CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM-SSC-PoA-DD) Version 01

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NOTE:

(i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.

(ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).

SECTION A. General description of small-scale programme of activities (PoA)

A.1 Title of the small-scale programme of activities (PoA):

>> "Greenlight Solar PV Lighting India"
Version Number: 04
Date: 29/11/2012

A.2. Description of the small-scale programme of activities (PoA):

>>

1. General operating and implementing framework of PoA

The purpose of the proposed PoA is dissemination of battery-charged solar-powered lamps to provide basic lighting service to households using fossil fuel based lighting systems in India. It will thereby replace the fossil fuel based lamps systems currently in use in project households, thereby reducing Greenhouse Gas (GHG) emissions resulting from combustion of fossil fuels in the baseline lamps. A typical programme solar lamp shall consist of a solar photovoltaic panel (SPV), electronic circuits, storage battery and luminary. SPV panel captures solar energy and converts it into electrical energy which is then stored in a battery. The luminary draws electricity from the battery and provides light.

In many parts of India, commonly used fossil fuel for lighting is kerosene. As per National Sample Survey Organisation Report (March 2010), Ministry of Statistics and Programme Implementation, Government of India 61.4 million rural households (39% of total rural households) and 3.2 million urban households (6% of total urban households) still depend on kerosene for meeting lighting needs[1]. The same is also advocated by the latest information in Census of India 2011, as ~77 million households (~72 million rural + ~5 million urban)[2] using kerosene as primary source of lighting. Thus, both in rural and urban areas, millions of households depend upon kerosene as their primary fuel for lighting.

The PoA targets consumers that use kerosene/oil as their primary lighting source either in rural / urban India to replace the fossil fuel based lamps with solar based lighting systems. The PoA by replacing fossil fuel (kerosene) based lamps as a preferred source of lighting shall result in GHG emission reductions, improve safety and enhance living standards in the user households over the lifetime of the PoA.

EcoSecurities India Private Limited (EIPL) is the coordinating/managing entity (CME) for this PoA and the host nation participant. Its responsibility is to communicate with CDM Executive Board and coordinate the work relating to validation, verification, registration and issuance of carbon credits generated by the PoA and efforts from CPA implementers (CPAIs).

J.P. Morgan Ventures Energy Corporation (JPMVEC) is the participant from the Annex 1 party in the programme.

Greenlight Planet India Private Limited (GLP) will act as the on ground expert and is also implementer of the first CDM program activity (CPA). GLP is in the business of manufacturing and marketing of solar lamps and has put-in-place an innovative distribution network for its marketing and

[1] NSSO, 2010. National Sample Survey Organisation. *Household Consumer Expenditure in India, 2007-08* –NSS Report Number 530, Table 15R and 15U, Ministry of Statistics and Programme Implementation, Government of India.

[2] Census of India 2011 – Source of lighting, 2001-2011

distribution in India that ensures a wider reach in the rural market. It will liaise with this distribution network to collect information necessary for monitoring.

Additional CPAIs may associate with the PoA during its lifetime. These CPAIs may or may not act as project participants depending upon the agreement between the CME and corresponding CPAI. Subsequent CPAIs may evolve their own network for the sales of lamps under the PoA. However, they must adhere to the general implementing framework described in the PoA-DD, while being free to develop their own network to facilitate effective marketing and distribution of the project lamps and collection of monitored data. Such details would be described in the specific CPA-DD. The CPAI must provide CME with the data necessary for monitoring.

2. Policy/ measure or stated goal of the PoA

The goal of the PoA is comprehensive dissemination of solar lamps to households, using kerosene/oil/other fossil fuel as their primary lighting source in rural / urban India, to replace the usage of fossil fuel based lamps. The programme will provide significant benefits of social, economic, environmental and technological well-being as discussed below:

a) **Social Benefits:** It has been well documented that the kerosene/oil lamps are a serious fire hazard[3] if fuel is accidentally spilled. In comparison, a solar lamp does not pose any fire risk, besides, the provision of reliable lighting.
b) **Economic Benefits:** As kerosene is the main fuel for lighting in rural areas, Government of India supplies kerosene at subsidized prices to rural households through the Public Distribution System (PDS). Solar lamps can improve the economic well-being of individual households through savings on recurring kerosene expenditure. Solar lamps can also help the national economy by reducing subsidy burden of Government of India and saving foreign exchange[4]. The programme would also lead to employment of large number of people engaged in activities like selling and servicing of solar lamps.
c) **Environmental Benefits:** Kerosene lamps are known to have undesirable effects on indoor air quality[5]. In comparison, solar lamps are smokeless as they do not consume fossil fuel. Further, use of solar PV panels to generate electricity produces no GHG emission by limiting the use of fossil fuel.
d) **Technological Benefits:** Solar lighting systems are based on a cleaner, environmentally safe and sound technology for lighting than fossil fuel based lamps. With the implementation of this PoA, the users would get access to a renewable improved lighting technology as compared to non renewable - fossil fuel lamps.

3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity

The Greenlight Solar PV Lighting India PoA is a voluntary activity proposed by JPMVEC and EIPL, the CME of the PoA. All Project Participants are voluntarily taking part under this program. There is no mandatory law regulation that mandates the installation of solar lamps by households in India.

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[3] Joseph E. Shepherd (Corresponding author) *Kerosene Lamps and Cookstoves - the Hazards of Gasoline Contamination* ,Aeronautical and Mechanical Engineering California Institute of Technology

[4] Rehman I. H., Malhotra P., Pal R. C., Singh P. B., *Availability of kerosene to rural households: a case study from India*, Energy Policy ,33 (2005), pg. 1.*4*

[5] Evan Mills, *Technical and Economic Performance Analysis of Kerosene Lamps and Alternative Approaches to Illumination in Developing Countries*, 2003, pg. 3.

A.3. Coordinating/managing entity and participants of SSC-POA:

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EIPL is the Coordinating/ managing Entity (CME) of this PoA and a project participant in the programme

JPMVEC is a project participant from the Annex 1 party in the programme.

The details of the project participants are given below:

Name of Party Involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	EcoSecurities India Private Limited (EIPL) (Private Entity)	No
United Kingdom of Great Britain and Northern Ireland	J.P.Morgan Ventures Energy Corporation (JPMVEC) (Private Entity)	No

A.4. Technical description of the small-scale programme of activities:

A.4.1. Location of the programme of activities:

>> India

A.4.1.1. Host Party(ies):

>>India

A.4.1.2. Physical/ Geographical boundary:

>> As per paragraph 10 of AMS-III.AR, the project boundary includes the project lamps as well as the charging systems, ie. In case project lamps that are charged by a renewable energy system, the project boundary includes the physical, geographical site of the renewable energy system. Therefore, for the proposed PoA, the project boundary includes all the sites where the project lamps are sold.

Figure 1 Geographical boundary for the Greenlight Solar PV Lighting India PoA

As the project lamps *may* be sold *in different regions in* India, the PoA boundary has been limited to political boundary of India. All states and union territories within India are within the geographic boundary of PoA. All project lamp units under this PoA, must be sold within the political boundary of India.

A.4.2. Description of a typical small-scale CDM programme activity (CPA):

>>

A typical CPA may involve distribution of a variety of solar lamps, with different lumen outputs and power ratings, as an alternative to fossil fuel based lamps, within the geographical boundary of India. The size of each CPA is defined by Paragraph 9 of AMS-III.AR, version 03 and Guidelines on the Demonstration of Additionality of Small-Scale Project Activities, version 09 as those measures reducing 60 ktCO_2e per year.

The CPAs will be implemented by GLP or the respective CPAIs. The CME will approve and submit the new CPAs for inclusion under the PoA. The CPAI would be involved in marketing and sales of the project lamps.

All CPAIs will follow the approved monitoring plan and procedures so that the appropriate number of emission reductions can be claimed. Record of project lamps sold in a CPA shall be maintained and managed by the CPAI/CME as per the relevant monitoring requirements prescribed in the corresponding CPA-DD.

A.4.2.1. Technology or measures to be employed by the SSC-CPA:

>>

The technology employed by the programme is environmentally safe as it does not lead to any harmful emissions in the atmosphere.

A typical project lamp[6] consists of a solar panel that converts solar energy directly into electricity by the photovoltaic effect. A brief description of the components of a typical solar powered lamp is given below:

- *Solar Panel:* It uses photovoltaic technology to convert solar energy into electricity.
- *Luminary: It* will be using LED as a light emitting source;
- *Electronics:* Electronic *circuit*ry will be present to control the charging, discharging of the battery, driving the luminary with the right voltage/current;
  Battery: The battery will be charged by the solar panel during the day and this stored energy will be used to drive the luminaries.

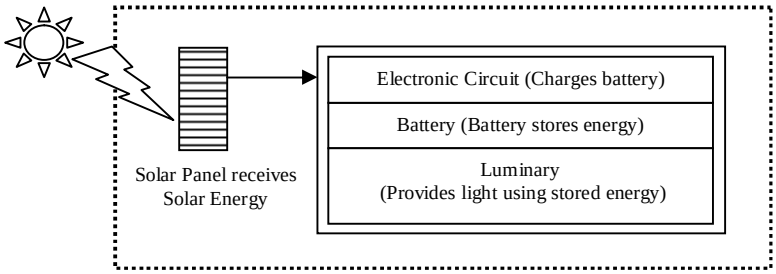

Figure 2: Block diagram of a typical solar lamp

The lamps included under any CPA of this PoA shall meet the eligibility requirements specified in AMS-III.AR, version 03.

[6] During the course of Programme, new models of solar lamps might be developed and marketed. Thus the description might differ from that mentioned above. However, the basic operating principle of the solar lamps shall remain the same as described above.

CPAIs are encouraged to improve upon the solar lamp design through, internal research and development. Alternative designs/models will also be eligible under the PoA, as long as they meet the eligibility criteria for inclusion as per section A.4.2.2 of this PoA-DD. Since different lamp models, with different design specifications, may be included in different CPAs, these design specifications are not being included in the PoA-DD. However, each specific CPA-DD section A.4, shall include all the design specifications, as listed in paragraph 7 of the methodology[7], of the project lamps included in the CPA. Depending upon the lamp models in distribution, the PoA or a particular CPA may or may not result in technology transfer. Each specific CPA-DD shall state if the CPA results in transfer of technology.
The PoA will be implemented using the approved methodology *AMS-III.AR: Substituting fossil fuel based lighting with LED/CFL lighting systems (Version 03)* under *Type (III). Sectoral Scope: 01 (*Energy industries (renewable/non-renewable sources).

A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA:

>>
The following eligibility criteria have been set for the inclusion of a CPA in the PoA**:**

- The proposed CPA and all its units must be sold within the geographical boundary of India.
- The start date of the proposed CPA shall not be prior to the start date of validation of the PoA. The CPA start date shall be the date of sale of first CDM eligible lamp under the CPA and shall be checked with documentary evidence.
- The technology used under the proposed CPA shall consist of isolated solar LED lighting systems.
- The CPA shall apply the small-scale methodology AMS.III.AR, version 03 and the solar lamps included in the proposed CPA must comply with applicability criteria of methodology AMS-III.AR version 03.
- The CPA shall ensure that the replaced baseline lamps are those that directly consume fossil fuel. This may be demonstrated through documentation of the common practice of fuel usage for lighting within the CPA boundary (e.g. based on representative sample surveys, official data or peer reviewed literature) that demonstrates that fossil fuel is a commonly used fuel for lighting and for this purpose common practice of fuel usage for lighting is deemed as fossil fuel usage in at-least 50 % of the households at the state(s) level (or districts' level as a secondary alternative) in India.
- Each of the unit[8] in the CPA should achieve less than 600[9] tCO_2e reduction per year
- The total number of all lamps installed under the proposed CPA are limited to those that result in emissions reductions of less than or equal to 60 kt CO2 equivalent annually throughout the crediting period.
- End users of the technology or measures should be households/communities/SMEs.
- The project lamps shall have provisions to eliminate double counting of emission reductions on account of multiple parties claiming ownership of emission reductions. The project lamps shall bear the logo of CPAI and/or a unique serial number and/or provisions for transfer of ERs arising from the use of the lamp to the CPAI.
- The CPA shall be checked and approved by the CME before being included under the PoA.
- The CPA shall not result in diversion of ODA.

[7] See format for reporting lamp specifications in Appendix 2

[8] A single solar lamp

[9] Lower of the threshold values defined in Paragraph 2 (c), EB 68, Annex 27 and paragraph 10 of Annex 13 to the EB 54

- Each CPA will be developed and implemented by a CPAI which has signed the standard contractual agreement with the CME/credit Buyer to participate in the PoA; such agreement guiding the transfer of the emission reduction rights to the CME.
- If applicable, the CPA sampling plan for verification shall be in accordance with the sampling plan in Appendix 1 of the PoA-DD.

A.4.3 Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

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The CPA will involve distribution of solar lamps with the objective to replace and reduce the continued usage of kerosene and other fossil fuels for lighting India. By replacing fossil fuel based lamps for lighting, the Programme of Activities will reduce the GHG emissions that would have resulted from the combustion of fossil fuels.

The proposed PoA is a voluntary program by the CME. Use of solar PV lighting system is not mandatory in India by any law, policy or regulation. Even for power generation, the Electricity Act 2003[10] does not restrict or empower any authority to restrict the fuel choice.

Assessment and Demonstration of Additionality of the Proposed PoA

The proposed PoA uses Guidelines on the Demonstration of Additionality of Small-Scale Project Activities, version 09 for demonstrating the additionality of the project. In accordance with the aforementioned guideline, the CPAs included in the PoA shall be considered additional as:

i. The CPAs are solely composed of isolated units in this case, a solar lamp
ii. The users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs)
iii. Each unit is no larger than 5% of the small-scale CDM threshold (ie. Each unit achieves less than 3000 tCO_2e)

Since these criteria are already listed as eligibility criteria for inclusion of a CPA in the PoA, thus, all the included CPAs in the PoA are deemed additional. Also, as this would be a characteristic of all the CPAs in the PoA, hence the additionality is demonstrated once at PoA level directly.

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

A.4.4.1. Operational and management plan:

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The objective of the operation and management plan is to make the execution and operation of the project more systematic for the purpose of achieving real and measurable emission reductions and supporting the verification process.

EIPL will be the coordinating/ managing entity (CME) of the proposed program.. Each CPA will be executed by individual CPA Implementers (CPAI) who will be responsible for the distribution of solar lamps as well as setting up of data collection and monitoring systems in accordance with the registered monitoring plan. The CPAI shall transfer sales information as well as monitoring survey results (in case of Option 2 only) at regular intervals to CME electronically/hard copy.

The CME has developed the monitoring plan and procedures described in the PoA-DD. Each CPA will be assigned a unique title/name by the CME.

[10] http://www.cercind.gov.in/08022007/Act-with-amendment.pdf

(i) A record keeping system for each CPA under the PoA

Each CPAI shall collect and archive data in accordance with the procedures listed below:

Step 1: Data collection

A solar lamp could be sold to a consumer either by the CPAI or through one of its marketing channels (distributor, dealer, retailer network, intermediary etc). Relevant sales information, as and where possible, shall be recorded in line with paragraph 21(a). For Option 2 of paragraph 12 data as per paragraph 21 (b) shall also be monitored and recorded. For further information, please refer section E.7.1. The information collected shall be transferred to CPAI head office at regular intervals (electronically/hard copy).

Step 2: Data Archiving

As applicable, relevant data on sales and product characteristics shall be archived electronically/hard copy by CPAI at their office(s). The same shall be submitted to the CME periodically and archived.

(ii) A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA

To avoid inclusion of any lamp which is a part of another registered carbon project/ programme, all lamps under this programme shall bear the logo of CPA Implementer(s)/ CME and provisions for transfer right to ERs attributable to the lamp to the CPAI/CME. Additionally, the lamps would carry unique serial number, which would assist in unique identification of each lamp included in the PoA. This shall ensure that only lamps that are part of this programme are included in the PoA and inclusion of any lamp external to this programme is not possible.

Also, for CPAs under Option 2, in line with the requirements of paragraph 25 of AMS.III.AR, version 03, paragraph 12, project lamps shall be marked with serial numbers for clear, unique identification to associate them with each unique CPA.

(iii) The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity

In accordance with *paragraph 10 of Annex 13 to the EB 54, Guidance for determining the occurrence of de-bundling under a Programme of Activities (PoA)*, if each independent subsystem/ measures included in the CPA of a PoA is *no larger than 1%* of the small scale threshold defined by the methodology applied, then that CPA of PoA is *exempted* from performing de-bundling check, i.e. considered as not being a de-bundled component of a large scale activity.

The threshold defined for all Type III project activities is 60 kt CO_2 equivalent annually. Each project lamp results in emission reduction of 0.092 tCO_2e per year (paragraph 13 &14, AMS.III.AR, version 03), which is less than 1% of 60 kt CO_2e. Hence, *the program is exempted from carrying out a de-bundling check.*

(iv) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA

The CPAIs would be aware of their activity being subscribed to the PoA as a CPAI's requirement to sign an agreement/MoU with CME/Credit Buyer is an eligiblity criterion for inclusion of CPA in the PoA.

A.4.4.2. Monitoring plan:

>>

(i) Description of the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA.

The project will follow *AMS-III.AR. Version 03,* "Substituting fossil fuel based lighting with LED/CFL lighting systems".
To determine the effective useful lifetime of a project lamp, each CPA in the proposed PoA shall chose either Option 1 or Option 2 defined in paragraph 11 and 12 of AMS. III-AR. The monitoring requirements for each CPA shall vary depending upon the choice of effective useful lifetime.

CPAs using option 1 as per paragraph 11 of AMS. III. AR
Project lamps are assumed to operate for two years after distribution to end-users. Therefore, under this option, emission reductions may only be claimed for two years. In this case, monitoring shall include recording of project lamp distribution data[11] only.

CPAs using option 2 as per paragraph 12 of AMS. III. AR
Project lamps are assumed to operate for upto seven years after distribution to end-users, and thus emission reductions can be claimed up to seven years per project lamp. In this case, monitoring shall include recording of project lamp distribution data; and ex post monitoring surveys to determine $OF_{y,i,j}$[12]. If ex-post monitoring is required, sampling procedures (Appendix 1) will be implemented to take place in the third year of each CPA and the results utilized for operational years 4, 5, 6 and 7 of project lamps of that CPA.
For CPAs using option 2, data to unambiguously identify each recipient of a project lamp, for all the project lamps distributed will also be maintained by means of a warranty registration process.

<u>Responsibilities</u>
The overall monitoring for a particular CPA will be managed and done by CPAI or appointed entity. The CPAI will maintain a database which would have relevant sales records for project lamps sold under the CPA .
If ex-post monitoring survey is required (for CPAs using Option 2), the CPAI shall follow the guidance given in CPA-DD section B.6.1 to carry out the monitoring surveys. The survey report will set out the value for $OF_{y,i,j}$[13],for emission reduction calculation.

DOEs shall follow the guidance in EB 65, Annex 2 or any subsequent version thereof, for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA.

[11] Including number of project lamps distributed to end users under the project activity, identified by the type of project lamps (lamp wattage, battery type, charging method, the date of sale / distribution)

[12] Assumed to be equal to 100% for years 1, 2 and 3 as per paragraph 19, AMS.III-AR (version 03).

[13] y = operational years 4, 5, 6 and 7 of a project lamps of that CPA

(ii) In case the coordinating/managing entity opts for a verification method that does not use sampling but verifies each CPA (whether in groups or not, with different or identical verification periods) a transparent system is to be defined and described that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA;

Each CPA under the PoA shall be verified. The verification shall include use of sampling techniques as defined in Appendix 1. The CME shall maintain a database of each lamp included in a CPA of the PoA. The PoA record keeping procedures and the unique serial numbers associated with each lamp will prevent double counting across CPAs. Each CPA shall be identified by a unique title/number.

A record with the start and end dates of each monitoring period and emission reductions attributable to each CPA under that monitoring period would be maintained. Appropriate record keeping procedures would be implemented to ensure that data set of a CPA/ monitoring period is not mixed with any other CPA/monitoring period, preventing any occurrences of double counting. Thus, these records shall enable determination of the current status of each CPA – the duration of previous monitoring periods, sample groups (if applicable), monitoring data, and current verification activities.

A.4.5. Public funding of the programme of activities (PoA):

>> No public funding is made available to finance the program.

SECTION B. Duration of the programme of activities (PoA)

B.1. Starting date of the programme of activities (PoA):

>> 14/10/2011[14]

B.2. Length of the programme of activities (PoA):

>> 28 years

SECTION C. Environmental Analysis

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C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

>>

1. Environmental Analysis is done at PoA level X
2. Environmental Analysis is done at CPA level ☐

The environmental analysis is undertaken at a PoA level only since all CPAs under the PoA shall disseminate solar lighting systems only and thus have the same impact as the programme itself.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

[14] Date of start of Global Stakeholder's Consultation.

The proposed PoA aims at increasing the penetration of solar lamps for lighting thereby reducing dependence on fossil fuels as a lighting fuel. In effect, the PoA reduces GHG emissions that would have resulted from the combustion of fossil fuel for lighting in the project households - thereby improving air quality.

No analysis of environmental impact is required by the Indian government for consumer electronics, however, in order to ensure environmental safety, the CPA entity will at the time of lamp distribution, inform the consumers about the collection and disposal of batteries in an environmentally friendly manner and offer an option for replacement, collection and safe disposal of batteries to the users.
No trans-boundary effects are expected to result from the implementation of this PoA.

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA),:

>>
In accordance with the host country regulations, a typical CPA does not require environmental impact assessment under this program. As per a notification regarding Environment Impact Assessment, dated 14th September, 2006[15], *it is mandatory for such new projects, expansion, modernization of existing plant projects, as those listed in the Schedule to this notification, to obtain Environment Clearance from the Ministry of Environment & Forest, Government of India.* The proposed PoA doesn't fall within the industries/ projects covered under this Schedule, and hence doesn't require any environment clearance.

SECTION D. Stakeholders' comments

>>

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

1. Local stakeholder consultation is done at PoA level X
2. Local stakeholder consultation is done at CPA level ☐

As all CPAs are identical in purpose/goal and the distribution of solar lamp to replace fossil fuel for lighting purpose is a characteristic of the programme itself, therefore, the Local Stakeholder's has been done at the PoA level only.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

>>

Invitation procedure:
Comments by stakeholders were invited by GLP in a stakeholder meeting on February 9, 2011 at Middle School Salaha, Gram Panchayat Sonapur, Begusarai district Bihar, India. Invitations to relevant stakeholders were sent out both personally (15 days in advance of the meeting[16]) and through public notices. A project concept note, providing an overview of the project activity, including the measures taken under the project and the benefits achieved by the project, was issued as information to the concerned stakeholders. Posters and notices were put up in public areas like bus stop, police station, schools, hospital etc. to invite as many people as possible.

[15] Ministry of Environment and Forest Circulars http://envfor.nic.in/legis/eia/so1533.pdf

[16] 25/01/2011

Twenty two participants consisting of customers (end users), dealers, local entrepreneurs, participated in the meeting organized by GLP. A representative from the Panchayat Samithi (Local Governing Body) was also present in the meeting.

GLP made a presentation on Kyoto protocol, CDM project cycle, salient technical and environmental features of the project, its likely environmental and social impacts and the role of local stakeholders in the project. The participants were called upon to seek clarifications and express their views, suggestions and concerns on the likely impacts of the project.

D.3. Summary of the comments received:

>>

The stakeholders viewed GLP as a reputed company contributing to economy and environment. The participants sought clarifications on Kyoto Protocol and Clean Development Mechanism process. There was an overall agreement that the proposed project was a beneficial project from sustainability viewpoint.

The following participants raised the following comments regarding the project activity:

- Gauri Shankar Sharma (Individual)
- Ram Prakash Sahu (Individual)
- Uma Kant Singh (Government school teacher)
- Chandan (Individual)
- Niwash Shani (GLP retailer 'Saathi')
- Manju Devi (Member of the Local Governance body)

Summary of comments and response:

What is the goal and mission of Greenlight Planet India Pvt Ltd?

A: Greenlight Planet is a social enterprise whose goal is to introduce life changing products into rural developing world homes. The short term goal is to eventually eradicate kerosene from the hinterland of India, and provide every one access to clean, affordable lighting.

What is the benefit of this program to the general people?

A: Solar technology today is a very expensive technology. With the help of this program, proceeds from the carbon credits will be used to make the lights cheaper and more accessible to the people who need it the most.

How is this impacting the environment?

A: Greenlight Planet's mission is to replace kerosene lamps with solar lamps. By doing so, Greenlight Planet is enabling its customers to reduce their usage of kerosene and thereby reducing the carbon released by them in the environment. This creates a direct environmental benefit for the project.

Can we extend these benefits for non-lighting solar appliances e.g. Televisions etc

A: Currently this program is exclusively for solar lighting devices.

How do we as Stocking Points benefit?

A: 'Generation of Carbon Credits and the subsequent revenue are necessary to keep the product price (to the end user) as low as possible and affordable while maintaining sustainable margins for you [our Stocking Points] and for the retailers. Secondly, Stocking Points benefit by allowing the end-user price to be viable for village users, who are using kerosene currently, thus creating a viable trade opportunity for you as Stocking Points.'

Who is JP Morgan?
A: 'As stated, JP Morgan is our project co-developer. They are a large, foreign bank whom we are working with in partnership to develop the CDM project.'

D.4. Report on how due account was taken of any comments received:

>>
None of the comments required any follow-up action.

SECTION E. Application of a baseline and monitoring methodology

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:

>>
The CPAs shall use the Clean Development Mechanism (CDM) approved small-scale methodology *AMS.III.AR "Substituting fossil fuel based lighting with LED/CFL lighting systems", version 03*[17]. The small scale baseline methodologies and monitoring methodologies can be downloaded from http://cdm.unfccc.int/methodologies/SSCmethodologies/approved

E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:

>>
Table: AMS.III.AR version 03 applicability criterion and justification

AMS.III.AR Applicability Criterion	Justification
This category comprises activities that replace portable fossil fuel based lamps (e.g. wick-based kerosene lanterns) with battery-charged LED/CFL based lighting systems in residential and/or non-residential applications (e.g. ambient lights, task lights, portable lights).	A typical CPA will involve the distribution of a variety of battery-charged solar LED based lighting systems as alternative to fossil fuel based lamps for residential and/or non-residential applications, within the geographical boundary of CPA.
This methodology is applicable only to project lamps whose batteries are charged using one of the following options: (a) Charged by renewable energy system included as part of the Project Lamp (e.g. a photovoltaic system or mechanical system such as a hand crank charger); (b) Charged by a standalone distributed generation system (e.g. a diesel generator set) or a mini-grid i.e. that is not connected to a national or regional grid;; (c) Charged by a grid that is connected to regional/national grid.	The project lamps are charged by a renewable energy system that is included as part of the project lamp i.e. solar photovoltaic systems included as a part of the project lamp.
At minimum project lamps shall be certified by their manufacturer to have a rated average life of at least • 5,000 hours for Option 1, paragraph 11; • 10,000 hours for Option 2, paragraph 12. Rated average life is the life certified by the	All lamps included in the PoA have a rated average life of at least 5,000 hours (for Option 1) and 10,000 hours (for Option 2).

[17] Available at http://cdm.unfccc.int/methodologies/DB/41A0Q0QT5CUP3TMD57GC6RZ4YRV28M

manufacturer or responsible vendor as being the time at which the lamps initial light output will decline by no more than 30%. In addition, for project lamps charged using Option 2(c) as provided for in paragraph 2 above, the manufacturer shall certify that the battery-charging-circuit efficiency of the project lamps, at the time of the purchase, s at least 50%. For project lamps charged under option indicated in paragraph 2(b), if the mini-grid or distributed generation system is not entirely powered by renewable energy generation unit(s), the manufacturer shall certify that the project lamp's battery charging circuit efficiency, at the time of purchase, is at least 50%.	The project lamps are charged using Option 2(a). Therefore, this condition is not applicable.
Project Lamps shall have a warranty of a minimum of one year. At a minimum, the warranty shall cover free replacement or repair of any failed lamps, batteries and where applicable solar panels. The warranty shall be provided to end users of the project lamps. In a situation where the project lamps are distributed through intermediaries, the one year warranty shall commence from the time that the project lamps are distributed to end-users.	All lamps included in the PoA will have a minimum of one year warranty to the end-users, covering cover free replacement or repair of any failed lamps, batteries and where applicable solar panels. Where project lamps are distributed through intermediaries, the one year warranty shall commence from the time that the project lamps are distributed to end-users.
Project lamps shall meet or exceed the following minimum performance characteristics, which should be proven by third-party test results: (a) Light Output: luminous flux of 20 lumens or illuminance of 25 lux over an area ≥ 0.1 m^2 when suspended at a distance of 0.75 meters or self-supported. The light output over a 2,000 hour lumen maintenance test should not decline by more than 20% for Option 1 (paragraph 11) or 15% for Option 2 (paragraph 12); (b) Run Time and Battery Capacity: Daily Burn Time (DBT) shall meet the following requirements: (i) DBT shall be equal to or greater than 3.5 hours; (ii) For charging option 2(a) the autonomous time of the project lamps shall meet the following requirements: a. For Option 1, paragraph 11, the autonomous time shall be equal to or greater than 150% than the DBT of the project lamps;	All lamps included in the PoA will have the following minimum characteristics substantiated by third-party test results: (a) Luminous flux of 20 lumens or illuminance of 25 lux over an area ≥ 0.1 m^2 when suspended at a distance of 0.75 meters or self-supported. The light output over a 2,000 hour lumen maintenance test shall not decline by more than 20% for Option 1 (paragraph 11) or 15% for Option 2 (paragraph 12); (b) (i) DBT equal to or greater than 3.5 hours; (ii) Autonomous time of the project lamps equal to or greater than 150% than the DBT of the project lamps (for Option 1); equal to or greater than 150% of the DBT of the project lamps (for Option 2); (iii) The project lamps are charged using Option 2(a). Therefore, this condition is not applicable. (iv) Solar Run Time for the project lamp in each month of the year (as determined per paragraph 7(g))

b. For Option 2, paragraph 12, the autonomous time shall be equal to or greater than 150% of the DBT of the project lamps; (iii) For charging options 2(b) and 2(c) the autonomous time of the project lamps shall meet the following requirements: a. For Option 1, paragraph 11, the autonomous time shall be equal to or greater than 200% of the DBT of the project lamps; b. For Option 2, paragraph 12, the autonomous time shall be equal to or greater than 200% of the DBT of the project lamps; (iv) For charging with solar PV under option 2(a) the Solar Run Time for the project lamp in each month of the year (as determined per paragraph 7(g)) shall be greater than or equal to the DBT; (v) For charging option per 2(b) or 2(c), the project lamp shall be fully charged after eight hours of charging	greater than or equal to the DBT; (v) The project lamps are charged using Option 2(a). Therefore, this condition is not applicable.
Emission reductions can only be claimed for up to five project lamps, distributed through the project activity, per each household or each business location (e.g. for commercial applications such as shops). For projects using Option 1 as per paragraph 11, compliance with this requirement can be demonstrated with documentation of the distribution procedures instead of by ex post recording of lamps distributed in each household. Any lamp distributed to a household or business location beyond the limit of five per location shall not be included in the project boundary, and emission reductions shall not be claimed for such lamps.	The number of project lamps in a given household shall be recorded at the time of sales. The warranty registration process would be used to collect this information. Project lamps in excess of five in a given household/business location shall be excluded from claiming emission reductions[18].
Measures are limited to those that result in emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.	Each CPA in the PoA shall be capped at a threshold of no more than 60 kt CO2 equivalent annually.

[18] % of lamps excluded (being in excess of 5 lamps in a given household) shall be determined from records of all end - users for which details (duly completed warranty registration process) are available to CPAI. The obtained % shall be applied as a discount factor to those lamps for which end user data could not be collected as an appropriate measure.

E.3. Description of the sources and gases included in the SSC-CPA boundary

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As mentioned in paragraph 10 of AMS.III.AR, the project boundary includes the project lamps as well as the charging systems, i.e. In case of project lamps that are charged by a renewable energy system; the project boundary includes the physical, geographical site of the renewable energy system. Therefore, for the proposed PoA, the project boundary includes all the sites where the project lamps are sold.
The table below gives the GHG emissions sources included in the CPA boundary:

Table: Sources and Gases Included in the CPA Boundary

Source		Gas	Included?	Justification / Explanation
Baseline	Combustion of fossil fuel for lighting	CO_2	Yes	Major source of emissions.
		CH_4	No	Not produced during combustion of fossil fuels in lanterns/lamps.
		N_2O	No	Not produced during combustion of fossil fuels kerosene in lanterns/lamps.
Project activity	Use of solar lamps for lighting	CO_2	No	No project emissions if the project lamps are charged by a renewable energy system. The project activity involves dissemination of battery-charged lamps whose batteries are charged using renewable solar energy and hence no project emissions are to be considered as per paragraph 16(a), AMS. III-AR, version 03.
		CH_4	No	
		N_2O	No	

E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

>>

The PoA targets consumers that have kerosene/oil as their primary lighting source either in rural or urban India to replace the fossil fuel based lamps with solar based LED lighting systems.

Fuel based lighting is a common practice in India with kerosene being one of the most widely used fossil fuels for lighting purposes, especially in rural India where a large part of this program will be based - and where a large proportion of the Indian population (~69%) is based[19]. In rural areas of India, commonly used fossil fuel for lighting is kerosene[20]. Apart from the rural population, kerosene is also heavily relied upon by the urban poor to meet their lighting needs[21]. As per National Sample Survey Organisation Report (March 2010), Ministry of Statistics and Programme Implementation, Government of India 61.4 million rural households (39% of total rural households) and 3.2 million urban households (6% of total urban households) still depend on kerosene for meeting lighting needs[22]. Further, as per the recently

[19] Census of India 2011, Source of lighting: 2001-2011

[20] Census of India 2011, Source of lighting: 2001-2011

[21] Improved Lighting for Indian Fishing Communities, ER291-3 Final Report, 2007

[22] NSSO, 2010. National Sample Survey Organisation. *Household Consumer Expenditure in India, 2007-08* –NSS Report Number 530, Table 15R and 15U, Ministry of Statistics and Programme Implementation, Government of India.

concluded Census of India 2011, ~72 million rural households in India depend upon kerosene as their primary source of lighting and about a third of the total households have no access to electricity. Even in urban areas, ~5 million of household depend upon kerosene as their primary fuel for lighting[23]. Oil/gas/others (all combined) sources of fuel for lighting is prevalent in only around 0.5% of urban households and 1% of the rural households[24].

Although there has been a reduction in use of kerosene for lighting over the last decade in percentage terms (from 47.1% (2001) to 38.6% (2008) in rural areas and from 7.8% (2001) to 5.6% (2008) in urban areas)[25], it has only marginally changed in absolute terms due to increase in population over these years (in 2001 a total of ~69.3 million[26] households were using kerosene as their primary source of lighting whereas in 2008 it was 64.6 million households). Thus, there is still a large number of households in India that use kerosene as a primary source of lighting. Recognizing the dependence on kerosene as a source of lighting, the government of India have subsidized the sale/distribution of kerosene through an extensive network of approximately 0.499[27] million Public Distribution Shops in most states. The government made an annual allocation of 11.25 million kilolitre (kl) of Kerosene for the year 2010-11 to states/UTs through PDS Approximately 149.23 million[28] kerosene-lamps are being used in various parts of the country.[29]

The state of grid electricity in India is dismal. India's average annual per capita electricity consumption, is estimated to be around 700 kWh, and is recognized to be amongst the world's lowest as per the World Bank article[30]. Even in states in which all the villages are officially connected to the power grid, large shares of the rural households do not use electricity[31]. About 85% of Indian villages are electrified; however, fewer than 60% of households actually consume electricity[32]. Further, even in areas which have

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[23] Census of India 2011, Source of lighting: 2001-2011

[24] Census of India 2011, Source of lighting: 2001-2011

[25] NSSO, 2010. National Sample Survey Organisation. *Household Consumer Expenditure in India, 2007-08* –NSS Report Number 530, Table P18, Ministry of Statistics and Programme Implementation, Government of India.

[26] http://censusindia.gov.in/Tables_Published/H-Series/H-Series_link/S00-012.pdf

In 2001, there were approximately 138 Million rural households and 54 million urban households. The % of kerosene users in 2001 has been taken from reference above (NSSO 2010, Table P18).

[27] http://www.pdsonline.in/PDS_Conceptualization.aspx

[28] Pal R. C., Srinivas S. N., Rehman I. H., Sharma S. P., Kerosene for lighting applications: a comparative analysis of energy-efficient lighting devices in India, International journal of ambient energy 25 (2) (2004). Accessible at: http://www.refdoc.fr/Detailnotice?cpsidt=15804734&traduire=en .

[29] Government of India, Ministry of Petroleum and Natural Gas, Rajya Sabha, Unstarred question no 125, Sale of kerosene in the black market.

[30] http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTENERGY2/0,,contentMDK:22831697~pagePK:210058~piPK:210062~theSitePK:4114200,00.html

[31] Andreas K., Centre for Energy Policy and Economics, Swiss federal institutes of Technology, Regional disparities in electrification of India – do geographic factors matter? CEPE Working Paper No. 51, 2006

[32] Andreas K., Centre for Energy Policy and Economics, Swiss federal institutes of Technology, Regional disparities in electrification of India – do geographic factors matter? CEPE Working Paper No. 51, 2006

very high village electrification rates, households on the outskirts of villages are rarely grid-connected[33]. Other independent sources also give similar estimates as 65% of the households in the electrified villages not receiving benefit of electrification due to poor reliability of electricity supply, frequent power cuts, and low quality supply[34]. As per International Energy Agency (IEA), World Energy Outlook 2011, Electricity Access Database[35], around 288.8 *million* people in India do not have access to electricity. It is implied that these people move to kerosene to meet their lighting needs, kerosene being the most common source of lighting after electricity in India. Even electrified, besides un-electrified households, depend on kerosene-based lighting devices to meet their lighting needs[36].

Conclusion

It can be concluded from the above discussion that there is a large gap between the share of electrified areas per state and the share of electrified households[37]. Besides the rural population, there are also shortcomings in access to electricity for the urban poor[38]. As a result, a significant population (~77 million households) in India depends upon Kerosene to meet its lighting needs. Thus, there is a huge potential in India with respect to the dissemination of the solar lighting technology to those who are deprived of access to electricity. Despite the striking increase in power generation capabilities, India has not been able to keep up with its domestic demand for electricity and owing to the shortfall in power generation capability and the inadequate transmission and distribution (T&D) infrastructure it is unlikely to meet future demand as well[39]. Kerosene being largely subsidised and easily accessible is the preferred source of lighting to such households.

Besides, the use of kerosene as the baseline fuel for lighting for project lamps will be demonstrated at each CPA level. This has been developed as a CPA inclusion eligibility criteria in section A.4.2, mandating each CPA to demonstrate that the baseline lamps being replace by the project directly consume fossil fuel in line with para 6(a) of the methodology.

Baseline Emissions

Baseline emissions are calculated as per equation 2 of the methodology (refer section E.6.2).

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[33] Andreas K., Centre for Energy Policy and Economics, Swiss federal institutes of Technology, Regional disparities in electrification of India – do geographic factors matter? CEPE Working Paper No. 51, 2006

[34] Rehman I.H., Malhotra P., Pal R.C., Singh, P.B., Availability of kerosene to rural households: a case study from India, Energy Policy, 33 (2005) 2165–2174

[35] International Energy Agency (IEA), World Energy Outlook 2011, Electricity Access Database

[36] Preeti Malhotra, Fellow, TERI; I H Rehman, Fellow, TERI; Preety Bhandari, Senior Fellow, TERI; Ronnie Khanna, Research Associate, TERI ; Ritu Upreti, Research Associate, Rural energy data sources and estimations in India, TERI and Rehman I. H., Malhotra P., Pal R. C., Singh P. B., Availability of kerosene to rural households: a case study from India, Energy Policy ,33 (2005), pg. 1.4

[37] Andreas K., Centre for Energy Policy and Economics, Swiss federal institutes of Technology, Regional disparities in electrification of India – do geographic factors matter? CEPE Working Paper No. 51, 2006.

[38] By Modi V., Opportunity and Challenge: Developing India's Electrical Infrastructure, Improving Electricity Services In Rural India, Working Papers Series, Center on Globalization and Sustainable Development CGSD Working Paper No. 30, 2007

[39] Andreas K., Centre for Energy Policy and Economics, Swiss federal institutes of Technology, *Regional disparities in electrification of India – do geographic factors matter?* CEPE Working Paper No. 51, 2006.

E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA):

E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:

>>

The additionality of a typical CPA is based on Guidelines on the Demonstration of Additionality of Small-Scale Project Activities, version 09. As compliance to this guidance is a part of eligibility criteria for inclusion, hence, additionality is substantiated by means of compliance to eligibility criteria.

E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:

>>

Please refer section A.4.3 of the PoA-DD.

E.6. Estimation of Emission reductions of a CPA:

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:

>>

A typical CPA under the PoA shall involve replacement of kerosene or other fossil fuel based lighting devices with solar LED lamps. All lamps distributed under a typical CPA shall meet the eligibility criteria as defined in the methodology AMS III. AR, version 03 - '*Substituting fossil fuel based lighting with LED/CFL lighting systems*' -

The solar battery-charged LED lamps distributed under a typical CPA would:

- replace portable fossil fuel based lamps in residential and/or non-residential applications

  As described in section E.4 above
- be charged by renewable energy system included as part of the project lamp

  A typical project lamp consists of a solar photovoltaic panel (SPV), electronic circuit storage battery and the luminary. SPV panel captures solar energy and converts it into direct current (DC) electricity which is then stored in a battery. Therefore battery is charged by renewable energy source i.e. solar energy and the renewable energy system is included as a part of the project lamp.
- at a minimum, be certified by their manufacturer to have a rated average life of at least 5,000 hours (for Option 1) and 10,000 hours for Option 2, paragraph 12.

  (a) Only lamps with rated average life of at least 5,000 hours will be included in a CPA using Option 1.

  (b) Only lamps with rated average life of at least 10,000 hours will be included in a CPA using Option 2.
- have a warranty of a minimum of one year. At a minimum, the warranty shall cover free replacement or repair of any failed lamps, batteries and where applicable solar panels. The warranty shall be provided to end users of the project lamps. In a situation where the project lamps are distributed through intermediaries, the one year warranty shall commence from the time that the project lamps are distributed to end-users.

  Only lamps with a warranty of a minimum of one year will be included in a CPA. The warranty shall cover free replacement or repair of any failed lamps, batteries and where applicable solar panels. In a situation where the project lamps are distributed through intermediaries, the one year warranty will commence from the time that the project lamps are distributed to end-users.

- meet or exceed the minimum performance characteristics described in paragraph 5 (a)-(b) of AMS.III.AR, version 03, which should be proven by third-party test results. Ie. All lamps in a CPA shall meet the following characteristics applicable for project lamps charged as per option 2(a) of AMS.III.AR, version 03:
  - (a) *The project lamps shall have a luminous flux of 20 lumens or illuminance of 25 lux over an area ≥0.1 m2 when suspended at a distance of 0.75 meters or self-supported. The light output over a 2,000 hour lumen maintenance test will not decline by more than 20% for Option 1 (paragraph 11) or 15% for Option 2 (paragraph 12);*
  - (b) *DBT will be equal to or greater than 3.5 hours;*
  - (c) *For Option 1, paragraph 11, the autonomous time shall be equal to or greater than 150% than the DBT of the project lamps;*
  - (d) *For Option 2, paragraph 12, the autonomous time shall be equal to* or greater than 150% of the DBT of the project lamps;
  - (e) Solar Run Time for the project lamp in each month of the year (as determined per paragraph 7(g)) shall be greater than or equal to the DBT;
- Emission reductions can only be claimed for up to five project lamps, distributed through the project activity, per each household or each business location (e.g. for commercial applications such as shops). For projects using Option 1 as per paragraph 11, compliance with this requirement can be demonstrated with documentation of the distribution procedures instead of by ex post recording of lamps distributed in each household. Any lamp distributed to a household or business location beyond the limit of five per location shall not be included in the project boundary, and emission reductions shall not be claimed for such lamps.

  The warranty registration process would be used to collect this information. For each household/business location, ERs shall be claimed only for a maximum of 5 lamps. Any lamp in excess of five for a given household/business location shall not be included in the PoA boundary.
- Measures are limited to those that result in emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.

  All CPAs would be capped at 60 ktCO_2e emission reductions annually.
- For Option 2, project lamps shall be, in addition to the standard lamp specifications as per paragraph 12(a)-(e), shall have provision for clear, unique identification to associate them with each unique CPA. The serial numbers on each lamp would allow attributing each lamp to a unique CPA.

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:

>>

Emission Reductions for a CPA shall be calculated according to the following formula:

$$ER_y = \sum_{i,j} N_{i,j} \times \left(BE_{y,i} - PE_{y,i,j}\right) \times \left(OF_{y,i,j}\right)$$

Where:

ER_y	=	Emission reductions of the CPA in year *y* (tCO_2e)
$N_{i,j}$	=	Number of project lamps distributed to end users of type i with charging method *j* in CPA in year y
$BE_{y,i}$	=	Baseline Emissions by project lamp of type i in year *y* (tCO2e)
PE_y	=	Average Project Emissions of the CPA in year y (tCO2e) per lamp
$OF_{y,i}$	=	Percentage of project lamps distributed to end users that are operating and in

service in year *y*[40], for each lamp type *i* and charging method *j*.

Project Emissions
Since all lamps in the PoA can only be charged with a renewable energy system, therefore, for all CPAs PE_y is = 0[41].

Baseline Emissions
Baseline emissions (BEy) per project lamp per year for a CPA are calculated as per equations 2 & 3 of AMS-III.AR version 03.

$$DV = FUR \times O \times U \times EF / 1000 \times LF \times n \times NTG$$

And,

$$BEy = DV \times GFy \times DBy$$

where,

Parameter	Description	Value used for ER estimation
DV	Default emissions Factor (tCO_2e) per project lamp calculated using the following 7 values indicated in paragraph 13 of AMS-III.AR, version 03)	0.092
FUR	Fuel use rate (liters/hour)	0.03
O	Utilization rate (hours/day)	3.5
U	Annual utilization (days/year)	365
EF	Fuel emissions factor ($kgCO_2$/liter)	2.4
LF	Leakage factor	1
n	Number of fuel-based lamps replaced per project lamp	1
NTG	Net-to-gross adjustment factor	1
GFy	Grid factor in year *y*	1[42]
DBy	Dynamic baseline factor in year y.	1[43]
BEy	*Baseline emissions per project lamp in year y (tCO2e)*	*0.092*

Leakage
No leakage calculation required as per AMS-III.AR.

[40] Equal to 100% for operational years 1, 2 and 3 of a project lamp.

[41] All lamps included in a typical CPA are expected to be charged only by a renewable energy system. Hence, PE = 0 as per paragraph 16(a) of AMS-III.AR version 03

[42] Equal to 1.0 when charging option defined in paragraph 2(a) of AMS.III.AR, version 03 is used.

[43] Default of 1.0 in the absence of relevant information, AMS-III.AR version 03 Paragraph 14

E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:

(Data / Parameter:	DV
Data unit:	tCO2e per project lamp
Description:	Default emissions factor per project lamp.
Source of data used:	AMS-III.AR, version 03 *"Substituting fossil fuel based lighting with LED/CFL lighting systems"*.
Value applied:	0.092
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default emissions factor value as mentioned in the methodology.
Any comment:	This value is fixed ex-ante for the entire crediting period

Data / Parameter:	GF
Data unit:	- -
Description:	Grid factor in year *y*
Source of data used:	AMS-III.AR, version 03 "Substituting fossil fuel based lighting with LED/CFL lighting systems".
Value applied:	1
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as prescribed by the Methodology for lamps charged by a renewable energy system.
Any comment:	This value is fixed ex-ante for the entire crediting period

Data / Parameter:	DBy
Data unit:	-
Description:	Dynamic baseline factor
Source of data used:	AMS-III.AR, version 03 "Substituting fossil fuel based lighting with LED/CFL lighting systems".
Value applied:	1

Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as prescribed by the methodology in absence of relevant information.
Any comment:	This value is fixed ex-ante for the entire crediting period

E.7. Application of the monitoring methodology and description of the monitoring plan:

E.7.1. Data and parameters to be monitored by each SSC-CPA:

Data / Parameter:	$N_{i,j}$
Data unit:	Number
Description:	Number of project lamps distributed to end users of type *i* with charging method *j* in CPA in year y
Source of data to be used:	CME Records of lamp distribution.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	NA (Value of data parameter shall be specified in respective CPA-DDs).
Description of measurement methods and procedures to be applied:	A database to monitor the sale/distribution of project lamps would be maintained.
QA/QC procedures to be applied:	All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later.
Any comment:	

Data / Parameter:	$OF_{y,i,j}$[44]
Data unit:	%
Description:	Percentage of project lamps distributed to end users that are operating and in service in year *y*, for each lamp type *i* and charging method *j*.
Source of data to be used:	For operational years 1, 2 and 3 of a project lamp in a CPA – Paragraph 19, AMS-III.AR, version 03. For operational years 4, 5, 6 and 7 of a lamp in a CPA[45] - Monitoring survey report

[44] Not to be monitored for CPAs using option 1.

[45] Only for Option 2 as per paragraph 20 of the methodology

Value of data applied for the purpose of calculating expected emission reductions in section B.5	NA (Value of data parameter shall be specified in the respective CPA-DDs).
Description of measurement methods and procedures to be applied:	For operational years 1, 2 and 3 of a project lamp in a CPA – Default value as defined in the methodology. For operational years 4, 5, 6 and 7 of a lamp in a CPA[46] - Monitored value; Equal to value determined as per paragraph 22 and 24. In order to determine the percentage of project lamps distributed to end users that are operating and in service in year *y*, a monitoring survey[47] will be conducted by the CPAI (or outsourced to another third party). The survey will consist of locating the system, recording its functionality.
QA/QC procedures to be applied:	The sampling size[48] is determined by minimum 90% confidence interval and ±10% error margin (Refer Appendix 1)
Any comment:	This parameter is to be monitored only for CPAs using option 2 to determine effective useful lifetime. Monitoring survey shall be done in the third year of each CPA and the results would be utilised for operational years 4, 5, 6 and 7 of the project lamps of that CPA.

Data / Parameter:	Sales information of the lamp
Data unit:	-
Description:	The following details are to be monitored/recorded, as applicable - lamp wattage - battery type - charging method - the date of sale / distribution[49] - Serial Number - Number of existing projects lamps in the household - Customer/recipient details (as applicable depending upon crediting period option)
Source of data to be used:	- Sales and/or distribution records / warranty registration process would provide details of lamp model, date of distribution and where applicable, customer identification. - Lamp wattage, battery type, charging method are fixed for a lamp model, which can be referred from its specification sheet.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	- This parameter is not used for ER calculations

[46] Only for Option 2 as per paragraph 20 of the methodology

[47] The survey shall follow the survey principles defined in paragraph 22, 23 &24 of AMS-III.AR, version 03.

[48] no less than 100 samples

[49] Or a conservative estimate thereof as per footnote 9, AMS.III.AR, version 03.

Description of measurement methods and procedures to be applied:	N/A
QA/QC procedures to be applied:	All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later.
Any comment:	Customer/recipient detail in the registration form is mandated only for CPAs using Option 2 as per paragraph 12 of the methodology.

E.7.2. Description of the monitoring plan for a SSC-CPA:

>>

Monitoring Plan

The CPA implementer shall maintain a distribution record of the project lamps. Where applicable, a customer database would also be generated through a warranty registration process. Such database(s) shall be submitted to the CME in electronic/hard copy periodically. The CME shall ensure that no more than 652,173 operational project lamps are included in any CPA at any given time.

To determine the effective useful lifetime of a project lamp, each CPA in the proposed PoA shall chose either Option 1 or Option 2 defined in paragraph 11 and 12 of AMS. III-AR. The monitoring requirements for each CPA shall vary depending upon the choice of effective useful lifetime. The same have been described in section A.4.4.2 of the PoA-DD.

All CPAIs will follow the approved monitoring plan and procedures. The parameters to be monitored are listed in section E.7.1 of the PoA-DD**.** Where monitoring survey is required, sampling guidelines defined in Appendix 1 of the PoA-DD shall be used.

For other details, please refer section A.4.4.1 and A.4.4.2.

E.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

>>

Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies): *29-11-2012*

Name of the person(s) / entity determining the baseline:

Name	Entity	Contact details
Prachi Khanna	EcoSecurities India Private Limited	prachi.khanna@ecosecurities.com
Rohit Lohia	EcoSecurities India Private Limited	rohit.lohia@ecosecurities.com

ANNEX 1

CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and PARTICIPANTS IN THE PROGRAMME of ACTIVITIES

Organization:	EcoSecurities India Private Limited
Street/P.O.Box:	NHCC, Jasola
Building:	Unit no. 302, Plot no. 8, Elegance Tower,
City:	New Delhi
State/Region:	New Delhi
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Please refer section A.4.2.2, A.4.5.

Annex 3

BASELINE INFORMATION

Please refer section E.4. For CPAs, the data collected through the 2011 Census of India (http://www.censusindia.gov.in/2011census/hlo/District_Tables/HLO_District_Tables.html) may be used to demonstrate the commonly used fuel sources for lighting (% of households).

Annex 4

MONITORING INFORMATION

Please refer section E.7 of the PoA-DD.

Appendix 1

Description of the sampling plan for a CPA

The following sampling plan is only applicable for CPAs using Option 2 as per paragraph 12 of AMS III-AR version 03. Ex post monitoring surveys shall be conducted in the third crediting year of the relevant CPAs to determine $OF_{y,i,j}$[50] for operational years 4,5,6, and 7 of the project lamps included in that CPA. For operational years 1, 2 and 3 $OF_{y,i,j}$ is 100%. In the following, relevant CPAs include only those CPAs that have chosen Option 2 as per paragraph 12 of the methodology and are in the third year of their crediting period.

(a) Sampling Design:

(i) *Objective and Reliability Requirements*: The objective of sampling is to check continued operation of sampled lamps (Yes/No).
The above parameters shall be monitored using a 90/10 (confidence/precision) (or, 95/10 as the case may be), as per the frequency described above. The size of the sample shall be no less than 100 as required by paragraph 23(a) of AMS III.A.R version 03.

(ii) *Target Population:* The sample survey shall be conducted by CPAI or appointed entity on those CPAs that are into third year of their crediting period. The target population are the users of lamps under the CPAs using Option 2.

(iii) *Sampling Method:* The sampling method chosen is random sampling or multistage sampling method. The sample size shall be determined as mentioned below.

(iv) *Sample Size*: The sample size shall be calculated for 90/10 (confidence/precision) or, 95/10 as the case may be. Sample size shall be determined using the latest version of "Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities".
In any case, the size of the sample shall be no less than 100 as required by paragraph 23(a) of AMS III.A.R version 03.

(v) *Sampling Frame*: The sampling frame in this case is constituted by the sales for which completed warranty cards /registration process are available.

(b) Data:

(i) *Field Measurements*: Field measurements for different parameters are conducted using the following monitoring procedures:

Parameter	**Description of measurement methods and procedures to be applied:**
Number of lamps operational out of all the lamps surveyed	Survey

[50] Assumed to be equal to 100% for operational years 1, 2 and 3 of the project lamps as per paragraph 19, AMS.III-AR (version 03).

(ii) Quality Assurance/ Quality Control: In case where survey results indicate that desired precision is not achieved, the lower bound of corresponding confidence interval of the parameter value would be used as an alternative to repeating survey.

(iii) Analysis: The data derived using monitoring shall be used to estimate the actual amount of ERs accrued by the project.

(c) Implementation Plan:

Training shall be provided to ensure that the above mentioned requirements are complied with at the time of sampling.
The survey will be carried out by CPAI or appointed entity.

Appendix 2

The lamp design specifications shall be included in the specific CPA-DD in the following format:

Design parameter	*Value for Lamp Type "<Insert model name>"*	*Value for Lamp Type "<Insert model name>"*	*Value for Lamp Type "<Insert model name>"*
Lamp wattage			
Illuminance			
Lamp lifetime			
PV type			
PV capacity			
Battery type			
Battery (Replacable? Chargable?)			
Battery capacity			
Type of charge controller			
Autonomous time			
Daily burn time			
Solar run time			
Grid charging time			
Physical protection against weather impacts			

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