



**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):

CarbonSoft Open Source PoA, LED Lighting Distribution: Emerging Markets

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

CarbonSoft Corporation (“CarbonSoft”) supports the development of purpose-designed, renewable energy charged, LED/CFL lamp distribution projects. These projects will specifically replace existing and predominant use of kerosene-based lighting with purpose designed LED/CFL lamps in countries situated in the Indian Sub continent (the “PoA” or “Projects”).

The baseline technologies, such as simple tin kerosene lamps, are so inexpensive to produce that even with rising fuel prices being felt, they remain the cheapest option for many families. For example, the price of a “tin” lamp is \$0.20; whilst a high quality “hurricane” lantern could only cost around \$5¹. The likelihood that families would connect to a local power grid remains small given the extremely high costs for getting a connection as compared to the average gross income in India².

Off-grid renewable lighting solutions offer a compelling and game changing market opportunity to reduce greenhouse gas (“GHG”) emissions and improve quality of life. CarbonSoft’s partners are seeking to distribute the lowest-priced solar lamp product to low-income families. This can only be achieved through the additional financial benefits leveraged from accessing the CDM and the carbon market.

1. General operating and implementing framework of PoA

According to the recent “From Carbon to Light” report one quarter of humanity continues to obtain illumination by burning fossil fuels, which is estimated to generate 190 million tonnes of carbon dioxide (“CO₂”) per year³. Currently, more than 1.4 billion people living in the developing world do not have access to grid-connected electricity⁴ and have no choice but to use kerosene as their domestic fuel, and principal light, source. About 67.6 million rural households in India rely on kerosene as fuel for lighting⁵.

Undertaking approved activities as described in this PoA, will create the opportunity for people using kerosene for lighting to access and obtain high quality, low cost lighting solutions that meet the quality standards specified in AMS.III.AR version 2.

¹ “Carbon to Light”

² <http://www.fias.net/advisory-services/regulatory-simplification/doing-business-reform-advisory/upload/5-Carolin-Geginat-Getting-Electricity-World-Bank.pdf>

³ <http://light.lbl.gov/pubs.html>. Accessed September 2011

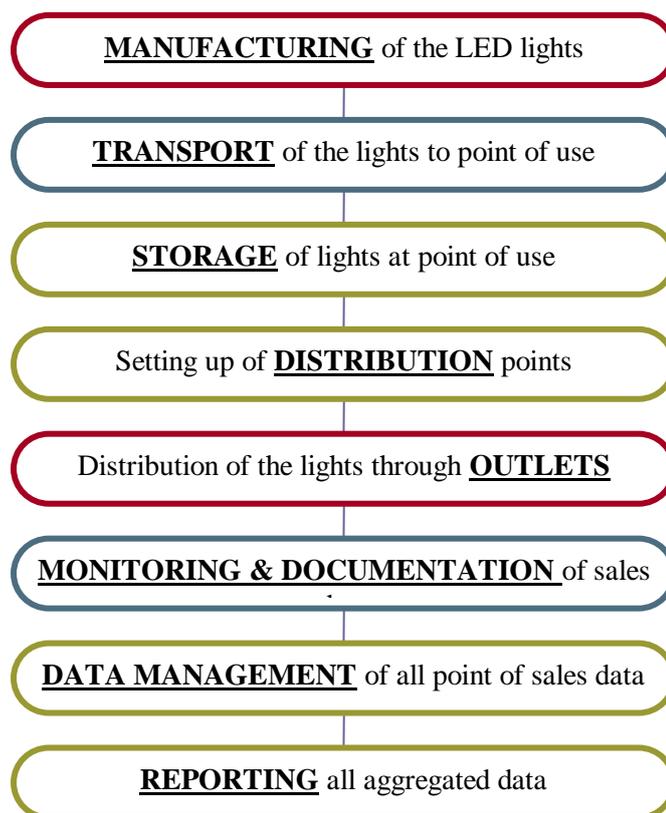
⁴ http://www.iea.org/index_info.asp?id=1847 (Accessed 28th July 2011)

⁵ NSSO (2008)



Qualifying ‘Project Lamps’ consist of at least one Light Emitting Diode (“LEDs”) or Compact Fluorescent Lamps (“CFLs”) that provide high quality, long-life and consistent luminosity. The lighting source is connected to a rechargeable battery, which is in turn connected to an energy source such as a photovoltaic (“PV”) panel. In practical terms an LED is a semiconductor diode that emits light when an electrical current is applied. LEDs are ideal for rural lighting purposes due to their efficiency, long lifetime, ruggedness and low maintenance costs associated.

Process flow for a generic CPA project:



2. Policies and measures of the stated goal of the PoA

The CME of the PoA will develop and coordinate project developers to replace kerosene-based lighting with approved Project Lamps across countries included under this PoA. The implementation of the PoA will have the following impacts;

- **Cost savings:** Families will have more available income to spend on their welfare priorities such as education, medicine and food. Kerosene costs vary across the world, but even in countries where



kerosene is heavily subsidized by the government, like India and Sri Lanka, the cost of a month's worth of kerosene can equal between three to five days of income.⁶

- **Energy Conservation:** by using LED/CFL lights, kerosene is saved. The batteries will be charged by renewable energy sources, such as solar power, and will hence lead to energy conservation.
- **Job creation:** The supply, storage, distribution and maintenance (including battery renewal) of LED/CFL lamps by the project proponents and their partner organizations will create new jobs across regions and communities. Research on solar home systems by using light to extend their productive hours after nightfall. A Dalberg and SEWA research in rural Bihar and Gujarat in India suggests that solar lanterns contribute to longer working hours for occupational groups ranging from traditional handicraft artisans, to textile workers, and livestock herders as well⁷.
- **Clean-energy education:** the promotion and use of LED/CFL lamps that use renewable sources of energy for charging may enable families to experience sustainable development in a tangible way that can positively affect their lives. Incorporating the management and maintenance of LED/CFL lamps utilizing clean energy in a household will provide direct education
- **Improved education environment:** The use of LED lamps has been recognized to promote improved learning conditions that in turn favour increased literacy. According to one study focused on Indian homes claims that average study time of students rose from 1.47 hours to 2.71 hours per day⁸, with a positive effect on school performance
- **Improved health and safety:** Human deaths and physical burns are commonly associated with the use of flame based domestic appliances. In India alone, 2.5 million people suffer severe burns due to overturned kerosene lamps annually. Reduction in the use of kerosene will contribute to the prevention of such domestic accidents and will also reduce indoor air pollution.

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

Coordinating/managing entity of the PoA:

- CarbonSoft Sustainable Resources Pte. Ltd (Singapore)

Project participants being registered in relation to the PoA, (project participants may or may not be involved in one or more of the CPAs related to the PoA):

- Eureka Forbes Ltd (India)
- Standard Bank PLC (United Kingdom)

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

⁶ Report on Off-grid lighting for the base of the pyramid.

⁷ Report (same as above) provided to DOE,

⁸ <http://light.lbl.gov/pubs/tr/lumina-tr5.pdf>



The following sections provide PoA project concept information, including, geographical description, technology type, operational and management plan, and monitoring structure.

A.4.1. Location of the programme of activities:

The geographical boundary of the PoA is all regions and provinces lying within the following countries: Georgia, Cyprus, Paraguay, Guatemala, Uzbekistan, Nicaragua, Bolivia, Mongolia, Ecuador, El Salvador, Honduras, Mexico, Azerbaijan, Uruguay, Argentina, Bangladesh, Malta, Costa Rica, Cambodia, Brazil, Bhutan, Chile, India, Thailand, China, Sri Lanka, Peru, Viet Nam, Jordan, Lao People's Democratic Republic, Republic of Moldova, Armenia, Kyrgyzstan, Guyana, Myanmar, Belize, Israel, Yemen, The former Yugoslav Republic of Macedonia, Pakistan, Qatar, Oman, United Arab Emirates, Saudi Arabia, Kuwait, Albania, Islamic Republic of Iran, Nepal, Syrian Arab Republic, Bahrain, Suriname, Lebanon, Bosnia and Herzegovina, Montenegro, Serbia, Tajikistan, Democratic People's Republic of Korea and the Republic of Korea

However, the project participants may chose to include more countries under the PoA, post registration. This is within the guidelines prescribed by the EB in Paragraph 6, Annex 26 of the EB 60 report⁹.

In case the project participants decide to further more add countries under the PoA post registration, they will make sure the following guidelines are met:

- 1) *The existing registered PoA design document (POA-DD) is revised to reflect the changes, in particular, the eligibility criteria for inclusion of CPAs;*
- 2) *A designated operation entity (DOE) confirms that the baseline established in the POA-DD is applicable to the extended programme boundary; and*
- 3) *The DNA of the new Host Party issues a letter of approval for the programme and a letter of authorization for the co-ordinating and managing entity.*

A.4.1.1. Host Party(ies):

1. Georgia
2. Cyprus
3. Paraguay
4. Guatemala
5. Uzbekistan
6. Nicaragua
7. Bolivia
8. Mongolia
9. Ecuador
10. El Salvador
11. Honduras
12. Mexico
13. Azerbaijan
14. Uruguay

⁹ http://cdm.unfccc.int/Reference/Guidclarif/PoA/poa_guid06.pdf



15. Argentina
16. Bangladesh
17. Malta
18. Costa Rica
19. Cambodia
20. Brazil
21. Bhutan
22. Chile
23. India
24. Thailand
25. China
26. Sri Lanka
27. Peru
28. Viet Nam
29. Jordan
30. Lao People's Democratic Republic
31. Republic of Moldova
32. Armenia
33. Kyrgyzstan
34. Guyana
35. Myanmar
36. Belize
37. Israel
38. Yemen
39. The former Yugoslav Republic of Macedonia
40. Pakistan
41. Qatar
42. Oman
43. United Arab Emirates
44. Saudi Arabia
45. Kuwait
46. Albania
47. Islamic Republic of Iran
48. Nepal
49. Syrian Arab Republic
50. Bahrain
51. Suriname
52. Lebanon
53. Bosnia and Herzegovina
54. Montenegro
55. Serbia
56. Tajikistan
57. Democratic People's Republic of Korea
58. Republic of Korea

A.4.1.2. Physical/ Geographical boundary:
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The geographical boundary of the PoA is depicted below:

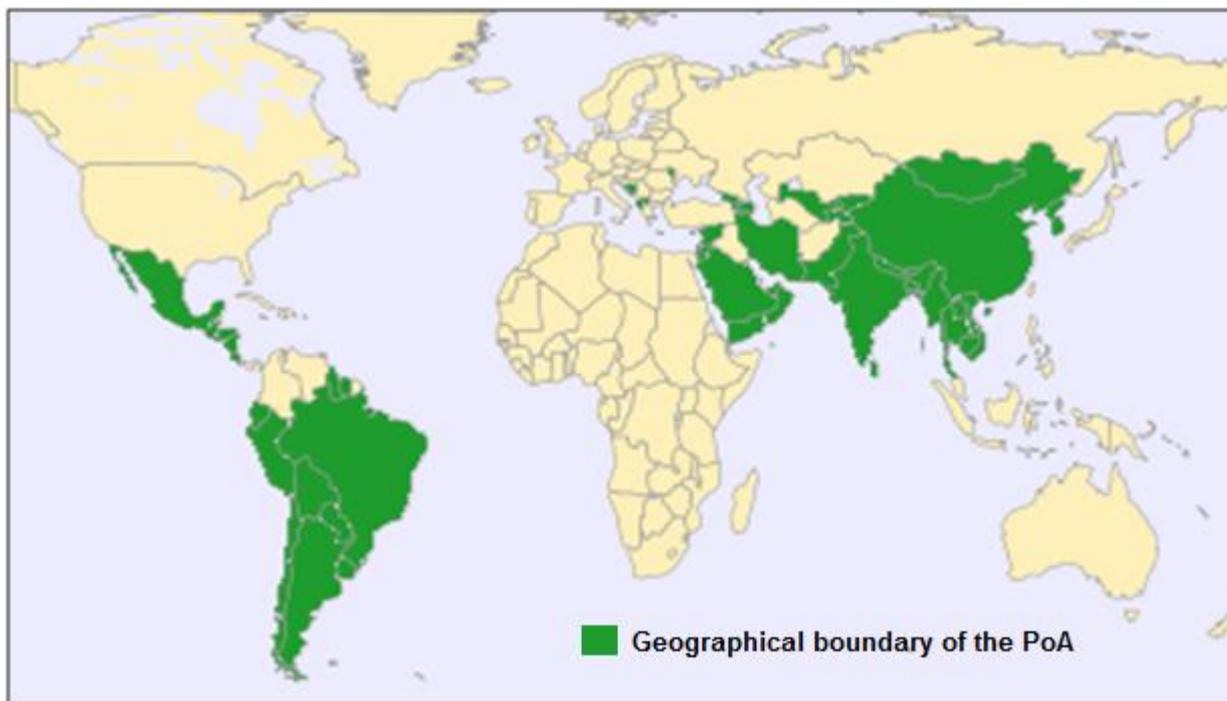


Figure 1: Geographical boundary of the PoA

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

A typical CPA Project will represent a specific region (up to the boundary of an entire country) up to a maximum volume of 60,000 tonnes of CO₂, per year, as per the methodology.

The CPA shall demonstrate that replacing traditional kerosene lamps with Project Lamps can reduce greenhouse-gas emissions and improve the quality of life for families through. These may include:

- lower household costs by reducing the need to buy kerosene;
- reduced pollutants created in the home; and
- less danger of household fires.

The financial benefit earned from the sale of Certified Emission Reductions (“CERs”) enables the project developer to reduce the unit price of the Project Lamps to ensure they are affordable and obtainable to low-income households in India, Pakistan, Sri Lanka, Nepal, Bhutan and Bangladesh.

“From Carbon to Light” estimates that 1.5 billion people lack access to electricity. Around 85% of those people are based in rural areas, mainly in Sub-Saharan Africa and South Asia.

Each CPA must adhere to the requirements as described in this PoA.



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

The Project will see the distribution of LED/CFL lamps to households across the countries involved in the PoA. Applying the simplified modalities and procedures for small-scale CDM project activities, each CPA Project falls under the following type:

- Type III: Other Project Activities

Portable and ambient lighting technology

Each CPA project will potentially involve the distribution of a range of lighting products that meet the quality requirements stipulated in AMS.III.AR.

Project Lamps selected by the CPA project developer shall meet the following technology requirements as per AMS.III.AR version 2:

- LED or CFL-based lighting systems shall be used for residential and non-residential applications including ambient lighting, task lighting and portable lighting
- Project Lamps shall have batteries that are charged using:
 - a. Charged by renewable energy systems included as part of the Project Lamp (e.g., photovoltaic systems or mechanical systems such as wind battery chargers)
- At a minimum, Project Lamps, shall be certified by their manufacturer to have a rate average life of at least 5,000 hours (if the CPA goes with **Option 2**, the lamp must have an average life of 10,000 hours)
- Manufacturer certification that the Project Lamp’s battery charging efficiency, at the time of the purchase, is at least 50%
- Project Lamps shall have a minimum of a one year warranty
- Each lamp must have a minimum illumination of 20 Lumens or 25 Lux over an area of greater than or equal to 0.1 metre sq

Development and improvements in portable and ambient lighting technology is expected to lead to a general reduction in the cost of products and increasing quality. Therefore, over the lifetime of the PoA and each CPA Project the technical features of Project Lamps are expected to improve with time.

Implementation of CPA projects, with the carbon finance support of the CDM, will create real, rapid and affordable technology transfer that directly and positively affects families across India, Pakistan, Sri Lanka, Nepal, Bhutan, and Bangladesh.

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

Eligibility criteria	Qualification
Geographical boundary of each CPA	Each CPA shall be limited to a maximum boundary equal to the size of the territory of one of the host countries included in the PoA, or lesser. The CPA will have to provide a map of the CPA boundary in



	<p>the CPA-DD to demonstrate the region where the project activity will be carried out.</p>
<p>Double counting avoidance provisions</p>	<p>While inclusion of a new CPA, the ‘New CPA reviewer’ and CPA will take the following steps:</p> <ol style="list-style-type: none"> 1) Check if any similar project activity (PoA/CDM) is carried out in the CPA boundary. 2) If Yes, the CPA will need to demonstrate that how the unique numbers on the Project lamps will prevent the double counting of lamps. They will also demonstrate how only LED/CFL lights with the Unique numbers will be considered.
<p>Technology specifications</p>	<p>All ‘Project Lamps’ will demonstrate they meet as a minimum the following specifications:</p>
<ul style="list-style-type: none"> • The LED or CFL-based lighting systems replace portable fossil fuel based lamps in residential and non-residential applications. • The Project Lamps provide a minimum illumination of 20 Lumens or 25 Lux over an area of greater than or equal to 0.1 metre sq specified by the methodology AMS-III.AR version 2. • The Project Lamps shall use rechargeable batteries charged by renewable photovoltaic energy systems which are included as part of the project lamp. • The manufacturer of the Project Lamps shall certify that the product has an average life of at least 5,000 hours (for Option 1) or 10,000 hours (for Option 2) • The manufacturer shall certify that the Project Lamp’s battery charging efficiency is at least 50% at the time of the customer’s purchase • Each Project Lamp shall be provided with a one year warranty which specifically covers free replacement or repair of failed lamps, batteries and where applicable solar panels • All Project Lamps manufactured carry a unique identification, which enables them to be marked as being within the CPA Project (e.g., such as a sticker attached to the lamp). The unique identification mark will also be used to avoid double counting of emission reductions • The CPA project will comply with any current, national laws and regulations in the host country regarding the disposal of batteries • Detailed technical specification and supporting documentation regarding the Project Lamps shall be made available and specified in the individual CPA-DDs • The CPA project developer will report any sales, where more than 5 lamps have been distributed to a house hold, only the first 5 lamps shall be eligible to earn CERs. A record of all surplus sales shall be kept and the total number of surplus lamps distributed shall be deducted from the final sales data prepared for verification • In the absence of the CPA project, the burning of kerosene fuel in lanterns would be used as the primary source of light 	



- The Project Lamps will generate light and be used onsite and locally by the user

<i>Parameter</i>	AMS III.AR Version 2	
	2 Year	7 year
<i>Rated Average Life</i>	5,000 Hours *	10,000 hours*
<i>Project Lamp charging efficiency</i>	atleast 50% *	atleast 50%*
<i>Warranty</i>	Min 1 year	Min 1 year
<i>Minimum Illumination</i>	20 Lumens (or) 25 Lux over 0.1 metre sq when suspended from 0.75 metres or self supported **	
<i>Daily Burn Time (DBT)</i>	Min of 3.5 Hours needs to be shown **	Min of 3.5 Hours needs to be shown **
<i>Solar Fraction of battery</i>	NA	NA
<i>Battery Capacity</i>	Autonomous time should greater than equal to 5.25 Hours (150% of 3.5 Hours)**	Autonomous time should greater than equal to 5.25 Hours (150% of 3.5 Hours)**
<i>Water and Dust tightness</i>	NA	Min protection of 1P43**
<i>Solar Run Times</i>	Using a value of 5 Kwh/metre sq, the Solar Run time should be greater than or equal to 3.5 Hours **	Using a value of 5 Kwh/metre sq, the Solar Run time should be greater than or equal to 3.5 Hours**
<i>Light Output</i>	The light output over a 2,000 hour lumen maintenance test should not decline by more than 20% **	The light output over a 2,000 hour lumen maintenance test should not decline by more than 15% **

A CPA Project shall also provide detailed specifications of the Project Lamps such as:

- Lamp wattage (in Watts) and illuminance (in lux);
- Lamp rated lifetime (in hours);
- The type and rated capacity of the renewable energy equipment used for battery-charging (in Watts)
- Type (e.g. NiMH, Lead-Acid, Li-ion), and rated capacity of the batteries (in Ampere Hours);
- Autonomous Time and Daily Burn Time



<p>6. Solar Run Time calculation (Version 2)</p> <p>7. Physical protection against environmental factors.</p>	
<p>Evidence of the Start Date of the CPA</p>	<p>The CPA shall demonstrate the start date of the project activity.</p>
<p>Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;</p>	<p>The CPA will provide the various information listed above and the New CPA reviewer will ensure that the CPA meets the technical and other applicability conditions of the CPA, before proceeding with inclusion for the CPA.</p>
<p>The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as specified in Section A above</p>	<p>Additionality is demonstrated at the PoA level in section A.4.3 of the PoA-DD. The CPAs will provide information at the time of inclusion to ensure that their projects do not exceed the limits of microscale projects. The demonstration of the same will be done in the Excel sheet provided to the DOE.</p>
<p>The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;</p>	<p>EIA and or environmental assessment undertaken by first CPA in a host country. Information will be provided in Section C of the CPA-DD. Similarly a stakeholder will be carried out for the first CPA of the</p>
<p>The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as specified in Section A above</p>	<p>Additionality is demonstrated at the PoA level in section A.4.3 of the PoA-DD. The CPAs will provide information at the time of inclusion to ensure that their projects do not exceed the limits of microscale projects. The demonstration of the same will be done in the Excel sheet provided to the DOE.</p>
<p>The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;</p>	<p>EIA and environmental assessment undertaken by first CPA in a host country. Information will be provided in Section C of the CPA-DD. Similarly a stakeholder will be carried out for the first CPA of the</p>
<p>Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance;</p>	<p>Section A.4.5 of the CPA-DD will provide information on the public funding of the CPA. In</p>



	<p>case there is public funding, it will be demonstrated that there is no diversion of official development assistance.</p>
<p>Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid connected/ off-grid) and distribution mechanisms (e.g. direct installation)</p>	<p>The CPA-DD will describe in provide information in general description, the target groups of the PoA activity.</p>
<p>Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys</p>	<p>Sampling is required for monitoring of those CPAs using Option 2 of the methodology wherein the lamps used will be able to generate CERs for a period of seven years. The Monitoring plan for the same has been added in Section E.7.2 of the PoA-DD and B.6 of the Generic CPA-DD. Any CPA using the option will place a monitoring and sampling plan in accordance with the above guidelines in the CPA-DD.</p>
<p>Test to ensure that each CPA meets the micro-scale threshold criteria and remains within the thresholds through the crediting period</p>	<p>CPAs will provide information at the time of inclusion to ensure that their projects do not exceed the limits of microscale projects. The demonstration of the same will be done in the Excel sheet provided to the DOE.</p>
<p>Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories</p>	<p>According to Paragraph 10 of Annex 13 of EB 54, <i>“If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied then that CPA of PoA is exempted from performing de-bundling check (i.e., considering as not being a de-bundled component of a large-scale activity)”</i>.</p> <p>The capacity of the individual subsystem (i.e., a Project Lamp) is a light, which is significantly smaller than even 1% of the 15 MW limit specified by the small-scale methodology. Hence, the PoA is not required to demonstrate the project concept as a de-bundled component of a large-scale activity. The average capacity of each Project Lamp will be</p>



	confirmed by the CarbonSoft in each individual CPA.
The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;	EIA and environmental assessment undertaken by first CPA in a host country. Information will be provided in Section C of the CPA-DD. Similarly a stakeholder will be carried out for the first CPA of the
Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance;	Section A.4.5 of the CPA-DD will provide information on the public funding of the CPA. In case there is public funding, it will be demonstrated that there is no diversion of official development assistance.

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):

Additionality for this PoA is demonstrated as stipulated in the “*Standard for demonstration of additionality of GHG emission reductions achieved by a programme of activities*” (Version 1, Annex 2, EB 63).

According to the standard, paragraph 7 states that “PoAs that will include one or more micro-scale projects as CPA shall include eligibility criteria derived from all the relevant requirements of the *Guidelines for demonstrating additionality of micro-scale project activities*”.

According to Para 2 of the guidelines (*in italics*):

Project activities up to five megawatts that employ renewable energy technology are additional if any one of the conditions below is satisfied:

- (a) *The geographic location of the project activity is in one of the least developed countries or the small island developing States (LDCs/SIDS) or in a special underdeveloped zone of the host country identified by the government before 28 May 2010;*
- (b) *The project activity is an off-grid activity supplying energy to households/communities (less than 12 hours grid availability per 24 hrs day is also considered off-grid. for this assessment);*
- (c) *The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied;*



- (i) Each of the independent subsystems/measures in the project activity is smaller than or equal to 1500kW electrical installed capacity;
- (ii) End users of the subsystems or measures are households/communities/small and medium enterprises (SMEs).

The CarbonSoft PoA will be made of CPAs each of which is an off-grid activity that supplies energy to households and communities by replacing kerosene lamps with LED/CFL lights. Each CPA will have a maximum of 300,000 LED lights active at a given time over a year. Because typical LED lights use less than 0.5 Watts¹⁰. Hence the total capacity for each CPA will be 300,000 x 0.3 = 0.09 MW which is much lesser than the capacity of 5 MW.

LED lamps typically have a very low energy capacity, because of the small power consumption requirements of the LED. Typical LED lamps consume less than 0.5 Watts, which is far less than the limit of 1500 KW. The LED lamps will be distributed in households in range of countries, thus also meeting the requirements of (ii).

Since the project meets points (b) and (c) according to the guidelines it is additional.

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

The following sections review the monitoring approach established by the PoA.

A.4.4.1. Operational and management plan:

Management Plan for CME

Introduction

CarbonSoft is the CME of the PoA and has developed and implemented a management system that includes the following requirements. The management plan is along the guidelines stipulated by “*Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities*” (EB 65, Annex2).

Requirement	A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies
Application	<ol style="list-style-type: none"> 1. Please refer below for details of personnel involved in the addition of new CPAs under the PoA 2. It has been ensured that responsibility is assigned to the various CarbonSoft team members based on their experience in the CDM markets.

¹⁰ Based on a review of approved LED lamps by Lighting Africa



S.No	Designation	Tasks	Experience/Management Level
1.	Liaison manager	The liaison manager will be in charge of getting in touch with those participants who wish to register CPAs under the PoA. His/Her task will be to begin communications in such interested parties and provide them with general information on the project and the conditions for the CPA to applicable under the project.	Low/Medium
2.	New CPA reviewer	Once the new CPA implementation entity is ready to join the PoA and have provided the various towards this cause, the CPA reviewer will check that the CPA covers all eligibility criteria of the PoA as described in Section A.4.2.2 of the PoA-DD. The reviewer will collaborate with the entity to ensure all criteria (such as Lamps meeting Methodology criteria) are met.	High
3.	KYC Manager	The KYC (Know Your Customer) manager is in charge of gathering KYC data from the CPA counter party. These include addresses, letters, and other documents.	Low/Medium
4.	Implementation manager	The implementation manager will work closely with the CPA to ensure that pre-registration tasks are carried out with out any errors at the CPA end. He/She will assist in stakeholder consultations/ Host country approval/Validation activities. This will ensure the CMEs experience in CDM can be put to use by the CPA implementation entities to ensure smooth sailing of the project activity.	High
5.	Data Management Officer	The Data management officer will be responsible for collections all documents throughout the project activity. These will include data on Project Lamps sold, CPA-DDs and other supporting documents that are required to be maintained by the CME.	Medium/High



Requirement	Records of arrangements for training and capacity development for personnel
Application	The CME will ensure that annual training and capacity development workshops are held for the personnel. Also any new personnel hired will undergo training and orientation workshop. Record of such will be made available to DOE on request.

Requirement	Procedures for technical review of inclusion of CPAs;
Application	Technical review for inclusion of new CPAs will be carried out by the ‘New CPA reviewer’. The tasks for above will include those mentioned in Section A.4.2.2 of the PoA-DD and which are based on the latest guidelines of the “Standard for Demonstration of Additionality, Development of Eligibility Criteria and Application of Multiple Methodologies for Programme of Activities” (Annex 3, EB 65).

Requirement	A procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA)
Application	<p>While inclusion of a new CPA, the ‘New CPA reviewer’ and CPA will take the following steps:</p> <ul style="list-style-type: none">3) Check if any similar project activity (PoA/CDM) is carried out in the CPA boundary.4) If Yes, the CPA will need to demonstrate that how the unique numbers on the Project Lamps will prevent the double counting of lamps. They will also demonstrate how only lights with the unique numbers will be considered. <p>According to Paragraph 10, of Annex 13 of EB 54, “If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity”.</p>



	Since the independent subsystem in this case is the light and its capacity is much lesser than 1% of 15 MW as specified by the small-scale methodology, this CPA of this PoA need not perform de-bundling check.
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Requirement	Records and documentation control process for each CPA under the PoA;
Application	Records and documentation control will be managed by the office in charge by the ‘Data Management Officer’. The CME officer will be in charge of collecting monthly data from the CPAs. A standard reporting document will have to be filled in by the CPAs and sent along with supporting documents by the 10 th of every Calendar month of the crediting period. This will ensure timely collection of data at CME end and will help in the preparation of monitoring reports at the end of the crediting period.

Requirement	Measures for continuous improvements of the PoA management system
Application	<p>An annual meeting will be held very year during which all CME team members will be present. The following will be the agenda of the meeting:</p> <ol style="list-style-type: none"> 1) Re-cap of previous year and major developments 2) Discussion of goals and whether they have been met or not 3) If not, various reasons that can be attributed to the above 4) Comments will be sought from each CME member and discussed. 5) CPA owners will be asked to provide comments via mail and those will be considered. 6) Goals for the coming year <p>The annual meeting will ensure that continuous improvements are made to the PoA management plan and to ensure proper implementation of the PoA</p>

A.4.4.2. Monitoring plan:

The monitoring plan will be designed and demonstrated by the Implementation Entities for each individual CPA, and will include such information required, depending on which of the following options they choose:



Option 1: *Project Lamps are assumed to operate for two years after project lamp distribution to end-users. Therefore, emission reductions can only be claimed for two years;*

Option 2: *Project Lamps are assumed to operate for seven years after project lamp distribution to end-users, and thus emission reductions can be claimed for up to seven years per project lamp.*

For CPAs going with Option 1 of the methodology the Project Activity will record the following data:

1. *Number of 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 supply).*

The Sales Record (SR) database has been established and shall contain the following information:

- Number of Project Lamps sold since the project began
- Serial number of lamp
- Date of sale of the Project Lamps
- Distributor or dealer
- Manufacturer's details of the Project Lamps

For CPAs that choose Option 2 of the methodology the Project Activity will record the following data:

1. *Number of 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 supply).*
2. *Number of lamps in use and operational within the CPA boundary*

In addition to maintaining sales records as mentioned above, since the Project Proponents are going with **Option 2** (the lamps will generate CERs for a period of 7 years), monitoring surveys will be conducted at the CPA level to determine the percentage of Project Lamps distributed to end users that are operating and in service during the third year of the crediting period.

The data will be gathered by the CPA project proponents (implementing agencies) and will be provided to the Coordinating/Managing Entity, where it will be aggregated. Data will be collected and made available to DOEs for all dates and sales of Project Lamps. Data collected will be attributed to a single CPA. Such detailed data can be verified, because all units will be individually identified by their identification number. This will either be a unique number or unique barcode. Identification numbers will be allocated to Project Lamps based on their location of sale (i.e., within a specific CPA). Because data will be fully transparent, data sampling will be at the discretion of the DOE.

A detailed description of all parameters has been provided in Section E.7.1 and E.7.2. The Coordinating/Managing Entity will store all data in an electronic database. Primary data will be stored by the implementing entities.

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

The PoA does not receive public funding.



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

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

Date the PoA is web-hosted by the UNFCCC: 15/12/2011

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

28 Years

SECTION C. Environmental Analysis

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
2. Environmental Analysis is done at SSC-CPA level

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

An environmental analysis will be conducted only in the first CPA project of each host country. This is because each lighting project is not site specific.

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):

Environmental impact assessments and pertinent laws and regulations shall be addressed at the CPA Project level.

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
2. Local stakeholder consultation is done at SSC-CPA level

The Local Stakeholder Consultations will be held at a CPA level, taking into consideration the differences of circumstances and opinions of each and every community in which each CPA is located. The goal of hosting local stakeholder consultations is to ensure that customers and affected persons will be able to share their opinions of the project and be provided with essential feedback on the CPAs proposed activities.



Stakeholder consultation will be carried out once for each host country where the CPAs are located. There is no need to carry out additional stakeholder consultations for each subsequent CPA in a host country since the project is not site specific.

CPA project developers will take care to ensure comments from all relevant stakeholders are invited and actions are carried out on the comments received.

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

Not applicable, conducted at the CPA level.

D.3. Summary of the comments received:

Not Applicable, conducted at the CPA level.

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

Not Applicable, conducted at the CPA level.

SECTION E. Application of a baseline and monitoring methodology

This section shall demonstrate the application of the baseline and monitoring methodology to a typical SSC-CPA. The information defines the PoA specific elements that shall be included in preparing the PoA specific form, which is used to define and include a SSC-CPA in this PoA (PoA specific CDM-SSC-CPA-DD).

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

The methodology AMS.III.AR *“Substituting fossil fuel based lighting with LED/CFL lighting systems”* (version 2) is chosen and applicable to all CPAs.

AMS.III.AR offers project proponents two options for generating emission reductions based upon the LED Lamp’s ‘Effective Useful Life’. Each CPA will choose one of the following options to claim Certified Emissions Reductions:

- **Option 1:** Project Lamps are assumed to operate for two years after project lamp distribution to end-users. Therefore, emission reductions can only be claimed for two years
- **Option 2:** Project Lamps are assumed to operate for seven years after project lamp distribution to end-users, and thus emission reductions can be claimed for up to seven years per Project Lamp.

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

AMS.III.AR requirement	SSC Qualification / Justification
------------------------	-----------------------------------



<p><i>Replace portable fossil fuel based lamps with LED/CFL based lighting systems in residential and non-residential applications</i></p>	<p>The PoA involves replacement of fossil fuel lamps with LED/CFL based lighting. The CPA will suitably demonstrate in the CPA-DD that fossil fuel lamps are a common feature in the country where the CPA is located. It will be demonstrated through publicly available data and literature review that fossil fuel is used predominantly in the region for lighting and thus distribution of LEDs/CFLs will lead to reduction on consumption of Fossil Fuels.</p>
<p><i>The Project Lamps shall use rechargeable batteries charged by one of the following:</i></p> <ul style="list-style-type: none"> <i>i) renewable energy systems</i> <i>ii) stand alone distributed generation systems</i> <i>iii) grid connected to the regional or national grid</i> 	<p>Since the Project Lamp is a renewable or mechanical source of energy, it meets the criteria that the lamp is charged by “renewable energy systems”. The details of the Project Lamp will be provided in the CPA-DD to ensure its meets the criteria of recharging mentioned in the methodology.</p>
<p><i>The manufacture of the Project Lamps shall certify the products has an average rated life of at least 5,000 hours (option 1) or 10,000 hours (option2)</i></p>	<p>All Project Lamps shall have suitable manufacturer certification that the units have an average life more than the minimum average life specified by the methodology</p>
<p><i>The manufacture shall certify that the LED/CFL lamps’ battery charging efficiency is at least 50% at the time of the customer’s purchase</i></p>	<p>Manufacturer certification shall provide a battery charging efficiency of at least 50% at the time of purchase</p>
<p><i>Each Project Lamp shall be provided with a one year warranty which specifically covers free replacement or repair of failed lamps, batteries and where applicable solar panels</i></p>	<p>All Project Lamps shall be sold with a one year warranty for full repair or full replacement</p>
<p><i>All Project lamps carry identification which enables them to be marked as being within the CPA Project and avoid double counting</i></p>	<p>All Project Lamps shall have a unique identification so that it is marked as being within the CPA Project</p>
<p><i>The disposal of batteries shall be in compliance with the regulations of the host country</i></p>	<p>The CPA Project shall demonstrate and ensure compliance with prevailing regulations pertaining to the use and disposal of batteries</p>
<p><i>Detailed technical specification and supporting documentation of the Project Lamps are made available and in the PDD</i></p>	<p>The CPA shall provide clear information about the technical specification of the Project Lamps. Supporting documentation shall be provided to the DOE on request</p>
<p><i>No more than five Project Lamps per household or business location shall be recognized for generating emission reductions within the CPA</i></p>	<p>A maximum of five Project Lamps per household or business location shall be recognized as Project Lamps within the CPA Project. This will be</p>



<i>Project</i>	<p>determined by the CPA project developer’s records.</p> <p>The CPA project developer will report any sales, where more than 5 lamps have been distributed to a household, only the first 5 lamps shall be eligible to earn CERs. A record of all surplus sales shall be kept and the total number of surplus lamps distributed shall be deducted from the final sales data prepared for verification</p>
<i>In the absence of the CPA Project, the burning of kerosene fuel in lanterns would be used as the primary source of light</i>	<p>As demonstrated in “Carbon to Light” and other supporting documents provided¹¹, the use of portable, cheap kerosene lamps is prevalent across populations across the countries included in the PoA. Project developers will replace consumers kerosene lamps with project lamps in accordance with AMS.III.AR version 2. Further information will be provided in the CPA-DD with regard to kerosene use in the country the CPA is included</p>
<i>The project lamps will generate electricity and be used onsite and locally by the user</i>	<p>The Project Lamps will generate electricity that shall be used onsite and locally by the user</p>

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

	Source	Gas	Included?	Justification / Explanation
<i>Baseline Activity</i>	GHG emissions generated from the combustion of kerosene fossil fuel	CO ₂	Included	Main emission source
<i>Project Activity</i>	GHG emissions from emissions due to charging of batteries (if non renewable source of energy is used)	CO ₂	No	Since the CarbonSoft deal exclusively with replacing kerosene lamps with Project Lights charged with renewable (Solar) or mechanical energy, there will be no project emissions.

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

¹¹ Supporting documents provided to DOE



According to methodology AMS.III.AR “Substituting fossil fuel based lighting with LED/CFL lighting systems” (version 2), there are default baseline values that may be applied to the CPA Project unless alternative values or parameters can be determined (e.g., using adequate research/monitoring and documentation) and provided by the project proponent. Suitable supporting documents include strategic surveys and research conducted by national or local organisations, international organisations, non-governmental organisations or reliable and comprehensive data collected by the project proponent.

In case the CPA project proponents have access to studies, reports or surveys as mentioned above with regard to kerosene consumption in households, that value will be used as opposed to the default value suggested by the methodology.

Pre-existing fuel-based technology

The pre-existing technology is the prevalent use of kerosene lamps, which consume significant amounts of fuel and cost a major portion of a family’s monthly income. With reference to the default values presented in AMS.III.AR the following values are applied accordingly:

- **Utilization (hours/day):** Whilst presently there is limited data on hours-per-day utilization of fuel-based lighting a fixed value of 3.5 hours per day is assumed
- **Utilization (days/year):** a default value of 365 days is assumed and 366 in each leap year.
- **Fuel emissions factor (kilograms CO₂ /litre):** we have selected a conservative value of 2.4 kg CO₂ per litre of kerosene
- **Leakage factor:** 1.0
- **Number of fuel-based lamps replaced per project lamp:** 1.0
- **Leakage factor (persistence in use of fuel-based light source)**
- **Number of fuel-based lamps replaced per LED:** whilst well-designed LED lamps may be able to replace multiple fuel-based lamps, we assume a conservative default assumption of 1:1
- The determination of the **Fuel use rate** will take place at the CPA level based on surveys or reports applicable to the CPA region. In the absence of any such report, the default value of 0.025 Litres per hour will be used for that CPA.

Ambient and portable LED/CFL lighting replacement technology

In order to demonstrate that the CPA Project meets the “additionality” and AMS.III.AR requirements the following assumptions have been taken:

- **Service life (years):** all electric lighting products experience a reduction in light output over time, a process called “lumen depreciation.” If the project developer chooses **Option 2**, they will demonstrate that the luminous flux does not reduce more than 15% over a period of 2,000 hour lumen maintenance test.
- **Net-to-Gross factor:** this value is assumed to be 1 (i.e., 100%)
- **Power conversion losses (for grid charging):** if Project Lamps are charged through Renewable energy sources or DG sets, no power conservation losses are taken. If they are charged through the grid, national standards for power conservation losses will be assumed.
- **Replaceable battery:** The battery compartment of the units can be simply opened by the user enabling them to be replaced. Thereafter, the organisation selling the Project Lamps at the CPA level will also



sell replacement batteries at suitably low price to ensure that they are affordable enough to extend the general life of the unit

- **Warranty or insurance:** Project Lamps shall offer a minimum of a one-year manufacturer warranty as per AMS.III.AR requirements

Technology factors

- **Baseline fuel and technology:** existing data suggests that kerosene lamps are the predominant source of lighting in the areas the project activity is carried out, hence kerosene will be used as baseline fuel. The CPA-DD will contain more information on the use of kerosene in the country the CPA is included.
- **Charging strategy:** the Project Lamps can be charged via renewable sources (e.g., such as solar), the grid, or DG sets.

Quality Assurance

- **Quality certified:** The Project Lamps will seek quality certification as part of its expanding business. At present the project lamp units and LED components have manufacturer-specified certificates

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:

Additionality for this PoA is demonstrated as stipulated in the “*Standard for demonstration of additionality of GHG emission reductions achieved by a programme of activities*” (Version 2, Annex 2, EB 63).

According to the standard, paragraph 7 states that “PoAs that will include one or more micro-scale projects as CPA shall include eligibility criteria derived from all the relevant requirements of the *Guidelines for demonstrating additionality of micro-scale project activities*”.

Demonstration of the above has been done in Section A.4.3 of the PoA-DD.

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

Each CPA will have to demonstrate that the number of LED lights sold does not exceed the limits of micro-scale projects as mentioned in the *Guidelines for demonstrating additionality of micro-scale project activities*.

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

The following sections provide the detailed approach to estimating emission reductions.

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



Each CPA shall apply the following calculation approach:

Equation 1, Baseline Emissions:

$$BE_y = DV \times GF_y \times DB_y$$

Parameter	Unit	Description	Source
BE_y	tCO ₂ e	Default emissions factor	
GF_y	Number	Number of consumers supplied with Project Lamps	As defined in AMS.III.AR
DB_y	%	<p><i>Option 1:</i> = 1.0 in the absence of relevant information</p> <p><i>Option 2:</i> = 1.0 + FFG. FFG is defined as the documented national growth rate of kerosene fuel use in lighting from the preceding 3 or 5 years (depending on the availability of reliable data)</p>	As described in later sections.

Equation 2, Project Emission:

According to the small scale methodology AMS III.AR, Project Emissions (PE_y) will depend on the project lamp charging mechanism utilized.

The methodology states that $PE_y = \text{Zero (0)}$ in the case of Project Lamps whose batteries are charged by:

- (a) renewable energy system (e.g., photovoltaic systems or mechanical systems such as wind battery chargers)
- (b) stand-alone distributed generation system (e.g., a diesel generator set) or a mini-grid, if the mini grid or distributed generation system is entirely powered by renewable energy generation unit(s).



The project developers whom operate a CPA within the CarbonSoft PoA will exclusively distribute approved LED lamp technology to replace kerosene lamps. Since the Project Lamps use either a renewable or mechanical energy system, the project emissions under this PoA shall be zero.

Equation 3, Emission Reduction:

According to the methodology AMS-III.AR., the annual emissions reductions are calculated as :

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

Parameter	Unit	Description	Value	Source
N_{ij}	Quantity	Number of Project Lamps distributed to end users of type i, with charging method 'j' The emissions reductions shall be considered from the date of completion of distribution of the project lamps to end users	Recorded by CPA and the distributor	CPA reporting and monitoring
$OF_{y,i,j}$	%	Percentage of Project Lamps distributed to end users that are operating an in service in year, y	Assumed to be 100%	Assumed based guidance from AMS.III-AR

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

Data / Parameter:	<i>FUR (ID 1)</i>
Data unit:	Litres per hour
Description:	Quantity of kerosene used per hour in household by a kerosene lamp
Source of data used:	Default value provided by AMS-III.AR. or specific value obtained for CPA region through reports/surveys/studies etc.
Value applied:	There are two options for this value:



	<ul style="list-style-type: none"> • Default value specified in AMS.III.AR: 0.025; or • Specific value obtained for CPA region through reports/surveys/studies etc.
Justification of the choice of data or description of measurement methods and procedures actually applied:	The methodology provides default value, however it provides provisions for using alternative values based on surveys or reports.
Any comment:	

Data / Parameter:	<i>DV (ID 2)</i>
Data unit:	tCO ₂ e
Description:	Default Emissions factor
Source of data used:	Default value as provided in the small-scale methodology AMS-III.AR or as calculated based on Fuel Use Rate derived from literature review specific to the CPA region.
Value applied:	0.08 or value derived based on Fuel Use Rate derived from literature review specific to the CPA region.
Justification of the choice of data or description of measurement methods and procedures actually applied:	The methodology provides default value, however it provides provisions for using alternative values based on surveys or reports.
Any comment:	

Data / Parameter:	<i>h (ID 3)</i>
Data unit:	Hours/day
Description:	Utilization rate: average operating hours are the average operational hours of kerosene lamps in the baseline
Source of data used:	AMS.III.AR (version 2)
Value applied:	3.5
Justification of the choice of data or description of measurement methods and procedures actually applied:	This value is fixed for the duration of the project; unless observed data further qualifies this value
Any comment:	

Data / Parameter:	<i>d (ID 4)</i>
Data unit:	Days



Description:	The number of days the lamp operates for
Source of data used:	AMS.III.AR (version 2)
Value applied:	365, 366 in case crediting year is a leap year
Justification of the choice of data or description of measurement methods and procedures actually applied:	This is a fixed value.
Any comment:	

Data / Parameter:	<i>EF_{CO2}</i> (ID 5)
Data unit:	KgCO ₂ / litre
Description:	Kerosene fuel CO ₂ emission factor of fuel type
Source of data used:	AMS.III.AR (version 2)
Value applied:	2.4
Justification of the choice of data or description of measurement methods and procedures actually applied:	Default value provided by small scale methodology AMS-III.AR
Any comment:	

Data / Parameter:	<i>L</i> (ID 6)
Data unit:	Value
Description:	Leakage factor
Source of data used:	AMS.III.AR
Value applied:	1.0
Justification of the choice of data or description of measurement methods and procedures actually applied:	Default value provided by small-scale methodology AMS-III.AR.
Any comment:	

Data / Parameter:	<i>N</i> (ID 7)
Data unit:	Value
Description:	Number of fuel-based lamps replaced per Project Lamp
Source of data used:	AMS.III.AR
Value applied:	1.0
Justification of the	Default value provided by small-scale methodology AMS-III.AR.



choice of data or description of measurement methods and procedures actually applied:	
Any comment:	

Data / Parameter:	<i>N-G (ID 8)</i>
Data unit:	Value
Description:	Net-to-gross factor
Source of data used:	AMS.III.AR
Value applied:	1.0
Justification of the choice of data or description of measurement methods and procedures actually applied:	Default value provided by small-scale methodology AMS-III.AR.
Any comment:	

Data / Parameter:	W_i (ID9)
Data unit:	Watts
Description:	Wattage of project lamps distributed to end users, of type <i>i</i>
Source of data used:	Lamp manufacturer
Value applied:	The value will be sourced from the lamp manufacturer and will depend on the lamp type used by the particular Project Activity
Justification of the choice of data or description of measurement methods and procedures actually applied:	
Any comment:	

Data / Parameter:	<i>DB (ID10)</i>
Data unit:	Value
Description:	Change in baseline kerosene consumption based on reports from national growth rate of the region where the CPA is located.
Source of data used:	Public reports or alternative data sources
Value applied:	The growth rate of the country will be sourced from reliable, official, publicly available data. Conservative change will be considered in case the growth rate of the country where the CPA is located varies over the last few years.
Justification of the	The growth rate of the country will have a direct effect on the consumption of



choice of data or description of measurement methods and procedures actually applied:	kerosene in non-grid connected areas. Hence, growth rate is a perfect measure to gauge increase in kerosene consumption.
Any comment:	

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

Data / Parameter:	n_j (ID11)
Data unit:	Quantity
Description:	Number of units sold
Source of data to be used:	CPA Project
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Project developer database
Description of measurement methods and procedures to be applied:	Sales date is determined as the date the Project Lamp is sold by the distributor.
QA/QC procedures to be applied:	Data will be collected by the project developer. CarbonSoft will be responsible to store the data for the crediting period and an additional two years.
Any comment:	This sales data, in its detailed form, is considered by project developers to be commercially sensitive information. The information will be provided to the DOE, and as required aggregated data can be made available. CarbonSoft will treat all detailed sales data as commercially confidential information.

Data / Parameter:	D_{intro} (ID 12)
Data unit:	Date
Description:	The date that the Project Lamp was distributed, rounded to the 1 st of the month following. This number is required to conservatively calculate the emission reductions for a verification period.
Source of data to be used:	Sale records available with CPA project implementer, where each Project Lamp has a Unique Identification Number.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	E.g., 01/03/2011
Description of	Data will be automatically rounded based on the exact date of the sale being input



measurement methods and procedures to be applied:	to the database.
QA/QC procedures to be applied:	Data will be collected by the project developer. CarbonSoft will be responsible to store the data for the crediting period and an additional two years.
Any comment:	

Data / Parameter:	<i>Customer Information (ID 13)</i>
Data unit:	Not applicable
Description:	Where a project developer has chosen Option 2 (seven year crediting) the details of the end user will be collected and maintained. Customer information shall include at a minimum: <ul style="list-style-type: none"> • Name • Geographical location
Source of data to be used:	Project Developer Database.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Various
Description of measurement methods and procedures to be applied:	All information will be collected locally by the project developer in provided in CarbonSoft templates.
QA/QC procedures to be applied:	Data will be collected by the project developer. CarbonSoft will be responsible to store the data for the crediting period and an additional two years.
Any comment:	

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_1 (ID11)
Data unit:	Quantity
Description:	Number of units sold
Source of data to be used:	CPA Project
Value of data applied for the purpose of calculating expected emission reductions in	Project developer database



section B.5	
Description of measurement methods and procedures to be applied:	The sales date is defined as the date of completion of distribution of the Project Lamps to the customers. Only project lamps with Unique Identification numbers provided by the CPA will be included.
QA/QC procedures to be applied:	Data will be collected by the project developer. CarbonSoft will be responsible to store the data for the crediting period and an additional two years.
Any comment:	

Data / Parameter:	<i>D_{intro}</i> (ID 12)
Data unit:	Date
Description:	To be conservative, the date that the Project Lamp was purchased, rounded to the 1 st of the month following. This number is required to conservatively calculate the emission reductions for a verification period.
Source of data to be used:	GI (ID 12)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	E.g., 01/03/2011
Description of measurement methods and procedures to be applied:	Based on the exact date of sale being input to the database, data will be automatically rounded up to the 1 st of the following month.
QA/QC procedures to be applied:	Data will be collected by the project developer. CarbonSoft will be responsible to store the data for the crediting period and an additional two years.
Any comment:	

Data / Parameter:	<i>Customer Information</i> (ID 13)
Data unit:	Not applicable
Description:	Where a project developer has chosen Option 2 (seven year crediting) the details of the end user will be collected and maintained. Customer information shall include at a minimum: <ul style="list-style-type: none"> • Name • Geographical location
Source of data to be used:	Project Developer Database.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Various



Description of measurement methods and procedures to be applied:	Data will be collected by the project developer. CarbonSoft will be responsible to store the data for the crediting period and an additional two years.
QA/QC procedures to be applied:	
Any comment:	This sales data, in its detailed form, is considered by project developers to be commercially sensitive information. The information will be provided to the DOE, and as required aggregated data can be made available. CarbonSoft will treat detailed sales data as commercially confidential information.

Data / Parameter:	UI (ID 14)
Data unit:	Not applicable
Description:	Unique identification number of lamp distributed
Source of data to be used:	Project Developer Database.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Various
Description of measurement methods and procedures to be applied:	The Unique Identification for a particular lamp will be based on a number which will be put on the lamp by a suitable means. Data will be collected by the project developer. CarbonSoft will be responsible to store the data for the crediting period and an additional two years.
QA/QC procedures to be applied:	
Any comment:	This sales data, in its detailed form, is considered by project developers to be commercially sensitive information. The information will be provided to the DOE, and as required aggregated data can be made available. CarbonSoft will treat detailed sales data as commercially confidential information.

In addition to these parameters if the CPA is claiming CERs for a period of 7 years, the following additional parameters will also be monitored:

Data / Parameter:	n_o (ID 15)
Data unit:	Quantity
Description:	Number of units in operation and in service
Source of data to be used:	Survey to determine number of Project Lamps in the 3 rd year of the lamps distribution (i.e., the third year of the 'vintage') Sampling survey results shall be utilised as the operating assumptions for years 4,5,6 and 7 for Project Lamps in the CPA.
Value of data applied for the purpose of calculating expected	Project developer database



emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	The number of units in operation and in service is found through monitoring and shall be presented as a percentage (%). Only Project Lamps with Unique Identification numbers provided by the CPA will be included.
QA/QC procedures to be applied:	Data will be collected by the project developer. CarbonSoft will be responsible to store the data for the crediting period and an additional two years.
Any comment:	

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

According to the methodology AMS-III.A.R the parameters monitored by an individual CPA will be determined by which crediting option is chosen:

- **Option 1:** *Project Lamps are assumed to operate for two years after project lamp distribution to end-users. Therefore, emission reductions can only be claimed for two years;*
- **Option 2:** *Project Lamps are assumed to operate for seven years after project lamp distribution to end-users, and thus emission reductions can be claimed for up to seven years per project lamp.*

For CPAs that choose Option 1 of the methodology the Project Activity will record the following data:

1. *Number of 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 supply).*

The following database will be operated and maintained to ensure completeness and accuracy of monitoring information:

- **Sales record (SR):** Project Lamp systems deployed sales records
- **Sample database (DB i,a):** sample database for deployed Project Lamps

Each Project Lamp distributed will only be eligible to generate emission reductions for a period of two years from the date of distribution.

The table below shows the main characteristics of each database: parties involved, periodicity and format.

	Project Lamps deployed sales records (SR)
Parties involved	Primary data collection: project developer Database maintenance: project developer
Periodicity	Continuous
Format	Paper or electronic for primary data



	Electronic database
Data saving	All data shall be saved for the whole crediting period, plus an additional two years

The Sale Record (SR)

The Sales Record (SR) database has been established and shall contain the following information:

- Quantity of lamps sold
- Serial number of lamps delivered to distribution point
- Date of sale provided by distributor
- Lamp wattage for each lamp
- Battery Type for each lamp
- Charging method for each lamp

The purpose of SR database is to provide enough information to enable full monitoring for each monitoring period.

For CPAs that choose Option 2 of the methodology the project developer will record the following data:

1. *Number of 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 supply).*
2. *Number of lamps in use and operational within the CPA boundary*

The following database will be operated and maintained to ensure completeness and accuracy of monitoring information:

- **Sales record (SR):** Project Lamps systems deployed sales records
- **Sample database (DB i,a):** sample database for deployed Project Lamps
- **Periodic check A (SG i,v):** regular review of sample group for monitoring of deployed Project Lamps

A Sales Record will be kept similar to the one described above.

	Project Lamps deployed sales records (SR)
Parties involved	Primary data collection: project developer Database maintenance: project developer
Periodicity	Continuous
Format	Paper or electronic for primary data Electronic database
Data saving	All data shall be saved for the whole crediting period, plus an additional two years

The Sale Record (SR)



The Sales Record (SR) database has been established and shall contain the following information:

- Quantity of Lamps lamps sold
- Serial number of lamps delivered to distribution point
- Date of sale provided by distributor
- Lamp wattage for each lamp
- Battery type for each lamp
- Charging method for each lamp

In addition, CPAs projects that choose **Option 2** will conduct monitoring surveys in the third year of the lamp being distributed at the CPA level to determine the percentage of Project Lamps distributed to end users that are operating and in service during the third year of the crediting period.

The following are the principles that need to be met during periodic monitoring for lamps sold under Option 2 and the ways project developers shall collect sampling information:

1. Only Project Lamps with an original unique marking can be counted as operating and in service.

CarbonSoft will ensure that each lamp sold under the CPA will have a Unique Identification Number, which will be suitably placed on each Project Lamp. Following sampling, only those lamps with the number will be counted as operating and in service.

2. While Project Lamps replaced as part of a regular maintenance or warranty program can be counted as operating, project lamps cannot be replaced as part of the survey process and counted as operating

The monitoring and replacement groups will be kept separate. At the time of monitoring, no replacement will take place to ensure such lamps are not counted.

3. The sampling size is determined by minimum 90% confidence interval and the 10% maximum error margin; the size of the sample shall be no less than 100.

A detailed sampling plan has been described at the end of this section to ensure minimum of 90% confidence level and up to a 10% margin of error.

4. The survey will be conducted by site visits

A survey form is being created for the process and will be used to gather information from the end users at the time of monitoring by carrying out door-to-door site visits.

5. Only persons over age 12 will be interviewed

At the time of monitoring a head of the household will be interviewed. In case this is not possible, other adults in the household will be interviewed. In no scenario, will any person under 12 be interviewed.



6. The CPA design document will describe in detail the survey design for gathering the above information.

The CPA-DD will describe the survey design for gathering the information required for monitoring.

7. The survey has a random distribution and is representative of target population (e.g., size, location)

A detailed sampling plan has been described at the end of this section to ensure random distribution.

8. The method to select respondents for interview is random

A detailed sampling plan has been described at the end of this section to ensure random sampling.

Sampling Plan and Procedure

The SSC-CPA implementation entities utilizing Option 2 and claiming CERs for a period of 7 years will follow the guidelines stipulated by the latest version of the “*Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities*” (EB 65, Annex2). The SSC-CPA will provide how the CPA conforms to the following in the CPA-DD.

Objectives of the Plan:

The following will be the outline of the sampling and monitoring plan prepared by a SSC-CPA utilizing **Option 2** defined in paragraph 2 of the methodology AMS-III.A.R. The goal of this plan is to determine number of project lamps in service and operating under the project in a given year. The lamps distributed will have a unique marking, and only those lamps with the marking will be counted to ensure lamps from other projects are not counted.

Since the Project Activity is typically spread out over a large area, monitoring each and every lamp is not a feasible option and hence a sample size is considered. According to the methodology, *the sampling size is determined by minimum 90% confidence interval and the 10% maximum error margin and the size of the sample shall be no less than 100.*

Hence the sampling plan provided by the SSC-CPA aims at counting the number of Project lamps in use during the crediting period across the CPA, using a 90/10 confidence precision.

Target Population:

The target population will be all the households across a given CPA, that have been distributed lamps to replace use of kerosene lamps for lighting.

Parameters of the Sampling Plan:

A multi stage procedure will be followed. According to guidelines,



“Multistage sampling is a complex form of cluster sampling. Using all the sample elements in all the selected clusters may be prohibitively expensive or not necessary. Under these circumstances, multistage cluster sampling becomes useful. Instead of using all the elements contained in the selected clusters, the researcher randomly selects elements from each cluster. Constructing the clusters is the first stage. Deciding what elements within the cluster to use is the second stage.”

The model adopted will be a two-stage model:

Stage I: This would involve dividing the entire project area into clusters, which typically would be sales points and then, selecting a sample of clusters for survey. Product-type distribution would also be taken into consideration while forming clusters.

Stage II: This would involve selection of a sample of lamps from each selected sample cluster for monitoring.

The aim of the plan is to check continued operation of sampled lamps and identification of user and checking with customer database. The sample survey will be carried out through direct household interviews or user feedback forms.

Sample Size:

The sampling size will be calculated using Cochran’s formula as follows:¹²

$$1. \quad SS = (Z^2 * p * (1-p)) / (c^2)$$

where,

SS = Sample Size

Z = Z value (e.g. 1.645 for 90% confidence level)

p = estimated percentage of the population possessing attribute of interest = 0.5

c = acceptable margin of error = 0.1

Correction is done for a finite population based on the following formula:

$$\text{New SS} = SS / (1 + (SS/P))$$

where,

SS = Sample Size

P = Population

After the sample size has been determined for the CPA using Option 2, the actual survey will be carried out by the CPA implementation agency.

¹² <http://www.surveysystem.com/sample-size-formula.htm>



Data Measured:

The objective of the monitoring for option 2 will be to check number of lamps operational during the crediting period. The number of sample households that will be visited will be calculated by the CPA implementation agency as described above. The following will the parameter monitored:

Parameter	Unit	Description
n _o	Quantity	Number of units in operation and in service

Quality Assurances:

The SSC-CPA implementation agency in its monitoring and sampling plan provided with the CPA-DD will ensure proper quality control methods are prescribed to ensure that data gathered is error free. An overall quality control and assurance strategy shall be documented in the plan. This shall include a procedure for defining outliers and under what circumstances outlier data/measurements may be excluded and/or replaced.

The implementation agency will also provide information on each of the following in the CPA-DD:

- 1) Training of field personnel,
- 2) Provisions for maximizing response rates
- 3) Documenting out-of-population cases
- 4) Refusals
- 5) Other sources of non-response, and related issues.

Implementation Plan:

The implementation plan will be provided in the CPA-DD for those CPAs utilizing Option 2 wherein the actual timelines of the sampling effort will be described. It will also contain a general description of qualifications and experience of personnel who will be engaged and if possible listing specific names, qualification and experience.

The CPA implementation agencies will ensure that all recommendations provided in the Annex 4 of the Guidelines for unbiased estimates of sampled parameters will be followed.

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: 10/09/2011

Name: Mr. Sebastian Foot

Organisation: CarbonSoft Corporation Ltd.



Annex 1

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

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



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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Annex 3



BASELINE INFORMATION

Annex 4

MONITORING INFORMATION
