of the population is present only once in the frame
- No elements from outside the population of interest are present in the frame

To prevent information mismatch, the database was checked for duplications and inconsistencies, and necessary corrections were made. Spot checks were conducted to verify the accuracy, before freezing the database for sampling frame.

Where information miss-match is still observed in the sampling frame, conservative assumptions would be applied given below:

- Elimination of duplicate entries: If multiple entries with duplication in the combination of consumer number and end user details are found then only one unique entry would be considered.
- Incomplete Contact Information: Entries with incomplete or missing contact information would be excluded to prevent traceability errors.
- Non-Active Accounts: Non-active or ineligible accounts would be removed from the sampling frame.

(v) Sampling Design

Simple Random Sampling was applied on distribution database for each type of LED wattage (7 W, 9 W, 12 W, 14 W) and samples were randomly selected from the distribution database with the help of online software. Combined monitoring survey was carried out for all project activity instances under this grouped project. It is to be noted that the first monitoring survey which was carried out from 07- July-2022 to 12-July-2022 is also applicable for the current monitoring period since no LEDs have been distributed in the current monitoring period and the parameter $\Pi_{i \text{ operational}}$ is required to be monitored annually as per the requirement of the applied methodology.

Please refer to Table 9 regarding the implementation aspects of monitoring method, approach followed for data collection of monitoring parameters, frequency of monitoring and sampling method applied for monitoring parameters- $O_i \text{ project}$, $\Pi_{i \text{ operational}}$

(vi) Sample Size

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). The sample size calculation spreadsheet is being submitted to the verifying VVB.

Steps followed for the calculation of sample size and instructions provided to the survey team regarding the monitoring survey of each LED wattage type are given below:

1. Required Sample Size of LEDs: The required sample size for each LED wattage type (7 W, 9 W, 12 W, 14 W) was determined. The third column "Required Sample Size of LEDs" in Table 11 indicates the number of LEDs that were calculated to be surveyed for each wattage type.
2. Minimum number of households to be surveyed: The number of households to be surveyed to obtain the required sample size for each wattage type was arrived at by dividing the number of sample LED with the average number of LEDs distributed per household.
3. Number of households to be surveyed including non-response: To account for non-responses due to non-availability of the household, 40% non-response was considered for providing samples to the monitoring survey team based on previous experience.
4. Random selection of households to be surveyed: It is to be noted that the number of households to be surveyed inclusive of 40% non-response has been finally chosen to randomly select households to be surveyed from the distribution database for each type of LED wattage separately.

The sample size calculations for each LED type wattage (7 W, 9 W, 12 W and 14 W) distributed under this grouped project have been summarized below:

Table 11: Calculated Sample Size for monitoring parameter n_i operational

LED Type	Population Size	Required Sample Size of LEDs	Required number of households to be surveyed	Number of households to be surveyed including 40% non-response (rounded up)
7 W	436,333	43	15	25
9 W	254,746	43	15	25
12 W	716,136	43	15	25
14 W	4,648	43	29	49

However, 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). 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. This approach allowed for assessment of operational status of LEDs across the different wattage categories within each surveyed household. The data for actual LEDs surveyed have been subsequently considered for analysis leading to more robust and reliable results. The number of surveyed samples have been summarized in Table 12 below.

For proportional parameters (Number of operational LEDs):

To estimate the number of LEDs to be surveyed with a 10% margin of error at desired confidence level of 95%, the optimal sample size n is given by:

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

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 was carried out as part of first verification under CDM.

Collected data -

The sample site locations which were covered in Assam and Tripura for collecting data as per the monitoring survey have been documented in the survey results spreadsheet being submitted to the VVB and VERRA (Please refer to column K in Sampling survey data spreadsheet). The data collected from the field surveys was compiled into the Excel

spreadsheet and was shared with the VVB. Hard copies of the surveys forms are kept, and the database has a back-up.

Analysis of the collected data:

Data obtained from the samples was used to estimate the values for the parameter described above. The values were then factored into the emissions reduction calculations.

Demonstration of 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 equation³² 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 operational- n_i are being submitted to VERRA for consideration.

The summary is provided in Table 12 below:

Table 12: Summary of Monitoring Survey Results analysis

Grouped Project SHINE CPA 2	Responded Samples			
	7 W LED	9 W LED	12 W LED	14 W LED
Required Sample Size	43	43	43	43
Actual Number of LED Surveyed	74	102	128	44
Number of LED found operational- n_i	71	102	123	44
LED loss rate for this MP	4.05%	0%	3.91%	0%
Precision achieved	0.05%	0%	3.49%	0%

Details regarding Sample estimate for parameter O_i project and reliability check is being submitted in Operating hours Calculation spreadsheet being submitted to the VVB. Sample estimates of both parameters are within the required reliability precision.

2. Roles and Responsibilities of the parties:

The below flow-chart illustrates the roles and responsibilities of the parties during the implementation of the monitoring plan for the project. In the below flowchart, the project implementer is abbreviated to "Imp", and can be the PP or another party authorized by the PP. The key elements of the ex-post monitoring survey approach have also been summarized below:

³² Equation 8, Page 72 of Guidelines for Sampling and Surveys in CDM Project Activities and Programme of Activities (version 04.0)

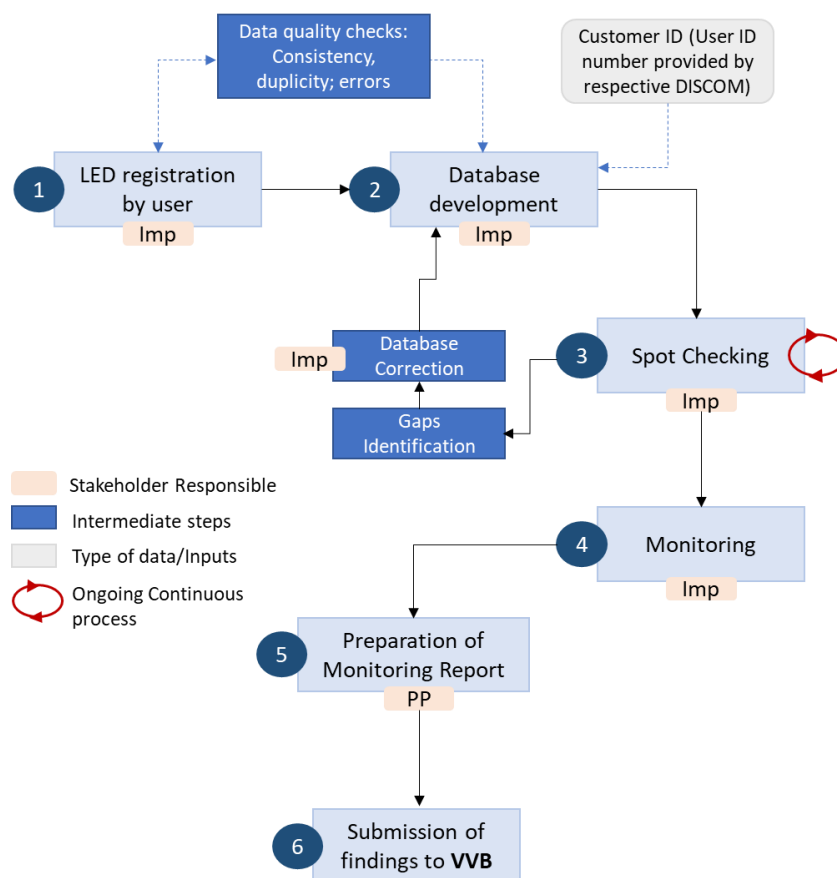


Figure 2: Ex-post Monitoring survey Approach

1. **User registers LED:** The distribution work was undertaken by a third party/Distribution agency commissioned by PP. Project implementer collected/received the necessary information requested in the Registration process from the user. Means of collecting this information was through a registration process performed by ground team under both the types of distribution. In addition to registering the LEDs, a record was also maintained about the number of ICLs collected back from the beneficiaries. The project adopts a one-to-one mapping approach for replacing ICLs with LEDs. PP staff double checked the accuracy of information provided, and request for ground team additional clarifications if needed.
2. **Data logged into database:** Distribution Agency (DA) trained staff had input the data in the database automatically using a digital platform. DA staff double checked the information included on the database and checked for duplications. Any duplicate information has been investigated, and errors corrected or excluded from the database if it is a true duplicate entry.
3. **Spot-checking (ongoing):** Distribution Agency (DA) field staff randomly selected units included in the database and visit or contacted the LED lightbulbs households to cross-check the information on the database with the factual evidence in the field. Any inconsistencies found (e.g., change in the address of a user) were updated on the database, and in the case, LEDs

were found to be no longer in use, they were clearly marked as such and excluded from emission reductions calculations.

4. **Monitoring:** The monitoring survey was undertaken by a third party commissioned by PP. They followed the requirements as per methodology to collect the necessary information for a monitoring report.
5. **Preparation of monitoring report:** The PP prepared the final monitoring report to be provided to the VVB for verification of emission reductions. A copy of the monitoring report will remain with the PP.

Implementation and quality assurance and control and procedures used for handling any internal auditing performed and non-conformities identified: The personnel responsible for monitoring activities possessed several competencies necessary for conducting effective monitoring survey. These competencies included technical knowledge and experience in conducting surveys, data collection and effective communication skills. It is important to note that the personnel also received thorough training which included briefing on the survey form, surveying approach to collect the required data, sample filling of the questionnaire from the project proponent to ensure that they were adequately equipped with the necessary skills and knowledge to perform their monitoring duties effectively.

Further, Project Proponent trained monitoring personnel on monitoring procedures, including provisions for maximizing response rates, documenting out-of-population cases, refusals and other sources of non-response. The monitoring survey included several questions to support the information on the key monitoring parameters. These included visual inspections to confirm LED use, and check of randomly selected households.

The PP coordinates and manages each DA and assist them in implementing each element of the monitoring plan. Also, regular audits conducted throughout the project lifetime ensures proper functioning of LED lightbulb and determination of the lifespan of the same.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 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,

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

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 follows³³-
60 W ICL replaced by 7 W LEDs= 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).

³³ 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.

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).

I_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

For 100 W ICLs replacing 12 W

$$EBL_y = 0.95 \times (0.9609 \times 0.1 \times 2346.95) / (1 - 0.10)$$

$$= 238.07 \text{ kWh}$$

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

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

For 100 W ICLs replacing 14 W

$$EBL_y = 0.95 \times (1.00 \times 0.1 \times 2346.95) / (1 - 0.10)$$

$$= 247.73 \text{ kWh}$$

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

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

For 60 W ICL replacing 7 W

$$EBL_y = 0.95 \times (0.9595 \times 0.06 \times 2346.95) / (1 - 0.10)$$

$$= 142.55 \text{ kWh}$$

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

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

For 60 W ICL replacing 9 W

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

$$= 148.64 \text{ kWh}$$

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

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

5.2 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,

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

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

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

$$PE_{ref,y} = \text{Project emissions from physical leakage of refrigerant from the project equipment in year } y \text{ (tCO}_2\text{e/y)}$$

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

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

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 number³⁴ 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 (2346.95 hours)

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 and 14W) of project lamp and then apportioned according to the working days for each household as per the database in the ER calculation spreadsheet.

For 14 W LEDs

$$= 0.95 \times (1.00 \times 0.014 \times 2346.95) / (1 - 0.10)$$

$$= 34.68 \text{ kWh}$$

$$= 34.68 \times 0.92 / 1000$$

$$= 0.032 \text{ tCO}_2\text{e/LED/year}$$

For 12 W LEDs

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

$$= 28.57 \text{ kWh}$$

$$= 28.57 \times 0.92 / 1000$$

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

For 9 W LEDs

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

³⁴ 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.

$$= 22.30 \text{ kWh}$$

$$= 22.30 \times 0.92 / 1000$$

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

For 7 W LEDs

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

$$= 16.63 \text{ kWh}$$

$$= 16.63 \times 0.92 / 1000$$

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

5.3 Leakage

According to the section 5.6 of the applied methodology, leakage emissions have to be considered if the energy efficiency technology involves equipments transferred from another activity. In the proposed project activity, LEDs that will be distributed to the consumers are not transferred from another activity; hence leakage emissions are not applicable.

5.4 Net GHG Emission Reductions and Removals

The emission reduction by the grouped project have been calculated in accordance with equation 10 in section 5.7 of the small-scale methodology AMS II.C., Version 15.0.

$$ER_y = (BE_y - PE_y) - LE_y$$

Where:

$$ER_y = \text{Emission reductions in year } y \text{ (tCO}_2\text{e)}$$

$$BE_y = \text{Baseline emission in year } y \text{ (tCO}_2\text{e)}$$

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

$$LE_y = \text{Leakage emission in year } y \text{ (tCO}_2\text{e)}$$

Since, Leakage emission considered as Zero (0). Hence,

$$ER_y = BE_y - PE_y$$

Net GHG emission reductions achieved at project activity instance level have been summarized in Table 8 below:

Table 10: Net GHG emission reductions at Project Activity Instance level

Year	Project Activity Instance Number	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 (01-June-2022 to 31-December-2022)	1	17282.69	2103.23	0.00	15179.46
	2	25083.03	16349.75	0.00	8733.28
	3	31340.40	3723.31	0.00	27617.08
	4	27800.97	3444.37	0.00	24356.61
	5	32248.90	3205.00	0.00	29043.91
	6	19021.56	2406.15	0.00	16615.41
	Total (Rounddown)	152,777	31,231	0.00	121,546

Net GHG emission reductions achieved from total project activity instances under this grouped project are summarized below:

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 (01-June-2022 to 31-December-2022)	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/removals under this grouped project are summarized below:

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

Number of Days: 214

Table 13: Comparison of ex-ante and achieved ERR values under MP 2

<u>Ex-ante emissions reductions /removals</u>	<u>Achieved emissions reductions /removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
<u>131,534</u>	121,546	8%	Achieved Emission reductions are lower than the ex-ante emission reductions because of the loss rate considered for LEDs based on monitoring survey result (4.05% for 7 W LEDs and 3.91% for 12 W LEDs). Monitoring survey sheet has been submitted to the VVB for reference wherein the percentage of operational LEDs has been calculated. Details can be referred from Ni, operational (7 W, 9W, 12 W, 14 W) parameter in section 4.2 of the MR.

APPENDIX A: LIST OF ABBREVIATIONS

AMS	Approved small scale Methodology
BEPL	Brightspark Energy Private Limited
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CPA	Component Project Activity
CQC	C-Quest Capital LLC
DA	Distribution Agency
DISCOM	Distribution Company
DMS	Database Management System
ESD	Electricity Sub Division
EIA	Environmental Impact Assessment
GHG	Greenhouse Gas Emissions
ICL	Incandescent Lamps
ISP	Independent Service Providers
LED	Light Emitting Diode
MoEF	Ministry of Environment and Forest
ODP	Ozone Depleting Potential
PAI	Project Activity Instance
PD	Project Description
PP	Project Proponent
SDG	Sustainable Development Goals
SD VISta	Sustainable Development Verified Impact Standard
VCU	Verified Carbon Unit
VCS	Voluntary Carbon Standard
VVB:	Validating and Verifying Body

APPENDIX B: REQUIREMENTS UNDER SECTION 1.10 OF MR

Public Notice for VCS Project 2608

SHINE- Distribution of LED Lightbulbs in India-2

This is to bring to your kind notice that Brightspark Energy Private Limited is implementing a grouped project titled "SHINE- Distribution of LED Lightbulbs in India-2" (VCS ID 2608). It involves the distribution of energy-efficient Light Emitting Diodes (LEDs) to grid-connected households in the states of Assam and Tripura. For this purpose, we had procured LEDs from different manufacturers including HPL Electric & Power Ltd which were further distributed via Kiosk based approach and direct installation in grid-connected households with support of various distributing agencies. These distribution agencies include SEWA, Centre for Research and Development (CRD), MB Enterprises.

Verified Carbon Units (VCUs) may be issued for the Greenhouse Gas emission reductions and removals for which Brightspark Energy Private Limited (BEPL) will be claiming carbon credits under VERRA. Based on the existing carbon rights transfer agreement signed between the parties, BEPL will be sharing the carbon credits generated from this grouped project with the entities i.e., Korea Impact Carbon Corporation (KICC) and Ecoeye Co., Ltd.

This notice intends to apprise you about the project, to avoid any potential risk of double claiming of Scope 3 emissions under this grouped project.

Figure 3: Screenshot of Public Statement on C-Quest Capital Website³⁵

³⁵ <https://cquestcapital.com/latest/public-notices/>

The screenshot of the email sent to distribution agent to avoid double claiming of Scope 3 Emissions under this grouped project are provided below:

Neha Oli

From: Sundeep Mittal
Sent: 25 April 2023 14:05
To: bibekbora123@gmail.com
Cc: Tridip Goswami; Siddhartha Pakrashi; Madhurjya Gogoi; Pooja Verma; Akhilesh Joshi; Arun Sharma; Neha Oli; Divyang Suri
Subject: Scope 3 Emission : SHINE- Distribution of LED Lightbulbs in India

Kind Attention: Bibek Bora (Chairperson)

Dear Sir,

This is to bring to your kind notice that Brightspark Energy Private Limited is implementing grouped projects- "SHINE- Distribution of LED Lightbulbs in India-2" (VCS ID 2608) in Assam, Tripura and "SHINE- Distribution of LED Lightbulbs in India-5" (VCS ID 2695) in Bihar.

These projects involve distribution of energy-efficient Light Emitting Diodes (LEDs) to grid-connected households. For this purpose, we had involved your organisation for supplying LEDs to the end users.

Verified Carbon Units (VCUs) may be issued for the greenhouse gas emission reductions and removals for which Brightspark Energy Private Limited (BEPL) will be claiming carbon credits under VERRA. This mail intends to apprise you about the project, to avoid any potential risk of double claiming of Scope 3 emissions under this grouped project.

Regards,
Sundeep Mittal,
Project Manager
C-Quest Capital Brightspark Energy Pvt Ltd
 Corporate Office: Unit No. 1706-08, 17th Floor, Narain Manzil,
 Barakhamba Road, Connaught Place, New Delhi - 110001
 Regd Add: Level 14 & 15, Concorde Towers, UB City
 1 Vittal Mallya Road, Bangalore, Karnataka - 560 001, India
Mob - +91 9555333414
 Web: <https://cquestcapital.com/>

The information contained in this message and any attachment(s) may be privileged, confidential, proprietary or otherwise protected from disclosure and is intended solely for the use of the individual or entity to whom it is addressed. If you are not the intended recipient, you are hereby notified that any dissemination, distribution, copying or use of this message and any attachment is strictly prohibited and may be unlawful. If you have received this message in error, please notify us immediately by replying to this email and permanently delete the message from your computer.

Nothing contained in this message and/or any attachment(s) constitutes a solicitation or an offer to buy or sell any securities, financial instrument, service, commodity, investment or an official confirmation of any transaction.

Figure 4: Screenshot of email sent to representative from Distribution Agency involved in VCS 2608

Neha Oli

From: Sundeep Mittal
Sent: 26 April 2023 11:45
To: crd4ev@gmail.com; crd4ev@yahoo.com
Cc: Tridip Goswami; Siddhartha Pakrashi; Madhurjya Gogoi; Pooja Verma; Akhilesh Joshi; Arun Sharma; Neha Oli; Divyang Suri
Subject: Scope 3 Emission : SHINE- Distribution of LED Lightbulbs in India

Kind Attention: Dr. Pradip Kumar Sarmah

Dear Sir,

This is to bring to your kind notice that Brightspark Energy Private Limited is implementing grouped project- "SHINE- Distribution of LED Lightbulbs in India-2" (VCS ID 2608) in Assam and Tripura. It involves distribution of energy-efficient Light Emitting Diodes (LEDs) to grid-connected households. For this purpose, we had involved your organisation for supplying LEDs to the end users.

Verified Carbon Units (VCUs) may be issued for the greenhouse gas emission reductions and removals for which Brightspark Energy Private Limited (BEPL) will be claiming carbon credits under VERRA. This mail intends to apprise you about the project, to avoid any potential risk of double claiming of Scope 3 emissions under this grouped project.

Regards,
Sundeep Mittal,
Project Manager
C-Quest Capital Brightspark Energy Pvt Ltd
Corporate Office: Unit No. 1706-08, 17th Floor, Narain Manzil,
Barakhamba Road, Connaught Place, New Delhi - 110001
Regd Add: Level 14 & 15, Concorde Towers, UB City
1 Vittal Mallya Road, Bangalore, Karnataka - 560 001, India
Mob - +91 9555333414
Web: <https://cquestcapital.com/>

The information contained in this message and any attachment(s) may be privileged, confidential, proprietary or otherwise protected from disclosure and is intended solely for the use of the individual or entity to whom it is addressed. If you are not the intended recipient, you are hereby notified that any dissemination, distribution, copying or use of this message and any attachment is strictly prohibited and may be unlawful. If you have received this message in error, please notify us immediately by replying to this email and permanently delete the message from your computer.

Nothing contained in this message and/or any attachment(s) constitutes a solicitation or an offer to buy or sell any securities, financial instrument, service, commodity, investment or an official confirmation of any transaction.

Figure 5: Screenshot of email sent to representative from Distribution Agency involved in VCS 2608

Neha Oli

From: Sundeep Mittal
Sent: 25 April 2023 13:22
To: MB Enterprise
Cc: Tridip Goswami; Siddhartha Pakrashi; Madhurjya Gogoi; Pooja Verma; Akhilesh Joshi; Arun Sharma; Neha Oli; Divyang Suri
Subject: Scope 3 Emission : SHINE- Distribution of LED Lightbulbs in India

Kind Attention: Sanjib Das (CEO)

Dear Sir,

This is to bring to your kind notice that Brightspark Energy Private Limited is implementing grouped projects mentioned below:

- SHINE- Distribution of LED Lightbulbs in India- 2 (VCS ID 2608) in Assam and Tripura
- SHINE- Distribution of LED Lightbulbs in India-6 (VCS ID 2700) in Uttar Pradesh (east)
- SHINE- Distribution of LED Lightbulbs in India-8 (VCS ID 3821) in Karnataka

These projects involve distribution of energy-efficient Light Emitting Diodes (LEDs) to grid-connected households. For this purpose, we had involved your organisation for supplying LEDs to the end users.

Verified Carbon Units (VCUs) may be issued for the greenhouse gas emission reductions and removals for which Brightspark Energy Private Limited (BEPL) will be claiming carbon credits under VERRA. This mail intends to apprise you about the project, to avoid any potential risk of double claiming of Scope 3 emissions under this grouped project.

Regards,
Sundeep Mittal,
Project Manager
C-Quest Capital Brightspark Energy Pvt Ltd
 Corporate Office: Unit No. 1706-08, 17th Floor, Narain Manzil,
 Barakhamba Road, Connaught Place, New Delhi - 110001
 Regd Add: Level 14 & 15, Concorde Towers, UB City
 1 Vittal Mallya Road, Bangalore, Karnataka - 560 001, India
Mob - +91 9555333414
Web: <https://cquestcapital.com/>

The information contained in this message and any attachment(s) may be privileged, confidential, proprietary or otherwise protected from disclosure and is intended solely for the use of the individual or entity to whom it is addressed. If you are not the intended recipient, you are hereby notified that any dissemination, distribution, copying or use of this message and any attachment is strictly prohibited and may be unlawful. If you have received this message in error, please notify us immediately by replying to this email and permanently delete the message from your computer.

Nothing contained in this message and/or any attachment(s) constitutes a solicitation or an offer to buy or sell any securities, financial instrument, service, commodity, investment or an official confirmation of any transaction.

Figure 6: Screenshot of email sent to representative from Distribution Agency involved in VCS 2608

APPENDIX C: CALCULATIONS FOR AVOIDANCE OF ICL WASTE BY DISTRIBUTION OF LED

Current Project Contributions:

The number of days in the current monitoring period (01-June-2022- 31-December-2022, including both dates) is equal to 214 days.

According to the ex-post monitoring survey conducted by PP, operating hours for one Light Emitting Diode (LED) are 2,346.45 hours. The number of hours per day for which LED can be considered operational is equal to $2,346.45 \text{ (hours/ year)}/365 \text{ (days/year)} = 6.43$, roughly 6 hours in a day.

Number of hours in the current monitoring period (01-June-2022 to 31-December-2022, including both dates) for which LED can be considered operational = $214 \text{ days} \times 6 \text{ hours} = 1,284 \text{ hours}$.

According to EESL Toolkit for DSM based Efficient lighting Programme (DELP), (Please refer Page 12)³⁶, working hours for one Incandescent Lamp (ICL) is 1,200 hours.

By replacing one ICL with one LED in a grid connected household, the generation of failed ICLs can be avoided. The number of failed ICL waste avoided by replacing with one LED can hence be calculated as follows:

Dividing the operating hours of LED with Working hours of ICL, i.e., $1284/1200 = 1.07$ that is roughly 1 ICL.

Over the current monitoring period, the total number of ICLs waste avoided by operational LED can be calculated by multiplying the number of the LED distributed and operational (1,366,198) by the number of failed ICLs avoided per household (calculated as 1) i.e., $= 1,366,198 \times 1 = 1,366,198 \text{ ICLs}$.

Cumulative Project Contributions:

Contributions over project lifetime are 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-2022³⁷. dated for MP 1. Therefore, SDGs contributions for only the current, i.e., second monitoring period specific data has been reported in row 2 under Table 5 of this MR.

³⁶ http://radiantharoti.com/docs/DELP_Toolkit_final.pdf

³⁷ 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>