



PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT



Version 1.0

Date 25/06/2022

First CoU Issuance Period: 10 years, 00 months

Date: 01/04/2022 to 31/03/2022



Project Concept Note (PCN)
CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION

Title of the project activity	Energy saving through efficient street lighting systems by LDA, Lucknow, India
Scale of the project activity	Small
Completion date of the PCN	25/06/2022
Project participants	Lucknow Development Authority
Host Party	India
Applied methodologies and standardized baselines	AMS-II.L Demand-side activities for efficient outdoor and street lighting technologies, Version 02.0
Sectoral scopes	GHG Sectoral Scope number: GHG-SS3 GHG Sectoral Scope Title: Energy demand
Estimated amount of total GHG emission reductions	519 CoUs (519 tCO _{2eq})

SECTION A. Description of project activity

A.1. Purpose and general description of Carbon offset Unit (CoU) project activity >>

The project activity involves replacement of old conventional energy inefficient street lights with efficient LED lighting systems in the area in Pradhanmantri Awas Yojna Ke Antargat Sharda Nagar Vistar Mein 624 Bhawano G Plus 3 Ka Nirman and Vikas Karya Group B. The project location is Lucknow, Uttar Pradesh, India controlled by Lucknow Development Authority (LDA). Lucknow Development Authority (LDA) is one of the municipal corporations in Lucknow, India created after the former Municipal Corporation of Lucknow was divided into three ("trifurcation").. There are 295 numbers of conventional street light fittings of multiple configurations (baseline luminaries) replaced one-for-one with same numbers of LED light fittings (project luminaries). The total installed capacity of baseline luminaries was 153 KW which is now reduced by approximately 600% to 27 KW in the project activity. The LED Street lights are connected through a web-based monitoring system that enables remote operations. There are 295 numbers of GIS mapped CCMS (Centrally Controlled Monitoring Systems) those enable controlling and monitoring the complete LED illumination system in the project from designated centralized locations.

The details of the registered project are as follows:

Purpose of the project activity:

The proposed LED streetlight project has been implemented through a trilateral agreement between Lucknow Development Authority (LDA), local vendor and Energy Efficiency Services Limited (EESL). When the trilateral agreement provides a framework for implementation of energy efficiency measures in streetlight in the jurisdiction of LDA, the implementation was done by EESL and entire upfront capital cost of energy efficiency interventions i.e., upgradation of conventional streetlight fixtures with LED streetlight fixtures including annual maintenance and warranty replacement is done by EESL is the local electricity distribution company in the region who has assisted EESL in getting permission for implementing the project and provided necessary data and access to the facilities.

Project Luminaries (New LED fittings)

Zone	-	50W	60W	90W	121W	Total
LDA	Nos of fittings	70	55	50	120	295
	Power output (kW)	5	3.3	4.5	14.52	27

The project is estimated to save approximately, 572 MWh of electricity annually which is expected to generate 519 tCO₂ annually and 5,190 tCO₂ in 10 years period spanning through the entire crediting period. The Project contributions to the sustainable development of the local area as well as the host country are as follows:

Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India, has stipulated the following indicators for sustainable development in the interim approval guidelines for CDM projects.

1. Social well-being;
2. Economic well-being;
3. Environmental well-being; and

4. Technological well-being

1. Social well-being The Project Activity will result in creating job opportunities for the local population on temporary and permanent basis. Manpower is required both during installation and operation of the LED street lights project. This would result in the improvement in living standards of the local community.

2. Economic well-being The Project Activity will create direct and indirect job opportunities to the local community during installation and operation of the installation and operation of the LED street lights project. The investment for the Project Activity would lead to the improvement in the economic activity in the local area.

3. Environmental well-being The Project Activity saves fossil fuel-based grid connected electricity by replacing old conventional lighting systems with efficient LED luminaries contributing to reduction in specific emissions (emissions of pollutant/unit of energy generated) including GHG emissions. The Project Activity causes no negative impact on the surrounding environment.

4. Technological well-being: LED lighting based clean technology will promote overall technological upgradation in the country as well as encourage other investors or local bodies and households to switch to efficient lighting solutions.

A.2 Do no harm or Impact test of the project activity>>

There are social, environmental, economic and technological benefits which contribute to sustainable development.

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Rational: As per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (07/03/2016)¹, it has been declared that wind project activity falls under the "White category". White Category projects/industries do not require any Environmental Clearance such as 'Consent to Operate' from PCB as such project does not lead to any negative environmental impacts. Additionally, as per Indian Regulation, Environmental and Social Impact Assessment is not required for Wind Projects.

There are social, environmental, economic and technological benefits which contribute to sustainable development. The key details have been discussed in the previous section.

A.3. Location of project activity >>

Country: India

District: Lucknow

Village: XYZ

Tehsil: Lucknow

State: Uttar Pradesh

Code: 226002

The proposed project is located at Sharda Nagar Extension, near Bijnor road Lucknow, Uttar Pradesh. Site is open land and does not involve activities of any type. Lucknow Development Authority has

¹ http://moef.gov.in/wp-content/uploads/2017/07/Latest_118_Final_Directions.pdf

got the responsibility to construct Affordable housing Project under Pradhan Mantri Awas Yojna vide letter from State Urban Development Agency (SUDA) Lucknow Uttar Pradesh. It is anticipated that the construction activities of the proposed project would not have an adverse effect on the land use in the project area. The development of the green belt and other landscape would enhance the visual aesthetics of the area.

Table 1: Site Specific Details

Items	Details
Location	At Sharda Nagar Extension, near Bijnor road Lucknow Uttar Pradesh.
Latitude & Longitude	Refer Fig :1
Site Elevation (m)	120m
Net Plot Area	1,14,400 m ²
Category	B, Type- 8(b), Township and Area Development
Land Use	Residential as per License issued by LDA
Type of facilities	<ul style="list-style-type: none"> • Residential plots • EWS Flats • Commercial • School • Convenient shop • School • College • Post Office.
Nearest Highway	NH-25
Nearest railway station	Utrahtia Railway Station -5.5km (NE) Mohanlalganj Railway Station -9km (SE) Charbagh Railway Station -10 km (NW) Aishbagh Railway Station- 10.3km (NW)

Nearest airport	Chaudhari Charan Singh International Airport (Amousi) - 5km
Protected areas as per Wildlife Protection Act, 1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries)	Kukrail Reserve Forest -21km (NE)
Rivers/Lakes	Gomti River-11km(NE) Pooran Pur Jheel-8 km(SE)
Archaeological important places	No archaeological important places are present nearby.
Seismic zone	Seismic Zone-III as per 2002 map.

Defense installations	Cantonment : 7km (NE)
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- **Fig.1: Location of Project site along with Coordinates**



Fig. 2 Site and Surroundings within 500 m from proposed Integrated Township



Fig. 3: Site and Surroundings within 10 km from proposed Integrated Township

A.4. Technologies/measures >>

Project Luminaries (New LED fittings)						
Zone	-	50W	60W	90W	121W	Total
LDA	Nos of fittings	70	55	50	120	295
	Power output (kW)	5	3.3	4.5	14.52	27
Total	Nos of fittings	70	55	50	120	295
	Power output (kW)	5	3	5	15	27

Baseline Luminaries (Old fittings)					
Zone	-	150W	500W	750W	Total
Central	Nos of fittings	70	105	120	295
	Power output (kW)	11	53	90	153
Total	Nos of fittings	70	105	120	295
	Power output (kW)	10.5	52.5	90	153

Type of controls installed: The project has implemented CCMS (Centralized Control and Monitoring System) which is a GSM/GPRS/2G/3G/4G/Equivalent proven technology installed in a feeder or switching point for remote monitoring and controlling group of lights. Time schedule of all the LED lights is preprogramed in the CCMS based on astronomical clock field. It is group wise central monitoring system. Group Controller is an automatic light control throughout the year on basis of precise sunrise and sunset time depending on the geographical location. It performs reporting of energy metering and failure information to central control station at variable time intervals. It achieves instant fault reporting via SMS along with fault information & details of location. There are 295 numbers of CCMS installed across all the four zones to control 198348 number of street lights included in the project activity.

Warranty of the project luminaries: EESL has provided warranty of 7 years on the project luminaries from the date of completion of installation covering any manufacturing defect, high voltage and storage under the tripartite agreement executed between LDA, BRPL and EESL. Lighting performance:

The lighting performance quality of the lighting installations has been defined as per the “Standards for integrated Street lighting Project for Lucknow” dated 29/12/2021. The illuminance criteria based on the standard for each class and type of roads were predefined in the tripartite agreement executed between LDA, EESL and BRPL. The performance of the luminaries is checked during operation on sample basis by EESL and the report is submitted to LDA.

Maintenance and replacement practice: The standard and specification of the project luminaries are predefined based on “Standards for integrated Street lighting Project for Lucknow in the tripartite agreement executed between LDA, EESL and BRPL. The Implementation Completion Certificates for each zone were issued by LDA after proper due diligence on installation of luminaries in all aspects as per the agreement. Before issuing implementation completion certificates, LDA had ensured that,

- ✓ all existing conventional streetlight fixtures are retrofitted, ✓ the LED fixtures are replaced as point-to-point replacement of existing conventional fixture,
- ✓ EESL has supplied Energy Efficient LED streetlight fixtures complete with all accessories, including necessary mounting arrangements with proper earthing to the fixture, and
- ✓ EESL has provided the details of the installed LED lights (i.e. no., location, GIS mapping of LED lights through CCMS system etc).

The responsibility of operation and monitoring is also vested on EESL who ensures that the LED streetlight fixtures supplied and installed shall conform to technical standards as indicated in agreement including maintenance of Lux level. EESL provides a system of remote switching on-off of all lights along with real time monitoring. Provision of penalty imposition on EESL is defined in the agreement on failure to maintain a minimum uptime of retrofit luminaries of 95% excluding the period of non-availability of power supply. Further, as a part of its performance requirement for replacement, EESL is obliged under the agreement to: a) replace the defective/ non burning LED lights within 24 hours of the reported failure, and b) keep adequate quantities of spare LED lights in order to enable speedy replacement. Annual audit is conducted by an independent third party to assess the performance level committed by EESL vide the agreement.

S.no	For 90W LED Lights	Details
1	no of units	50
2	commissioned units	50
3	commissioned date	29.05.2022
4	no of LED lights used	50nos-90W
5	technical specification of lights	BRLEP 90W LED WW V3 E
6	DAILY USAGE OF LIGHTS	11 hours
7	technical specification of baseline	LED
8	suppliers of LED lights	Bajaj
9	PO/and Invoice of LED	Verbal
S.no	For 60W LED Lights	Details
1	no of units	55
2	commissioned units	55
3	commissioned date	29.05.2022
4	no of LED lights used	30nos-60w
5	technical specification of lights	ENDURA PEARL NEO 60W
6	DAILY USAGE OF LIGHTS	11 hours
7	technical specification of baseline	LED
8	suppliers of LED lights	Havells
9	PO/and Invoice of LED	Verbal

A.5. Parties and project participants >>

Party (Host)	Participants
India	Lucknow Development Authority

A.6. Baseline Emissions>>

Adoption of energy efficient lamps and/or fixture combinations to replace less efficient lamps and/or fixture combinations in public- or utility-owned street lighting systems

Limited to public- or utility-owned street lighting systems;

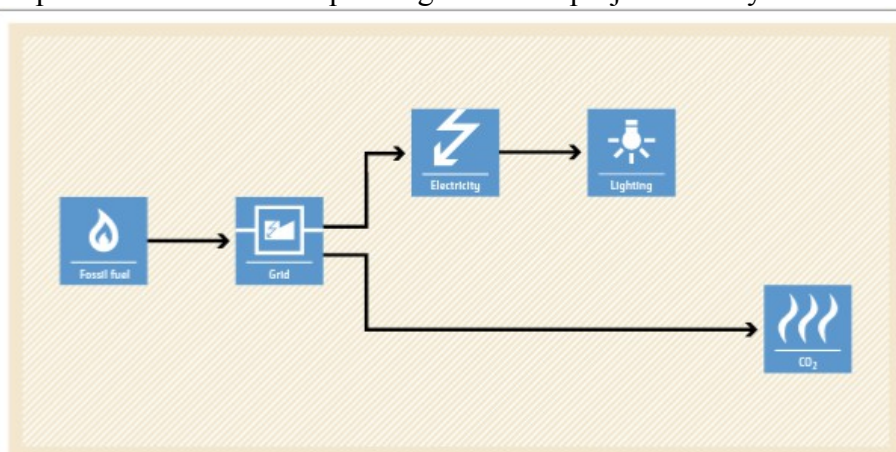
- Allows multiple-for-multiple lamps replacements;
- Requires continuous replacement of failed lamps;
- Includes new construction (Greenfield) installations;
 - Identify baseline technology for Greenfield, using the data from the region
- Ensure that lighting performance quality of project lamps be equivalent or better than the baseline or applicable standard;
- No mandatory destruction of replaced lamps required.

Monitored:

- Average time elapsed between failure of luminaires and their replacement;
- Annual failure rate;
- Average annual operating hours;
- Average project equipment power;
- Number of project luminaires placed in service and operating under the project activity.

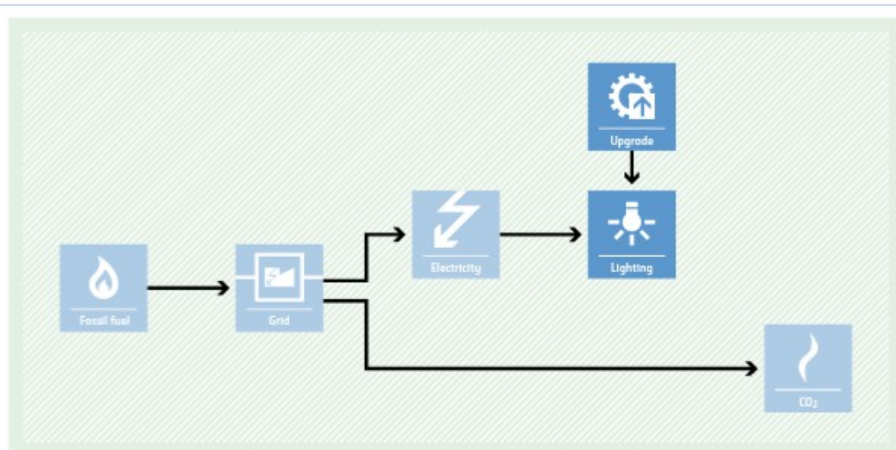
BASELINE SCENARIO

Less efficient lamps are used in street lighting systems.



PROJECT SCENARIO

Efficient lighting replaces less efficient lighting thus reducing electricity consumption and GHG emissions.



A.7. Debundling>>

This “Energy saving through efficient street lighting systems by LDA, Lucknow, India” project is not a debundled component of a larger project activity.

SECTION B. Application of methodologies and standardized baselines

B.1. References to methodologies and standardized baselines >>

SECTORAL SCOPE – 3 Energy demand

TYPE **TYPE II - ENERGY EFFICIENCY IMPROVEMENT PROJECTS**

CATEGORY- Title: AMS-II.L: Demand-side activities for efficient outdoor and street lighting technologies–Ver. 2.0 Tools involved in the project are listed below:

Tool to calculate the emission factor for an electricity system - Ver 7.0

1. Tool 21: Demonstration of additionality of small-scale project activities – Ver 13.1
2. Tool 23: Additionality of first-of-its-kind project activities – Ver 03.0
3. Guidelines for sampling and surveys for CDM project activities and programmes of activities – Ver 04.0

B.2. Applicability of methodologies and standardized baselines >>

S.I No.	Applicability conditions of AMS-II.L. (Ver. 2.0)	Eligibility of project under consideration
1	<p>Scope:</p> <p>This category comprises activities that lead to efficient use of electricity through the adoption of energy efficient lamps and/or fixture combinations to replace less efficient lamps and/or fixture combinations in public- or utility-owned street lighting systems. Project and baseline lamps and/or fixture combinations are referred to here as luminaires, which encompasses all of the components in an individual assembly of street lighting equipment, including lamp, lens and reflector, fixture housing, wiring, and driver or ballast and individual and centralized controls components/system(s). This methodology covers projects involving multiple luminaires used to illuminate roadways.</p>	<p>The project activity involves replacement of old conventional energy inefficient lighting fixtures with efficient LED lighting luminaries in the streets of the administrative zone covered under the jurisdiction of the urban body, South Lucknow Municipal Corporation (LDA). The lighting fixtures are also owned by LDA. Hence, the scope of the methodology covers the type of the project activity to use the methodology, AMS II.L.</p>
2	<p>This methodology is applicable for one-for-one replacements of baseline luminaires with project luminaires or for replacing multiple baseline luminaires with multiple project luminaires. This methodology is also applicable to projects that involve the implementation of lighting controls that reduce total operating hours or average wattage of the lighting system as well as for new construction installations.</p>	<p>There is one-for-one replacement of baseline luminaries with project luminaries. Hence this condition of the methodology is met.</p>

3	This methodology is only applicable if failed project equipment will continuously be replaced based on local maintenance practices, during the crediting period, with equipment of equivalent or better lighting and energy performance specification.	The failed streetlights in the entire administrative zone of Lucknow Municipal Corporation (MCD) including LDA is replaced whenever found failed. The same is going to be continued during the crediting period of the project activity. The failed project equipments in the project activity are continuously replaced by the EESL as per the tripartite execute between LDA, EESL and BRPL. Hence, this condition of the methodology is met.
4	The luminaires selected to replace existing equipment must be new equipment and not transferred from another project activity.	The LED luminaires fitted in the project activity are new and not transferred from any other project activity. This could be evidenced from the purchase orders placed to the suppliers and the tripartite agreement executed between LDA, EESL and BRPL. Hence, this condition of the methodology is met.
5	Controls covered by this methodology may include simple photocells and/or astronomical time clocks that provide basic streetlight scheduling control. Controls may also include advanced systems that allow for more sophisticated strategies, such as dynamically altering street lighting power (dimming or multiple levels of operation such as bi-level lighting) based on vehicle and/or pedestrian traffic sensors or schedules, time of night, ambient conditions, etc.; a practice known as adaptive lighting.	technology installed in a feeder or switching point for remote monitoring and controlling group of lights. It is group wise central monitoring system. Group Controller is an automatic light
		control throughout the year on basis of precise sunrise and sunset time depending on the geographical location. It performs reporting of energy metering and failure information to central control station at variable time intervals. It achieves instant fault reporting via SMS along with fault information & details of location. There are 2964 numbers of CCMS installed across all the four zones to control 198348 number of street lights included in the project activity. Hence, this condition of the methodology is met.
6	This methodology applies to street lighting projects that provide lighting performance quality either: (a) equivalent to or better than the baseline lighting performance; or (b) equivalent to or better than the applicable street lighting standard. If adaptive controls will be used to vary light output for project luminaires, lighting performance must be proven to meet or exceed baseline performance or the applicable standard for all light output settings. The preferred standard would be the local standard if there is one, in the absence of a local standard the national standard if there is one, or the CIE standards detailed in appendix 1 of this methodology, if there is no local or national	The lighting performance quality has been defined as per the “Standards for integrated Street lighting Project for Lucknow” . The illuminance criteria based on the standard for each class and type of roads were predefined in the tripartite agreement executed between LDA, EESL and BRPL. The performance of the luminaires is checked during operation on sample basis by EESL and the report is submitted to LDA. Hence, this condition of the methodology is fulfilled.

	standard.	
7	<p>For retrofit projects, lighting performance quality of project luminaires shall be shown to comply with this methodology through the use of one of the following methods:</p> <p>a) Equivalence to existing baseline luminaires: the project participant shall prove that project luminaires provide equivalent or improved total useful illumination (lx), compared to the baseline luminaires being replaced, at each representative location. Either by:</p> <p>(i) measurements and calculations; or</p> <p>(ii) or computer modeling of average illuminance from baseline and project luminaires at representative locations that shall be determined in accordance with CIE standard 140:2000;</p>	<p>As explained above, Lighting performance of the project luminaires has been defined as per the “Standards for integrated Street lighting Project for Lucknow”. The lighting performance quality of the project luminaires will be shown to comply with this methodology through method no. (b). The performance of project luminaires as per the local standard shall be checked at each representative location.</p> <p>Hence, this condition of the methodology is fulfilled.</p>
	<p>b) Compliance with applicable street lighting standard:</p> <p>I. If a national or local lighting standard is available that prescribes lighting levels for roadway lighting classes, such shall be used to evaluate project luminaire compliance at each representative location. A standard field of calculation shall be defined to field measure or computer model illuminance per appendix 2 of this methodology. Project luminaires must meet or exceed the illuminance levels prescribed in the standard, as well as uniformity and glare criteria as applicable;</p> <p>II. If no national or local standard exists, the project participant shall use an approved international standard such as CIE’s Lighting of Roads for Motor and Pedestrian Traffic (CIE 115:2010), which provides a structured model for selection of the appropriate roadway lighting class and gives recommended maintained lighting levels. Alternately, if appropriate, project participant may use the illuminance standards given in CIE’s Technical Report: Road Transport Lighting for Developing Countries (CIE 180:2007). The illuminance, uniformity and glare requirements of both of these standards are provided in appendix 2 of this methodology;</p>	

	<p>III. Illuminance evaluations for comparison of project and baseline luminaires or for compliance with an applicable standard shall either be made on the basis of the photopic response curve, or using the mesopic system of photometry developed by the CIE and relying on photopic and scotopic response curve measurements;</p> <p>IV. Determining lighting performance quality is a one-time activity and thus continuous monitoring and verification of lighting system performance compliance with baseline performance or applicable street lighting standards are not required during the crediting period.</p>	
8	In the case of a Greenfield (new construction) project, the existing baseline technology is assumed to be the prevailing street lighting technology used in the region for equivalent roadway types and lighting classes. If it is not common practice in the project's region to illuminate roadways with electric lighting and it cannot be shown that a less efficient street lighting system would be installed in lieu of project activities, this methodology is not applicable.	This condition is not applicable as the candidate project is not a greenfield project.
9	For Greenfield baseline determination, project participant must be able to document representative locations, as described in paragraph 7, where baseline luminaires are already installed in the same region as the project. The same region is defined as either: (a) within 200 km of the project's boundary; or (b) within the same city or town jurisdiction. The project participant must document the type, wattage, and operating schedule of the baseline luminaires at the comparable location and assume this as the baseline for the project representative location. In selecting the baseline technologies to consider, the project participant shall follow the "General guidelines for SSC CDM methodologies" under the section 'Type II and III Greenfield projects'.	This condition is not applicable as the candidate project is not a greenfield project.
10	The aggregate electricity savings by a single project activity may not exceed the equivalent of 60 GWh per year.	The annual estimated electricity saving from the project activity is below 60 GWh, hence, this condition of the methodology is met.

11	<p>The PDD shall include and/or explain:</p> <p>(a) Design specifications of project lamps and/or luminaires such as:</p> <ul style="list-style-type: none"> (i) Equipment power (in Watts) and output (in lumens); (ii) Type of controls installed (astronomical time clock, photocell, wireless RF controller, etc.); (iii) Equipment warranty; <p>(b) How project procedures eliminate double counting of emission reductions, for example due to project luminaire manufacturers, wholesale providers or others possibly claiming</p>	The explanations are incorporated in the section A.3 of the PSF. Hence, this condition of the methodology is fulfilled.
	<p>credit for emission reductions for the project luminaires;</p> <p>(c) How the project design utilizes professional lighting design practices to ensure adequate roadway lighting levels are delivered by project equipment according to accepted practice or local or national roadway lighting standard if one exists;</p> <p>(d) How the maintenance and replacement practices for the street lighting system will ensure that failed equipment is replaced by equipment of the same or better specification to that of any failed project equipment to assure that lighting and energy performance of the project system is maintained.</p>	

B.3. Applicability of double counting emission reductions >>

PP will request for issuance of carbon offsets in UCR for the post completion of the fixed crediting period (01/04/2022 – 31/03/2032) i.e., crediting period will start from 01/04/2022. The project is not registered with any other voluntary market (National or International). Hence, the criteria for double counting are not applicable for the project.

The current status of project activity is "Listed", and not yet registered. PP will provide undertaking for no double accounting for the same monitoring period during verification stage and will ensure that there will not be any double accounting for same project location.

B.4. Project boundary, sources and greenhouse gases (GHGs)>>

As per the applied methodology, AMS II.L, Ver. 02.0, the project boundary is the physical, geographical location of all project luminaires installed. Accordingly, the entire administrative zone under the control of SDMC where all the installed LED streetlights are spread over is considered as the project boundary.

The table below provides an overview of the emissions sources included or excluded from the project boundary for determination of baseline and project emissions.

	Source	GHG	Included?	Justification/Explanation
Baseline	CO ₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
Project	Energy Saving due to efficient LED street lights installation.	CO ₂	No	No CO ₂ emission is attributed to the project activity
		CH ₄	No	No CH ₄ emission is attributed to the project activity
		N ₂ O	No	No N ₂ O emission is attributed to the project activity

B.5. Establishment and description of baseline scenario (UCR Standard or Methodology) >>

The project saves energy in form of reduced consumption of electricity due to installation of energy efficient LED streetlight luminaries as compared to the luminaries fitted in the pre-project/baseline scenario. Therefore, grid-based electricity used in the pre-project as well as project scenario has been considered as the baseline source of energy. As per the applied methodology, AMS II.L, baseline emission has been calculated based on the net electricity saved in the project activity after installation of energy multiplied with the grid emission factor.

In line with paragraph 20, of the applied methodology, AMS II.L, for the calculation of ex-ante emission reduction, the rated power (watts) of the baseline and project luminaries is considered as below.

LED type	Power output		
	Output of each single installation (W)	Total numbers	Total output (kW)
50W	50	70	5
60W	60	55	3.3
90W	90	50	5
121W	121	120	15
Total		295	27

Baseline Luminaries:

Luminary type	Power output		
	Output of each single installation (W)	Total numbers	Total output (kW)
150W	150	70	10.5
500W	500	105	52.5
750W	750	120	90
Total		295	153

As per paragraph 20 (b) of the methodology, since the luminaries are controlled by advanced

controls that allow scheduling options other than light sensing or time clock, the operating time has been assumed as 11 hours.

As per paragraph 20 (c) of the methodology, the gross electricity saving is calculated as below;

$$\begin{aligned}\text{Gross Annual Saving} &= (153 - 27) \text{ kW} \times 11.5 \text{ hrs} \times 365 \\ &= 528000 \text{ kWh} \\ &= \mathbf{528 \text{ MWh}}\end{aligned}$$

In line with paragraph 20 (d) of the methodology, the net electricity saving (NES) is calculated by correcting the gross electricity savings for any leakage and transmission & distribution losses.

There is no leakage associated with the project activity. When the sources suggest that the transmission and distribution losses of electricity in India is higher, for sake of conservativeness, a default value of 10 per cent has been used for the calculation of emission reduction.

In line with the paragraph, 21 of the methodology, once the project is installed, the electricity saved by the project activity in year y shall be calculated as follows:

$$NES_y = \sum_{i=1}^n (G_{i,y} \times (1 - L_{i,y})) \quad \text{Equation (1)}$$

Where,

$$G_{i,y} = (P_{i,y} \times T_{i,y} \times (1 - L_{i,y})) - (P_{i,y} \times T_{i,y} \times (1 - L_{i,y})) \quad \text{Equation (2)}$$

$$NES_y = \sum_{i=1}^n G_{i,y} \times (1 - L_{i,y}) \quad \text{Equation (3)}$$

$$NES_y = NES_{gross,y} \times (1 - L_{i,y}) \quad \text{Equation (4)}$$

Where:

$$\frac{\sum_{i=1}^n \sum_{y=1}^Y E_{i,y}}{\sum_{i=1}^n \sum_{y=1}^Y E_{i,y}}$$

= Net electricity saved in year y (kWh)

= Estimated annual electricity savings for equipment of type i , for the relevant type of project equipment in year y (kWh)

$$C_y$$

= Crediting year counter

$$C_i$$

= Counter for luminaire type

$$N_i$$

= Number of luminaires

$$\frac{\sum_{i=1}^n \sum_{y=1}^Y L_{i,y}}{\sum_{i=1}^n \sum_{y=1}^Y L_{i,y}}$$

= Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the luminaires are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g. theft/pilferage). The average annual technical grid losses shall 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. Reliability of the data used (e.g. appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 10 per cent shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable

$$\frac{\sum_{i=1}^n \sum_{y=1}^Y Q_{i,P}}{\sum_{i=1}^n \sum_{y=1}^Y Q_{i,P}}$$
 and

= Quantity of baseline (BL) or project (P) luminaires of type i distributed and installed under the project activity (units). Once all of the project luminaires are distributed or installed, $Q_{i,P}$ is normally a constant value independent from y unless size of operating luminaire inventory decreases during crediting period, in which case only operating project luminaires shall be credited.

Note that $Q_{i,BL}$ and $Q_{i,P}$ may represent a different number of luminaries (e.g. a larger number of LEDs with less output), but they must represent the same illuminated area

$$P_i$$

$$P_{i,BL}$$

= Rated power of the baseline luminaires of the group of i lighting devices (kW), or time-integrated average power if equipment operates at various power settings, constant value independent from y . For retrofit projects, project proponents shall maintain records to demonstrate what type of luminaire are replaced

22

3333

= Rated power of the project luminaires of the group of i lighting devices (kW), or time-integrated average power if equipment operates at various power settings, normally constant value independent from y unless operating schedule or parameters changes during crediting period.

Time-integrated average power takes into account controls savings such as dimming or bi-level operation that reduce lighting power for periods of time. For example, if on average, project equipment operates at full power 50 per cent of annual operating hours, and half power 50 per cent of annual operating hours, $P_{i, P}$ will be de-rated from full value to 75 per cent of full value $((1 \times 50\%)+(0.5 \times 50\%))$

A "grid emission factor" refers to a CO₂ emission factor (tCO₂/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO₂/MWh for the 2014- 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021 and 2022, the combined margin emission factor calculated from CEA database in India results into higher emission than the default value. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.

B.6. Prior History>>

The project activity is not having prior history of any registration with any other mechanism

B.7. Changes to start date of crediting period >>

There is no change in the start date of crediting period.

B.8. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

There are no permanent changes from registered PCN monitoring plan and applied methodology

B.9. Monitoring period number and duration>>

First Issuance Period: 10years, 00 months – 01/04/2022 to 31/03/2032

B.8. Monitoring plan>>

Data / Parameter:	CO ₂ emission avoided
Methodology reference	AMS-IL, Version 02.0
Data unit	tCO ₂ /Yr
Description	CO ₂ avoided due to implementation of the project.
Measured/calculated /default	Calculated
Data source	This shall be calculated based on the monitored parameters defined in the above tables.

Value(s) of monitored parameter	--
Measurement/ Monitoring equipment	Not applicable
Measuring/reading/ recording frequency	This shall be monitored continuously based on the operational hours of the project luminaries.
Calculation method (if applicable)	
QA/QC procedures	-
Purpose of data	
Additional comments	-

Data / Parameter:	<i>Energy Saved</i>
Methodology reference	AMS-II.L, Version 02.0
Data unit	MWh/Yr
Description	Electrical energy saved due to implementation of the project.
Measured/calculated /default	Calculated
Data source	This shall be calculated based on the monitored parameters defined in the above tables.
Value(s) of monitored parameter	--
Measurement/ Monitoring equipment	Not applicable
Measuring/reading/ recording frequency	This shall be monitored continuously based on the operational hours of the project luminaries.
Calculation method (if applicable)	
QA/QC procedures	-
Purpose of data	
Additional comments	-