Monitoring report form for CDM programme of activities (Version 04.0)

MONITORING REPORT			
Title of the PoA	SHINE – Distribution of LED Lightbulbs in India		
UNFCCC reference number of the PoA	10484		
Version numbers of the PoA-DD applicable to this monitoring report	07		
Version number of this monitoring report	01		
Completion date of this monitoring report	17/09/2021		
Monitoring period number	Third Monitoring Period		
Duration of this monitoring period	01/08/2020 – 31/12/2020 (both days inclusive)		
Monitoring report number for this monitoring period	01		
Coordinating/managing entity	Brightspark Energy Private Limited		
Host Parties	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)	
	India	Yes	
Applied methodologies and standardized baselines	AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0		
Sectoral scopes	Sectoral Scope 3: Energy demand		
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by all CPAs covered in this monitoring report in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013 until 31 December 2020	Amount achieved from 1 January 2021
	NIL	179,280 tCO_2e	NIL
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the CPA-DDs for the CPAs covered in this monitoring report	230,103 tCO_2e		

PART I Monitoring of programme of activities (PoA)

SECTION A. Description of PoA

A.1. General description of PoA

>>

The purpose of the PoA- "SHINE – Distribution of LED Lightbulbs in India" is to reduce fossil-fuel based electricity consumption in the lighting usage of India's residential and commercial sector by introducing more energy efficient LED lamps/tubes to replace incandescent lightbulbs ("ICLs") and fluorescent lamps (FLs)[1], thereby contributing to the reduction of greenhouse gas emissions.

With a mission to provide energy efficient technology to the poorest communities in India, the PoA is committed towards accelerating the shift from inefficient electricity guzzling ICL (or florescent tubes) to more efficient long-life luminaries such as LEDs. It also addresses the objective of The National Mission for Enhanced Energy Efficiency under the National Action Plan for Climate Change[2].

Brightspark Energy Private Limited (BEPL) is the Coordinating Managing Entity (CME) of this SSC-PoA. Ecoeye Co., Ltd. and Korea Impact Carbon Corporation("KICC") have fully financed all LEDs to be distributed by the CPA implementer at free of cost in each CPA under this PoA. They also have provided all the operation & distribution cost to operate this CPA in a financially sustainable condition. Carbon revenue supports the aforesaid activities, without which these activities and thus this program would not take place.

The LEDs distributed under the scheme would follow the Bureau of Indian Standards (BIS) mandated technical specifications i.e. IS 16102:2012 for self-ballasted LEDs or that of equivalent international standard.

The first LED was registered in August 2018. In the third monitoring period the PoA reduced 179,280 tCO_2e.

A.1.1. Corresponding generic component project activities (CPAs)

Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Sectoral scopes	Applied methodologies and standardized baselines
SHINE – Distribution of LED Lightbulbs in India – XXX	07	Sectoral Scope 3: Energy Demand	AMS-II.C- Demand-side energy efficiency activities for specific technologies, Version 15.0

A.1.2. CPAs included in the PoA

Title and UNFCCC reference number of the CPA	Version of the PoA-DD	Title and reference number of the corresponding generic CPA	Crediting period type and duration	Covered in this monitoring report? (yes/no)
SHINE-Distribution of LED Llightbulbs in India-1 Version 3; 10484-P1-0001-CP1	07	SHINE – Distribution of LED Lightbulbs in India – XXX	Renewable 12/01/2020-11/01/2027	Yes
SHINE-Distribution of LED Llightbulbs in India-2 Version 3; 10484-P1-0002-CP1	07	SHINE – Distribution of LED Lightbulbs in India – XXX	Renewable 12/01/2020-11/01/2027	Yes
SHINE-Distribution of LED Llightbulbs in India-3 Version 3; 10484-P1-0003-CP1	07	SHINE – Distribution of LED Lightbulbs in India – XXX	Renewable 06/03/2020-05/03/2027	Yes

[1] Commonly known as tube-light in India.

[2] https://www.beeindia.gov.in/content/nmeee-1,

SHINE-Distribution of LED Llightbulbs in India-4 Version 3; 10484-P1-0004-CP1	07	SHINE – Distribution of LED Lightbulbs in India – XXX	Renewable 12/01/2020-11/01/2027	Yes

A.2. Coordinating/managing entity

>>
Brightspark Energy Private Limited

SECTION B. Implementation of PoA

B.1. Description of implemented PoA

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a) Definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;

Brightspark Energy Private Limited (BEPL) is the Coordinating/Managing Entity (CME) of the SSC-PoA under which the CPAs are included and currently is the only project participant. Four CPAs have been included in the PoA until the end of the present monitoring period and this monitoring report covers all of them. Ecoeye Co., Ltd. and KICC have been responsible for financing the implementation of the 4 CPAs.

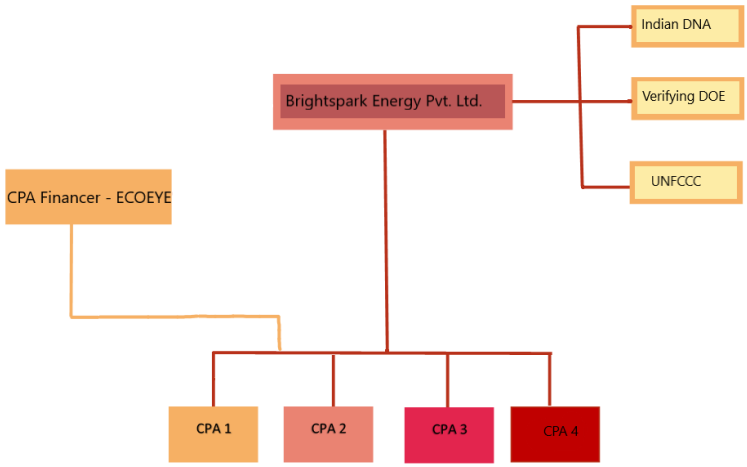

Figure 1: Management Structure of the PoA

BEPL has distributed the LEDs to the households under CPAs, prepared the monitoring report and hired third party for ex-post monitoring surveys. Sampling plan has been implemented individually for each of the four CPAs.

b) Records of arrangements for training and capacity development for personnel

Till the end of the monitoring period, 7W, 9W, 12W and/or 14W LEDs were distributed under 4 CPAs of the PoA. The training on distribution and database management of LEDs was provided by BEPL.

c) A procedure to avoid double counting (e.g., to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another SSC-PoA).

Each LED in each CPA can be identified by a specific geographical location and customer name, as well as the grid connection number allocated to the consumer by the DISCOM. The CPA implementer maintains this database with complete details such as name of the customer, address/ description of location, contact telephone number(s) and grid connection number. Grid connection number is the unique identification for each household.

LEDs replaced under this PoA are marked for clear unique identification. This is important to avoid double counting within the PoA (the same device belonging to two different CPAs of the same PoA);
A logo as shown in section C.1 of this MR is used on each of the LEDs distributed under this PoA.

d) Sampling Approach

For each CPA, sample of consumers were randomly selected from distribution database of respective CPA.

B.2. Post-registration changes to PoA

B.2.1. Corrections

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B.2.2. Inclusion of monitoring plan

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B.2.3. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

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B.2.4. Changes to programme design

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B.2.5. Changes specific to afforestation or reforestation activities

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PART II Monitoring of CPAs

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All the four CPAs included in this monitoring report have common generic CPA, apply the same methodology and have been implemented in the same country, that is India, hence all 4 have been grouped together.

SECTION C. Implementation of CPAs

C.1. Description of implemented CPAs

>>
Each of the four SSC-CPAs developed under the PoA involve distribution and installation of LED lamps within domestic premises in areas where outreach of LED has been minimal owing to unawareness, limited availability of LED technology as well as high upfront cost of the LEDs. Ecoeye Co., Ltd., and Korea Impact Carbon Corporation("KICC") have fully financed all improved LED bulbs distributed to the households, and the total project cost per LED bulb is USD 1.65 including the cost of a LED. This replacement scheme was available only for grid connected consumers who voluntarily decided to be a part of this programme. Door to door distribution was mainly carried out for all the four CPAs, however, in some places distribution through kiosks was also undertaken. The distribution work was undertaken by a third party commissioned by Brightspark Energy Pvt. Ltd.

Individual project activity involved installation of self-ballasted LED to replace existing ICL used in the household. The electronic ballast integrated in the LED is a non-removable part. The table below shows the lumen output and rated lifetime of the LEDs installed in the individual project activity against the replaced ICLs. The project LEDs meet or exceed the rated normal lumen output of the replaced ICL. Lumen output of 7W LED is 100% & 9W LED is 125.87% of the lumen output of 60W ICL, similarly lumen output of 12W LED is 100% and 14W LED is 103.7% of the lumen output of 100W ICL.

	SHINE-Distribution of LED Llightbulbs in India-1; 10484-P1-0001-CP1					
	ICL (baseline)	LED (project)		ICL (baseline)	LED (project)	
Wattage (W)	60	7	9	100	12	14
Lumen output (lm)	715	715	900	1,350	1,350	1,400
Rated Lifetime (hours)	1,000	25,000	25,000	1,000	25,000	25,000
	SHINE-Distribution of LED Llightbulbs in India-2; 10484-P1-0002-CP1					
	ICL (baseline)	LED (project)		ICL (baseline)	LED (project)	
Wattage (W)	60	7	9	100	12	14
Lumen output (lm)	715	715	900	1,350	1,350	1,400
Rated Lifetime (hours)	1,000	25,000	25,000	1,000	25,000	25,000
	SHINE-Distribution of LED Llightbulbs in India-3; 10484-P1-0003-CP1					
	ICL (baseline)	LED (project)		ICL (baseline)	LED (project)	
Wattage (W)	60	7	9	100	12	14
Lumen output (lm)	715	715	900	1,350	1,350	1,400
Rated Lifetime (hours)	1,000	25,000	25,000	1,000	25,000	25,000
	SHINE-Distribution of LED Llightbulbs in India-4; 10484-P1-0004-CP1					
	ICL (baseline)	LED (project)		ICL (baseline)	LED (project)	
Wattage (W)	60	7	9	100	12	14
Lumen output (lm)	715	715	900	1,350	1,350	1,400
Rated Lifetime (hours)	1,000	25,000	25,000	1,000	25,000	25,000

*Rated normal Lumen output for 60 W and 100 W of ICLs as per Table 2; AMS II.C. version 15

** Rated normal Lumen output for 7/9 W and 12/14 W LED as per Test Report from accredited Lab

The project LEDs are in compliance with Indian Standard IS 16102 (Part 1-Safety Requirements; Part 2-Performance Requirements), which is the national standard for self-ballasted LED lamps. The specifications of the project LEDs are as below:

a) Self-ballasted type

b) Rated lifetime of 25,000 hours

c) Embossed or laser printed with project logo for clear unique identification

The implementation of the project activity involves the distribution of long-life quality LEDs per household to the grid connected consumers in the CPA area. This is one to one exchange, meaning, the consumer gets one LED in place of one ICL (in working condition) and a fixed amount for each CPA is collected per bulb as single time fee for destruction of ICL. Each LED distributed under SHNE PoA has warranty of two years and will be replaced free of cost till two years from the date of distribution. Each household at the time of

distribution can be identified by the combination of the name of the consumer, grid connection number, address and contact number. The CPA specific implementation chronology is presented as follows:

UNFCCC Ref No	10484-P1-0001-CP1
Start date of LED distribution	13/08/2018
Monitoring for Operating hours	16/08/2018 – 14/04/2019
1st ex-post Monitoring survey	11/03/2020 – 16/03/2020
1st Monitoring Period	12/01/2020 – 15/03/2020
2nd ex-post Monitoring survey	31/10/2020 – 07/11/2020
2nd Monitoring Period	16/03/2020 – 31/07/2020
3rd Monitoring Period	01/08/2020 – 31/12/2020

UNFCCC Ref No	10484-P1-0002-CP1
Start date of LED distribution	12/08/2018
Monitoring for Operating hours	30/06/2019 – 07/01/2020
1st ex-post Monitoring survey	17/03/2020 – 20/03/2020
1st Monitoring Period	12/01/2020 – 15/03/2020
2nd ex-post Monitoring survey	16/10/2020 – 22/10/2020
2nd Monitoring Period	16/03/2020 – 31/07/2020
3rd ex-post Monitoring survey	16/10/2020 – 22/10/2020
3rd Monitoring Period	01/08/2020 – 31/12/2020

UNFCCC Ref No	10484-P1-0003-CP1
Start date of LED distribution	06/03/2020
Monitoring for Operating hours	16/06/2019 – 12/02/2020
1st ex-post Monitoring survey	17/03/2020 – 19/03/2020
1st Monitoring Period	12/01/2020 – 15/03/2020
2nd ex-post Monitoring survey	30/09/2020 – 20/10/2020
2nd Monitoring Period	16/03/2020 – 31/07/2020
3rd ex-post Monitoring survey	16/10/2020 – 22/10/2020
3rd Monitoring Period	01/08/2020 – 31/12/2020

UNFCCC Ref No	10484-P1-0004-CP1
Start date of LED distribution	05/10/2018
Monitoring for Operating hours	04/10/2018 – 31/05/2019
1st ex-post Monitoring survey	03/03/2020 – 05/03/2020
1st Monitoring Period	12/01/2020 – 15/03/2020
2nd ex-post Monitoring survey	03/11/2020
2nd Monitoring Period	16/03/2020 – 31/07/2020
3rd Monitoring Period	01/08/2020 – 31/12/2020

The DISCOM (Distribution Company) maintains a database of domestic users identifiable on the basis of a unique connection number and/or address used for billing purposes. The distribution activities were carried out by first accessing this consumer database of the grid connected residential consumers from the CPA area. Unique connection number issued by the DISCOM (UKSC No.) is considered as unique identification number for each household.

The potential recipient households were educated to install the LED in high-usage areas, such as veranda/porch/balcony, common areas, living room area and kitchen to maximize the energy savings. The

distribution of LEDs and replacement of previously used ICLs in households in the CPA area was done using the following methods:

- Direct installation at each household;
- Dedicated distribution points as advertised by the CPA investor in the local media e.g. local DISCOM offices, retail outlets, resident association offices, schools etc.

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.

Brightspark Energy Pvt. Ltd. hired third party waste disposal agencies for destruction of collected ICLs, who have collected the stored ICLs from the respective CPAs and destroyed as per the legal norms of Govt of India. The detail such as contractual agreement with the agencies, photos and videos of ICL destruction including the destruction certificates have been shared with the verifying DOE.

To prevent double counting the LEDs utilized under the 'SHINE' scheme, in addition to being marked for standard lamp specifications, were also marked with programme logo as shown above.

The total GHG emission reductions achieved in this monitoring period is 179,280 tCO_2 equivalents.

C.2. Location of CPAs

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The political boundary of India is the country/ geographical boundary of the SSC-PoA. It lies north of equator between 8°44' to 37°6' north latitude and 68°7' to 97°25' east longitude[3].

The geographical location of each of the CPAs is as follows:

10484-P1-0001-CP1

The CPA implemented in the south Indian state of Telangana, within the Telangana State Southern Power Distribution Company Limited (TSSPDCL) network circle.

TSSPDCL encompasses an area of fifteen districts viz., Mahabubnagar, Narayanpet, Nalgonda, Bhuvanagiri, Suryapet, Siddipet, Medchal, Wanaparthy, Nagarkarnool, Jogulamba Gadwal, SangaReddy, Medak, Hyderabad, Vikarabad and Rangareddy.

The co-ordinates[4] of each one of them are:

District	Latitude	Longitude
Hyderabad	17° 23'N	78° 29'E
Mahabubnagar	16° 23'N	78° 6'E
Nalgonda	17° 11'N	79° 11'E
Medak	18° 3'N	78° 15'E
Rangareddy	17° 23'N	77° 50'E
Narayanpet	16° 44'N	77° 29'E

[3] https://en.wikipedia.org/wiki/Geography_of_India

[4] https://www.distancesto.com/coordinates/in/vikarabad-latitude-longitude/history/8179.html

Bhuvanagiri	17° 31'N	78° 53'E
Suryapet	17° 8'N	79° 37'E
Siddipet	18° 6'N	78° 51'E
Medchal	17° 37'N	78° 29'E
Wanaparthy	16°21'N	78°3'E
Nagarkarnool	16°29'N	78°18'E
Jogulamba Gadwal	16°13'N	77°49'E
SangaReddy	17°37'N	78°4'E
Vikarabad	17°20'N	77°54'E

Map of TSSPDCL Network[5]

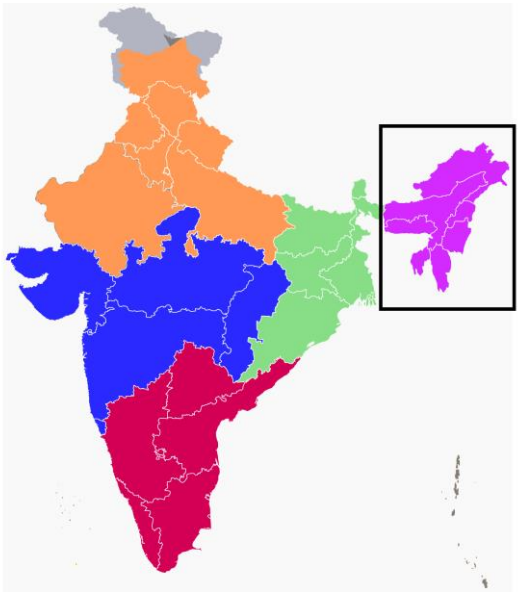
10484-P1-0002-CP1

The CPA implemented within the North-East Indian region e.g. states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. These states comprise the North Eastern Grid circle in the grid map of India.

The co-ordinates of each one of them are:

5 https://www.tssouthernpower.com/CPDCL_Home.portal?_nfpb=true&_pageLabel=CPDCL_Home_portal_page_69_page_70

State	Latitude[6]	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° 30' N	20° 52' E
Nagaland	26° 00' N	94° 20' E
Tripura	23° 45' N	91° 30' E



Grid Map of India

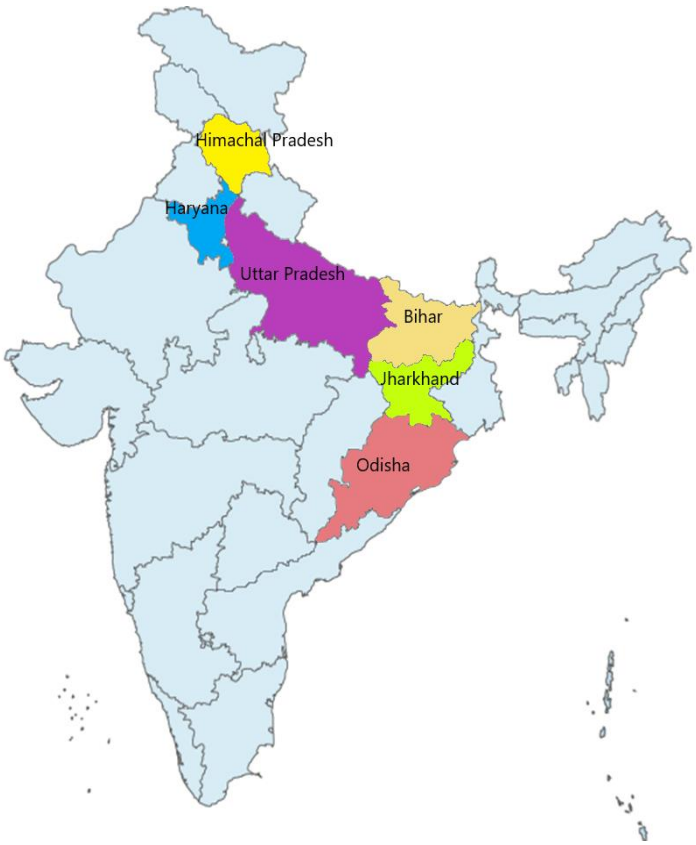
10484-P1-0003-CP1

The CPA will be implemented in the following states within the stated co-ordinates:

State	Latitude[7]	Longitude
Uttar Pradesh	27° 40' N	80° 00'E
Haryana	30.30 N	74.60 E
Himachal Pradesh	32° 29' N	75° 10' E
Bihar	25° 11' N	85° 32' E
Jharkhand	23° 45' N	85° 30' E
Odisha	26° 00' N	94° 20' E

[6] https://www.mapsofindia.com/lat_long/

[7] https://www.mapsofindia.com/lat_long/



Map of CPA implementing states

10484-P1-0004-CP1

The CPA will be implemented in Telangana state within the TSNPDCL-Northern Power Distribution Company of Telangana Limited, network circle.

TSNPDCL encompasses an area of 18 districts viz., Mancherial, Nirmal, Kumram Bheem, Kamareddy, Peddapalli, Jagtial, Rajanna, Warangal Urban, Warangal Rural, Mahabubabad, Jayashankar, Jangaon, Bhadradri, Adilabad, Nizamabad, Karimnagar and Khammam Districts.

The co-ordinates[8] of each one of them are:

District	Latitude	Longitude
Mancherial	17° 23' N	78° 29' E
Nirmal	16° 23' N	78° 6' E
Kumram Bheem	17° 11' N	79° 11' E
Kamareddy	18° 3' N	78° 15' E
Peddapalli	17° 23' N	77° 50' E
Jagital	18° 47' N	78° 54' E
Raianna	18° 23' N	78° 48' E
Warangal Urban	17° 58' N	79° 55' E

[8] https://www.gps-latitude-longitude.com/

Warangal Rural	18° 04' N	79° 44' E
Mahabubabad	17° 36' N	80° 00' E
Jayashankar	17° 18' N	78° 25' E
Jangaon	17° 43' N	79° 09' E
Bhadradari	14° 44' N	74° 40' E
Adilabad	19° 39' N	78° 31' E
Nizamabad	18° 40' N	78° 05' E
Karimnagar	18° 26' N	79° 07' E
Khammam	17° 14' N	80° 09' E

Map of TSNPDCL Network[9]

C.3. Post-registration changes to CPAs

C.3.1. Temporary deviations from the monitoring plans in the included CPA-DDs, applied methodologies, standardized baselines or other methodological regulatory documents

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C.3.2. Corrections

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[9] https://www.tsnpdcl.in/

C.3.3. Changes to the start date of the crediting period

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Start date of crediting period was changed for the included CPA as follows:

Reference number of the specific-case CPA	Notification date	Start date of crediting period at the time of CPA inclusion	Revised start date of crediting period	Date of approval from CDM EB
10484-P1-0003-CP1	22/03/2020	12/01/2020	06/03/2020	26/03/2020

C.3.4. Inclusion of monitoring plan

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C.3.5. Permanent changes to the included monitoring plans, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

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C.3.6. Changes to project design

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C.3.7. Changes specific to afforestation or reforestation CPA

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SECTION D. Description of monitoring system of CPAs

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The overall monitoring system under all the SSC-CPAs can be summarised in the figure 2 & 3. These two figures outline the key elements of the hierarchy and data monitoring plan for a SSC-CPA, highlighting responsible entities and their tasks, interaction channels among them, and key monitoring parameters.

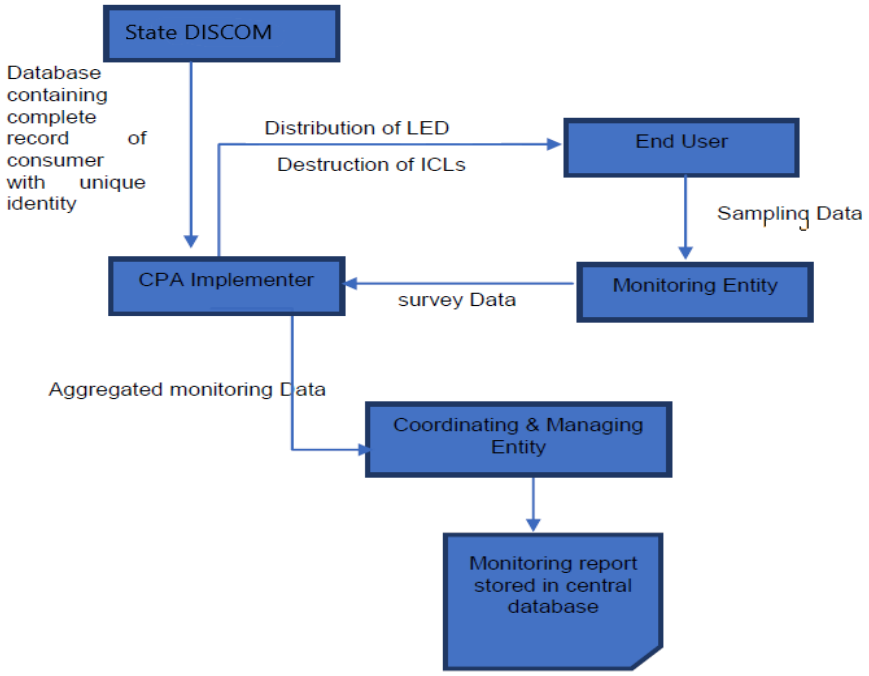


Figure 2: Role of stakeholders involved in the CPA

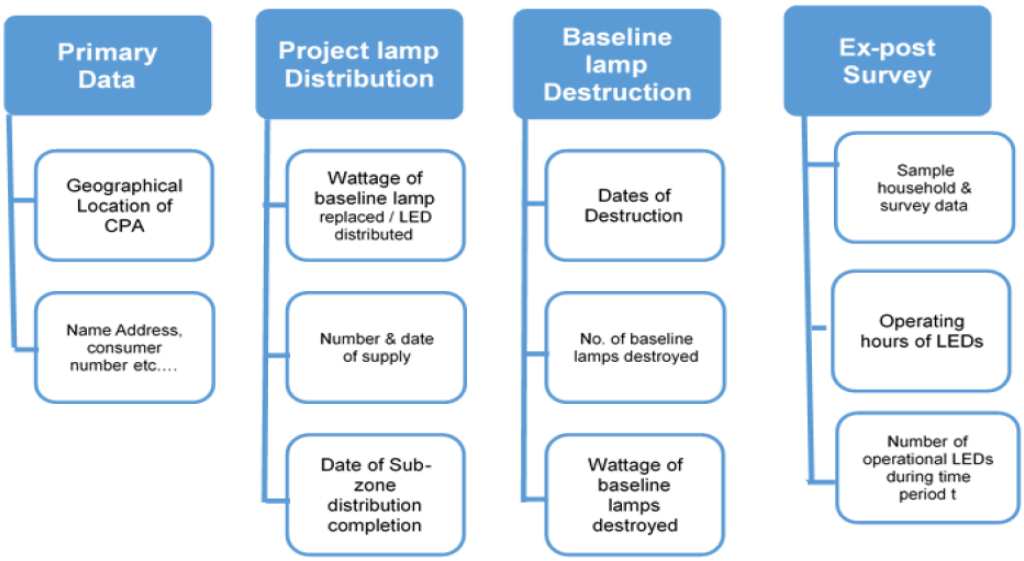


Figure 3: SSC-CPA Database components as per SHINE scheme

As per applied methodology AMS–II.C., the monitoring for the SSC-CPAs have been carried out at the following levels:

1.LED distribution
2.Ex-post Monitoring Survey
3.Baseline ICL destruction

1. LED Distribution

The LEDs were distributed by the CME with support from third party, using the following methods:

- Direct installation at each household;
- Distribution through dedicated distribution points as advertised by the CME in local media e.g., local DISCOM offices, retail outlets, resident association offices, schools etc.

Information regarding following parameters was collected at the time of LED distribution

Parameter	Description	Data Unit	Monitoring Method	Data collection method	Frequency	Sampling
$\rho_{i\ baseline}$	Electrical power demand of baseline lamps	watts	on-site visit by distribution team at the time of project implementation.	Data was collected via smart phone or tablet app module connected to data cloud. This was relayed in real time to a central DMS. Industry standard software, infra-structure and back up procedures were followed ensuring full auditability and long-term data integrity and security so that data is not misreported, overwritten or lost	Once, at the time of CPA implementation	100 per cent of data was monitored
$n_{i\ baseline}$	Number of pieces of baseline lamps replaced.	Number				
$\rho_{i\ project}$	Electrical power demand of project devices	Watts				
$n_{i\ project}$	Number of project devices distributed	Number				

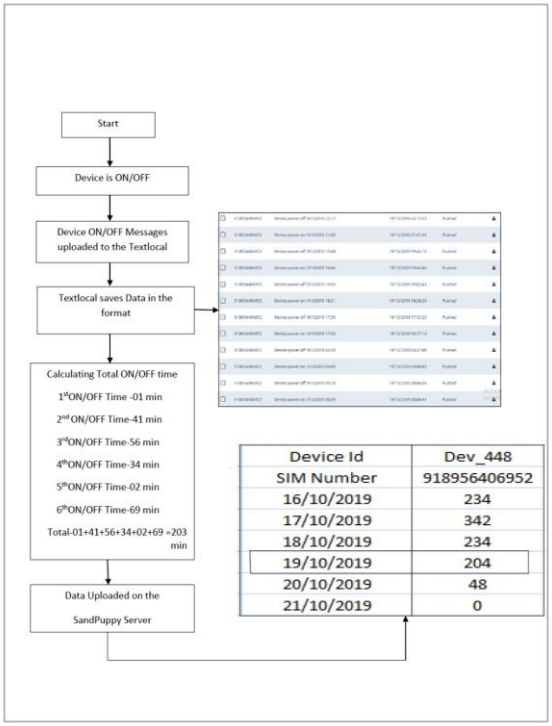
2. Ex-post Monitoring Survey

Monitoring survey was carried out through computer assisted personal interview (CAPI) where part of data was collected via smart phone or tablet app module connected to data cloud and part was collected through questionnaires along with physical observations where respondents were requested to fill pre-compiled questionnaire.

The data so collected was collated by the CME. The following parameters were monitored:

Parameter	Description	Data Unit	Monitoring Method	Data collection method	Frequency	Sampling
$o_{i\ project}$	Average annual Operating hours of project lamps	hours	Remote survey via data loggers (run time meters)*	The operating hours was 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.	once, prior to the first ex-post monitoring.	Random samples were collected from each SSC-CPA area using statistical tools. Sample size was determined to have at least 95% confidence level and 10% maximum margin of error.
$n_{i\ operational}$	Number of group 'i' project lamps that are operational during time interval 't'	number	Survey through physical on-site visit by third party monitoring team.	Physical observation and recording response in questionnaires to assess whether • LEDs have project logo •They were operational	Annual.	Random samples were collected from non-monitored samples in SSC-CPA area using statistical tools. Sample size was determined to have at least 95% confidence level and 10% maximum margin of error.

***** Run time meter is an equipment that was installed with the baseline lamp (ICL) selected for monitoring. There is a sim card inserted in the meter. It sends the signal massage to the centralized server as & when the device gets switched on. The server records the time till it receives the signal. The moment monitoring lamp gets switched off (or server do not receive the signal due to network issue), it stops recording the operating time. In this manner server compiles the data for a day and records the operating time for the day.



Basic working principle of run time meter

Operating pattern of the user do not change with the replacement of ICL to LED. Although on installing the LED, usage hours may increase due to improved quality of the light and power saving (and hence electricity charges saving) of the user. Therefore, operating hours will not vary due to project implementation and monitored value can be used bot for baseline lamps and project lamps.

3. ICL Destruction

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 y, each SSC-CPA verified whether the number of distributed LEDs was equal to or less than the number of returned and destroyed ICLs in the SSC-CPA area.

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”.

BEPL has hired Auctus E-Recycling Solutions (P.) Ltd. for destruction of ICLs collected. The various dates of ICL destruction activities and the quantity of ICLs destructed are as follows:

CPA	7W LED Distributed	9W LED Distributed	12W LED Distributed	14W LED Distributed	60W ICL Destroyed	100W ICL Destroyed	Date of destruction of ICLs
10484-P1-0001-CP1	0	73,204	0	4,906	73,204	4,906	23/10/2018 & 28/11/2018
10484-P1-0002-CP1	292,022	250,969	540,227	4,642	542,991	544,869	11/02/2019 – 14/02/2021

10484-P1-0003-CP1	517,497	515,061	2,028,391	0	1,032,558	2,028,391	18/03/2020 – 17/12/2020
10484-P1-0004-CP1	0	10,034	0	0	10,034	0	23/10/2018

SECTION E. Data and parameters

E.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{CO2,ELEC,y}$
Unit	tCO2/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'; version 07
Source of data	CO2 Baseline Database for the Indian Power Sector, User Guide; Version 13.0 (June 2018)[10]
Value(s) applied	0.92
Choice of data or measurement methods and procedures	The SSC-CPA owner shall apply the latest grid emission factor database available on the CEA website and fix the value ex-ante.
Purpose of data/parameter	Used in calculation of baseline emissions and project emissions.
Additional comments	None

Data/Parameter	$L_{i\ 9W}$
Data unit	Hours
Description	rated average operating hours for LED type *i*
Source of data	manufacturer's specification
Value(s) applied	25,000
Choice of data or measurement methods and procedures	Determined from independent life-tests of the LEDs as per national / international standard or any other industry admissible test. The value is fixed ex-ante.
Purpose of data	Used in calculation of baseline emissions and project emissions
Additional comment	None

Data/Parameter	$L_{i\ 12W}$
Data unit	Hours
Description	rated average operating hours for LED type *i*
Source of data	manufacturer's specification
Value(s) applied	25,000
Choice of data or measurement methods and procedures	Determined from independent life-tests of the LEDs as per national / international standard or any other industry admissible test. The value is fixed ex-ante.
Purpose of data	Used in calculation of baseline emissions and project emissions
Additional comment	None

[10] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver13.pdf

Data/Parameter	$L_{i\ 14W}$
Data unit	Hours
Description	rated average operating hours for LED type *i*
Source of data	manufacturer's specification
Value(s) applied	25,000
Choice of data or measurement methods and procedures	Determined from independent life-tests of the LEDs as per national / international standard or any other industry admissible test. The value is fixed ex-ante.
Purpose of data	Used in calculation of baseline emissions and project emissions
Additional comment	None

E.2. Data and parameters monitored

Data/Parameter	$n_{i\ baseline\ (60W)/(100W)}$
Unit	Number
Description	Number of pieces of 60W/100W baseline lamps replaced.
Measured/calculated/ default	Measured
Source of data	Actual collection record as stored in database
Value(s) of monitored parameter	<table><tr><th></th><th>100 W</th><th>60 W</th></tr><tr><td>10484-P1-0001-CP1</td><td>4,906</td><td>73,204</td></tr><tr><td>10484-P1-0002-CP1</td><td>544,869</td><td>542,991</td></tr><tr><td>10484-P1-0003-CP1</td><td>2,028,391</td><td>1,032,558</td></tr><tr><td>10484-P1-0004-CP1</td><td>0</td><td>10,034</td></tr></table>
Monitoring equipment	None.
Measuring/reading/recording frequency	Once at the time of project implementation
Calculation method (if applicable)	Not applicable
QA/QC procedures	Data was collected via smart phone/ tablet app module connected to data cloud allowing data validation checks to be enforced at the point of collection, hence minimizing errors.
Purpose of data/parameter	Used in calculation of baseline emissions and project emissions
Additional comments	data will be stored in the project database for at least two years after the crediting period or the last issuance

Data/Parameter	$n_{i\ baseline\ scrapped\ (60W)/(100W)}$
Unit	Number
Description	Number of pieces of 60W/100W baseline lamps destroyed.
Measured/calculated/ default	Measured
Source of data	Actual destruction record
Value(s) of monitored parameter	<table><tr><th></th><th>100 W</th><th>60 W</th></tr><tr><td>10484-P1-0001-CP1</td><td>4,906</td><td>73,204</td></tr><tr><td>10484-P1-0002-CP1</td><td>544,869</td><td>542,991</td></tr><tr><td>10484-P1-0003-CP1</td><td>2,028,391</td><td>1,032,558</td></tr><tr><td>10484-P1-0004-CP1</td><td>0</td><td>10,034</td></tr></table>

Monitoring equipment	None
Measuring/reading/recording frequency	Once
Calculation method (if applicable)	Not applicable
QA/QC procedures	Number of baseline lamps that are destroyed will be cross checked with n_i baseline (60W/100W)
Purpose of data/parameter	Used in calculation of baseline emissions.
Additional comments	None

Data/Parameter	$n_{i\ project\ (9W)/(12W)/(14W)}$
Unit	Number
Description	Number of pieces of 9W/12W/14W project lamps distributed
Measured/calculated/ default	Measured
Source of data	Actual distribution record as stored in database
Value(s) of monitored parameter	

	14 W	**12 W**	**7 W**	**9 W**
10484-P1-0001-CP1	4,906	0	0	73,204
10484-P1-0002-CP1	4,642	540,227	292,022	250,969
10484-P1-0003-CP1	0	2,028,391	517,497	515,061
10484-P1-0004-CP1	0	0	0	10,034

Monitoring equipment	None
Measuring/reading/recording frequency	Once at the time of project installation.
Calculation method (if applicable)	Not applicable
QA/QC procedures	Data was collected via smart phone/tablet app module connected to data cloud allowing data validation checks to be enforced at the point of collection, hence minimizing errors.
Purpose of data/parameter	Used in calculation of project emissions
Additional comments	data will be stored in the project database for at least two years after the crediting period or the last issuance

Data/Parameter	$n_{i\ operational\ (9W)/(12W)/(14W)}$
Unit	Number
Description	Total number of 9W/12W/14W project lamps that are operational during monitoring period
Measured/calculated/ default	Calculated from survey data
Source of data	First ex-post monitoring survey of sample of non-metered households

Value(s) of monitored parameter	<table><tr><th></th><th>14 W</th><th>12 W</th><th>7 W</th><th>9 W</th></tr><tr><td>10484-P1-0001-CP1</td><td>4,906</td><td>0</td><td>0</td><td>73,204</td></tr><tr><td>10484-P1-0002-CP1</td><td>4,642</td><td>540,227</td><td>292,022</td><td>250,969</td></tr><tr><td>10484-P1-0003-CP1</td><td>0</td><td>2,028,391</td><td>517,497</td><td>515,061</td></tr><tr><td>10484-P1-0004-CP1</td><td>0</td><td>0</td><td>0</td><td>10,034</td></tr></table>
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	The $n_{i\ operational}$ 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.
QA/QC procedures	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/parameter	Used in calculation of project emissions
Additional comments	data will be stored in the project database for at least two years after the crediting period or the last issuance

Data/Parameter	$O_{i\ project\ (9W)/(12W)/(14W)/\ baseline\ (60W)/(100W)}$
Unit	Hours
Description	Average annual operating hours of type 'i' project /baseline lamp
Measured/calculated/ default	Measured
Source of data	CPA Database
Value(s) of monitored parameter	<table><tr><th></th><th>10484-P1-0001-CP1</th><th>10484-P1-0002-CP1</th><th>10484-P1-0003-CP1</th><th>10484-P1-0004-CP1</th></tr><tr><td>Operating Hours</td><td>5.99</td><td>6.43</td><td>5.9</td><td>6.16</td></tr></table>
Monitoring equipment	Run time meters
Measuring/reading/recording frequency	Once, prior to the first ex-post monitoring
Calculation method (if applicable)	The operating hours was be 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 daily operating hours. The value obtained was multiplied with 365 days to give average annual operating hours of project lamps.
QA/QC procedures	Calibration of this meter is not required as this device works with the signal transmitted through SIM card.
Purpose of data/parameter	Baseline and project emission calculation
Additional comments	data will be stored in the project database for at least two years after the crediting period or the last issuance

Data/Parameter	$\rho_{i\ baseline\ 60W,\ 100\ W}$
Unit	Watts
Description	Rated power of 60 W & 100 W baseline lamps replaced
Measured/calculated/ default	Measured
Source of data	Actual collection record as stored in CPA database
Value(s) of monitored parameter	100 W and 60 W
Monitoring equipment	None
Measuring/reading/recording frequency	Once at the time of project installation.
Calculation method (if applicable)	Not applicable
QA/QC procedures	Data was collected via smart phone/tablet app module connected to data cloud allowing data validation checks to be enforced at the point of collection, hence minimizing errors.
Purpose of data/parameter	Used in calculation of baseline emissions
Additional comments	None

Data/Parameter	$\rho_{i\ project\ 9W,\ 12W,\ 14W}$
Unit	Watts
Description	Rated power of the LEDs of 9W, 12W and 14W project lamps (Watts)
Measured/calculated/ default	Measured
Source of data	Actual distribution record as stored in CPA database
Value(s) of monitored parameter	<table><tr><th></th><th>10484-P1-0001-CP1</th><th>10484-P1-0002-CP1</th><th>10484-P1-0003-CP1</th><th>10484-P1-0004-CP1</th></tr><tr><td>Rated Power of installed LEDs</td><td>9 W and 14 W</td><td>7 W, 9 W, 12 W and 14 W</td><td>7 W, 9 W and 12 W</td><td>9 W</td></tr></table>
Monitoring equipment	None
Measuring/reading/recording frequency	Once at the time of project installation.
Calculation method (if applicable)	Not applicable
QA/QC procedures	Data was collected via smart phone/tablet app module connected to data cloud allowing data validation checks to be enforced at the point of collection, hence minimizing errors.
Purpose of data/parameter	Used in calculation of project emissions
Additional comments	None

Data/Parameter	Ly
Unit	per cent
Description	Average annual technical grid losses
Measured/calculated/ default	Default AMS II.C option
Source of data	AMS II.C, version 15

Value(s) of monitored parameter	10%
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	fixed for crediting period
Calculation method (if applicable)	Not applicable
QA/QC procedures	Not applicable
Purpose of data/parameter	Used in calculation of baseline emissions and project emissions
Additional comments	This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage)

E.3. Implementation of sampling plan

>>

(a) **List of CPAs to which sampling was applied;**

A separate sampling plan was carried out for all four CPAs covered in this monitoring period for the parameters "$n_{i\ operational}$" & "$o_{i\ project}$".

(b) **Description of implemented sampling design;**

(i) Sampling Design:

Due to the large number of LEDs distributed as part of the CPA, it was not economically feasible to monitor each individual LED distributed. Therefore, representative sampling was undertaken as part of a SSC-CPA-wide Sampling Plan that is designed in line with the requirements of the "Standard for sampling and surveys for CDM project activities and programme of activities" from EB 86, Annex 3 (the *Sampling standard*). Therefore, separate sampling was conducted for all the 4 CPAs.

(ii) Objective and Reliability Requirements:

The objective of the 3rd monitoring survey was to obtain an unbiased and reliable estimate of the proportion or mean value of the following key variables over the course of the crediting period, and with 95/10 confidence/prevision.

Monitored Parameters:

Parameter	Description of Parameter
$n_{i\ operational}$	*Number of operational project lamps during the monitoring period*

(iii) Target Population:

1. Participating households under the CPA area
2. Random sample group determined using statistical tools as representing the households falling under the CPA area.

(iv) Sampling Frame:

Distribution database was considered as sampling frame for the parameter $n_{i\ operational}$,.

(v) Sampling Design

Simple Random Sampling was applied, and samples was randomly selected from the primary sampling units.

For determination of operational project LEDs, random samples were selected from the distribution database with the help of online software.

To determine the parameter, sampling involved the following approaches (outcome in brackets):

$n_{i\ operational}$: Visual inspection of the premises to see project LED is operational. Interview with end user if required (Yes/No)

(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 is available in Excel spreadsheet for sharing with DoE. The sample size was adjusted upwards to account for non-responses where the rate was determined by CME based on previous experience.

(c) **Collected data (electronic spreadsheets may be attached and referenced);**

The method of collecting data is field surveys and the summary is provided in table below.

Parameter	Methods to be applied
$n_{i\ operational}$	Visits to the premises, visual inspection and interview with the LED user.

The data collected from the surveys was compiled into the Excel spreadsheet and was shared with DoE. Hard copies of the surveys form are kept, and the database has a back-up.

(d) **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 be factored into the emissions reduction calculations.

(e) **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, and summary provided in table below.

CPA			Responded samples			Value of parameter obtained	Precision achieved
	HHs	7W LED	9W LED	12W LED	14W LED		
10484-P1-0002-CP1	74 HHs	77	100	117	43	100%	0.00%
10484-P1-0003-CP1	42 HHs	50	60	110	-	100%	0.00%

Sample estimates of both parameters are within the required reliability precision.

SECTION F. Calculation of emission reductions or net anthropogenic removals

F.1. Calculation of baseline emissions or baseline net removals

>>

The emission reduction by the CPA will be calculated in accordance with **equation 10**, of the small-scale methodology AMS II.C., Version 15.0.

$ER_y = (BE_y - PE_y) - LE_y$

Where:

ER_y	Emission reductions in year y (tCO_2e)
BE_y	Baseline emission in year *y* (tCO_2e)
PE_y	Project emission in year *y* (tCO_2e)
LE_y	Leakage emission in year *y* (tCO_2e)

Baseline Emission (BE_y)

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

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.

Energy consumption for baseline in year y is calculated as:

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

where

n_i	=	Number of pieces of equipment of the group of 'i' baseline equipment (ICLs) replaced.
ρ_i	=	Electrical power demand (kW) of the group of 'i' baseline equipment (e.g. 60W or 100W incandescent lamps). In the case of more than one type of ICLs are replaced, electrical power demand is the weighted average of the rated power (kW) of group i baseline equipment (ICLs).
o_i	=	Average annual operating hours of the group of 'i' baseline equipment (ICLs).
l_y	=	0.10
0.95	=	Net to gross adjustment factor

For calculating the baseline emission (for monitoring period from 01/08/2020 to 31/12/2020), annual baseline emission per ICL has calculated for each type (i.e. each for 100W & 60W) of baseline lamp and then apportioned according to the working days for each household as per the database in the ER calculation sheet.

For 100 W ICLs

CPA 10484-P1-0001-CP1

$E_{BL,y}$ = 0.95 x (1 x 0.1 x 2,186.35) / (1- 0.10)

= 230.78 kWh

BE_y = 230.78 x 0.92/1000

= 0.212 tCO2e/ICL/year

CPA 10484-P1-0002-CP1

$E_{BL,y}$ = 0.95 x (1 x 0.1 x 2,347) / (1- 0.10)

= 247.73 kWh

BE_y = 247.73 x 0.92/1000

= 0.228 tCO2e/ICL/year

CPA 10484-P1-0003-CP1

$E_{BL,y}$ = 0.95 x (1 x 0.1 x 2,153.5) / (1- 0.10)

= 227.31 kWh

BE_y = 227.31 x 0.92/1000

= 0.209 tCO2e/ICL/year

CPA 10484-P1-0004-CP1

$E_{BL,y}$ = 0.95 x (1 x 0.1 x 2,248.4) / (1- 0.10)

= 237.33 kWh

BE_y = 237.33 x 0.92/1000

= 0.218 tCO2e/ICL/year

For 60 W ICLs

CPA 10484-P1-0001-CP1

$E_{BL,y}$ = 0.95 x (1 x 0.06 x2,186.35) / (1- 0.10)

= 138.47 kWh

BE_y = 138.47 x 0.92/1000

= 0.127 tCO2e/ICL/year

CPA 10484-P1-0002-CP1

$E_{BL,y}$ = 0.95 x (1 x 0.06 x 2,347) / (1- 0.10)

= 148.64 kWh

BE_y = 148.64 x 0.92/1000

= 0.137 tCO2e/ICL/year

CPA 10484-P1-0003-CP1

$E_{BL,y}$ = 0.95 x (1 x 0.06 x 2,153.5) / (1- 0.10)

= 136.39 kWh

BE_y = 136.39 x 0.92/1000

= 0.125 tCO2e/ICL/year

CPA 10484-P1-0004-CP1

$E_{BL,y}$ = 0.95 x (1 x 0.06 x 2,248.4) / (1- 0.10)

= 142.4 kWh

BE_y = 142.4 x 0.92/1000

= 0.131 tCO2e/ICL/year

F.2. Calculation of project emissions or actual net removals

>>

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

$$PE_y = EP_{PJ,y} \times EF_{CO2,y} + PE_{ref,y}$$

PE_y	=	Project emissions in year *y* (tCO_2e)
$EP_{PJ,y}$	=	Energy consumption in project activity in year y. This shall be determined ex post based on monitored values
$EF_{CO2,y}$	=	Emission factor for electricity or thermal baseline energy. The emissions associated with grid electricity consumption should be calculated in accordance with the procedures of AMS-I.D. For fossil fuel displaced reliable local or national data for the emission factor shall be used; IPCC default values should be used only when country or project-specific data are not available or difficult to obtain
$PE_{ref,y}$	=	Project emissions from physical leakage of refrigerant from the project equipment in year y (tCO_2e/y)

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

$$PE_y = E_{PE,y} \times EF_{CO2,ELEC,y}$$

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

n_i	=	Number of group 'i' project devices operating during time interval t in year y.
ρ_i	=	Electrical power demand (kW) of the group 'i' project devices measured during the time interval t in year y.
0_i	=	Operating hours of group of 'i' project devices in the time interval t in year y
0.95	=	Net to gross adjustment factor

For calculating the project emission (for monitoring period from 01/08/2020 to 31/12/2020), annual project emission per LED has calculated for each type (i.e. each for 7W, 9W, 12W & 14W) of project lamp and then apportioned according to the working days for each household as per the database in the ER calculation sheet.

CPA 10484-P1-0001-CP1

For 14 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.014 x 2,186.35) / (1- 0.10)

= 32.31 kWh

PE_y = 32.31 x 0.92/1000

= 0.030 tCO2e/LED/year

For 9 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.009 x 2,186.35) / (1- 0.10)

= 20.77 kWh

PE_y = 20.77 x 0.92/1000

= 0.019 tCO2e/LED/year

CPA 10484-P1-0002-CP1

For 14 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.014 x 2,347) / (1- 0.10)

= 34.68 kWh

PE_y = 34.68 x 0.92/1000

= 0.032 tCO2e/LED/year

For 12 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.012 x 2,347) / (1- 0.10)

= 29.73 kWh

PE_y = 29.73 x 0.92/1000

= 0.027 tCO2e/LED/year

For 9 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.009 x 2,347) / (1- 0.10)

= 22.3 kWh

PE_y = 22.3 x 0.92/1000

= 0.021 tCO2e/LED/year

For 7 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.007 x 2,347) / (1- 0.10)

= 17.34 kWh

PE_y = 17.34 x 0.92/1000

= 0.016 tCO2e/LED/year

CPA 10484-P1-0003-CP1

For 12 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.012 x 2,153.5) / (1- 0.10)

= 27.28 kWh

PE_y = 27.28 x 0.92/1000

= 0.025 tCO2e/LED/year

For 9 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.009 x 2,153.5) / (1- 0.10)

= 20.46 kWh

PE_y = 20.46 x 0.92/1000

= 0.019 tCO2e/LED/year

For 7 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.007 x 2,153.5) / (1- 0.10)

= 15.91 kWh

PE_y = 15.91 x 0.92/1000

= 0.015 tCO2e/LED/year

CPA 10484-P1-0004-CP1

For 14 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.014 x 2,248.4) / (1- 0.10)

= 33.23 kWh

PE_y = 33.23 x 0.92/1000

= 0.031 tCO2e/LED/year

For 9 W LEDs

$E_{PE,y}$ = 0.95 x (1 x 0.009 x 2,248.4) / (1- 0.10)

= 21.36 kWh

PE_y = 21.36 x 0.92/1000

= 0.020 tCO2e/LED/year

F.3. Calculation of leakage emissions

>>

According to the applied methodology, leakage emissions have to be considered if the energy efficiency technology involves equipment transferred from another activity. In the proposed CPA, LEDs that will be distributed to the households are not transferred from another activity; hence leakage emissions are not applicable.

Hence

$$ER_y = BE_y - PE_y$$

F.4. Calculation of emission reductions or net anthropogenic removals

CPA UNFCCC reference number	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)			
				Before 01/01/2013	From 01/01/2013 until 31/12/2020	From 01/01/ 2021	Total amount
10484-P1-0001-CP1	4,345	647	0	0	3,698	0	3,698
10484-P1-0002-CP1	43,152	6,126	0	0	37,026	0	37,026
10484-P1-0003-CP1	157,737	19,650	0	0	138,087	0	138,087
10484-P1-0004-CP1	551	82	0	0	469	0	469
Total	**205,785**	**26,505**	**0**	**0**	**179,280**	**0**	**179,280**

F.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the included CPA-DDs

CPA UNFCCC reference number	Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante for this monitoring period in the CPA-DD (t CO_2e)
10484-P1-0001-CP1	3,698	3,975
10484-P1-0002-CP1	37,026	59,157
10484-P1-0003-CP1	138,087	166,453
10484-P1-0004-CP1	469	518
Total	**179,280**	**230,103**

F.5.1. Explanation of calculation of "amount estimated ex ante for this monitoring period in the CPA-DD"

>>

	Estimated LEDs installed	tCO_2e/year as per CPA DD	Actual LEDs installed	tCO_2e/year as per actual ICS installed	No. of days (for comparable period)	tCO_2e
10484-P1-0001-CP1	3,000,000	3,64,202	78,110	9,482	153	3,975
10484-P1-0002-CP1	700,000	90,810	1,087,860	141,126	153	59,157
10484-P1-0003-CP1	700,000	90,810	3,060,949	397,092	153	166,453
10484-P1-0004-CP1	700,000	86,220	10,034	1,235	153	518
Total		**632,042**		**548,935**		**230,103**

F.6. Remarks on increase in achieved emission reductions

>>

Actual emission reductions achieved are less than the value estimated in ex-ante calculation.

F.7. Remarks on scale of small-scale CPAs

>>

CPAs developed under this PoA consist of micro-scale CDM units hence this section is not applicable.

- - - - -

Document information

Version	*Date*	*Description*
04.0	6 April 2021	Revision to: • Reflect the “Clarification: Regulatory requirements under temporary measures for post-2020 cases” (CDM-EB109-A01-CLAR).
03.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN); • Add a section on remarks on the observance of the scale limit of small-scale CPAs during the crediting periods; • Add "changes specific to afforestation or reforestation activities/CPA" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R PoAs between two commitment periods; Make structural and editorial improvements.
02.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the “CDM project standard for programmes of activities (CDM-EB93-A07-STAN); • Make editorial improvements.
01.0	1 April 2015	Initial publication.

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