



**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):

>>

Project to replace fossil fuel based lighting with Solar LED lamps in Africa¹

Version 03

Date: 18/09/2012

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

>> The “Project to replace fossil fuel based lighting with Solar LED lamps in Africa” (“POA” or “Projects”) is a voluntary initiative by ToughStuff International (“ToughStuff”) with specific focus on the replacement of fossil fuel (kerosene) based lighting systems at the domestic or non-residential level at facilities such as shops and SMEs by installation of solar charged LED lamps.

1. Policy/measure or stated goal of the PoA

The principal objective of the PoA is to increase dissemination of solar charged, LED based lighting applications at the domestic level and non-residential levels at facilities such as shops and SMEs. The stated policy shall seek to abate greenhouse gas emissions attributable to the use of the baseline technologies (fossil fuel based lighting applications) as well as to stimulate sustainable development in line with the indicators described below.

Statistics on use of kerosene based lighting applications in Sub-Saharan Africa reveal a dire situation where approximately half a billion people in the region lack access to electricity and therefore have no choice but to use kerosene lamps for domestic lighting².

Small scale component project activities (CPAs) under this proposed PoA will be implemented by ToughStuff and other companies operating (hereinafter defined as Individual CPA Operators) in the PoA project boundary and will access either financing or technology independently or from the CME to the PoA which will enable these companies to further disseminate solar LED lamps (hereinafter called project lamps.)

The use of fossil fuel based lighting has numerous adverse environmental, economic and social effects. In its stead the following parameters highlight the contribution to sustainable development that will be realized by implementation of the proposed PoA-DD.

Environmental:

1. Reduction of anthropogenic emissions associated with the use of fossil fuel based lighting applications, specifically kerosene lamps.
2. Reduction of indoor air pollution.

¹ At the time of the Global stakeholder Consultation the CME had initially titled the PoA: Project to replace fossil fuel based lighting with Solar LED lamps in East Africa. However during validation the CME considered the possibilities of expanding the boundary of the PoA, post registration to include more regions in Sub Saharan Africa including West Africa. In light of this decision the CME sought it fit to title the PoA with a name that encompasses this decision of approaching the PoA boundary without a specific regional limitations in Africa.

² IFC:

<http://www.ifc.org/IFCExt/africa.nsf/ContentPageDesignPreview/D8EF5023E7DCA44242257444002DBB31?OpenDocument&PreviewStyle=9D66A9622EB40AE64225776600531512>



Economic:

1. Domestic savings realized from the diminished consumption of fossil fuel.
2. Domestic savings on medical bills/fees traditionally attributed to illnesses associated with indoor air pollution.

Social:

1. Improved domestic lighting with increased lumen output as compared to kerosene lamps. Providing a better environment for children to study in devoid of the low quality lighting and eye irritation previously witnessed with the traditional based kerosene lamps.
2. Increased awareness on the use environmentally friendly lighting applications and the adverse effects of traditional fossil fuel lighting applications creating social awareness on the need to conserve the environment and the health of their families.

• **Improved Domestic Lighting:**

The low quality lighting provided by the kerosene applications restricts household productivity as follows:

- Lighting may be restricted and provided only by the fire, candles, or simple kerosene wick lamps which can be a significant source of pollution.
- The lack of light restricts activities in the home, including children's homework, reading and opportunities for income generating activities.
- Lack of access to electricity restricts the use of a wide range of appliances that can contribute to food safety (refrigerators), communication/education, leisure (radio, TV), and economic activity³.



Figure 1: Child studying using Kerosene Hurricane Lamp

³ WHO: Addressing the links between Indoor Air Pollution Household energy and Human Health
http://www.who.int/mediacentre/events/HSD_Plaq_10.pdf



While there are a variety of models, arrays and types of LED lamps, it is a widely acknowledged fact that the typical LED Lantern produces greater quality useful light than the typical Kerosene lantern. This figure according to some reports is as high as 200 times better light as fuel based lighting systems⁴.

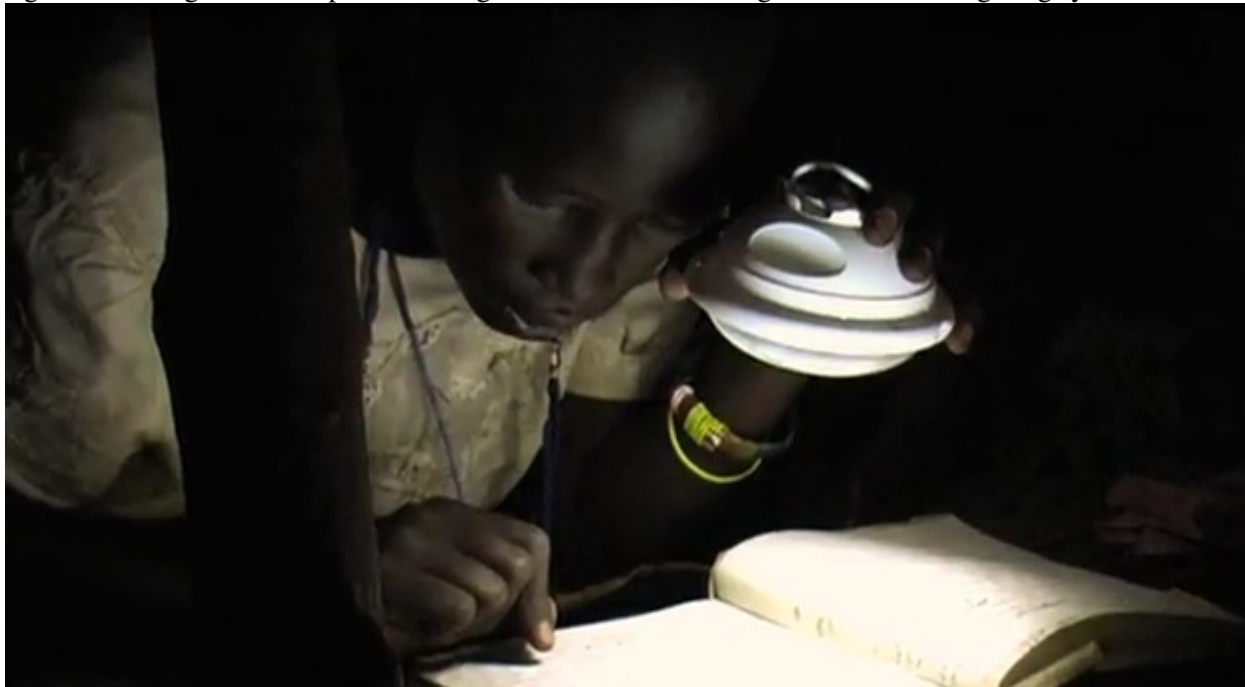


Figure 2: Image of student using ToughStuff International’s project lamps to study at night

- **Access to efficient lighting systems:**

Global lighting-related CO₂ emissions were estimated to be 1900 million tons in 2005, which was about 7% of the total global CO₂ emissions from the consumption and flaring of fossil fuels⁵. In Sub-Saharan Africa these figures are amplified by poverty, poor infrastructure and subsequent poor access to electricity.

<u>Parameter</u>	<u>Value</u>
Access to Electricity	23%*
Energy Poor in Africa	500 million people**
Annual Expenditure on Fuel Based Lighting	\$17 billion

Table 1: Statistics on Electricity and Lighting in Africa⁶

*Average estimate

**Projection anticipated by the year 2030

⁴ Christian Science Monitor: <http://www.csmonitor.com/2006/0103/p01s02-wosc.html>

⁵ Lighting Laboratory Report: summary and conclusions
http://www.lightinglab.fi/IEAAnnex45/guidebook/13_summary_conclusions.pdf

⁶ IFC
<http://www.ifc.org/IFCExt/africa.nsf/ContentPageDesignPreview/D8EF5023E7DCA44242257444002DBB31?OpenDocument&PreviewStyle=9D66A9622EB40AE64225776600531512>



While the levels of illumination provided by flame based lamps are far lower than with modern electric lighting, the efficiency of fuel-based light production is also low. The result is a substantial amount of primary energy use with little service received in return.

Typical kerosene lamps deliver between 1 and 6 lumens per square meter (lux) of useful light, compared to typical western standards of 300 lux for tasks such as reading. Kerosene-based light is poor for reading and many other tasks, particularly on horizontal surfaces. A competitive analysis of kerosene lanterns versus conventional electric alternatives (both grid-based and grid-independent) and emerging white-LED alternatives; shows considerable potential for economic and environmental benefits⁷ for the use of LEDs.

There are a wide variety of fuel-based light sources, including candles, oil lamps, ordinary kerosene lamps, pressurized kerosene lamps, biogas lamps, and propane lamps. According to most studies, ordinary wick-based kerosene lamps are the most common type of fuel-based lighting in developing countries⁸.

- **Reduced In-Door Air pollution**

The use of kerosene lamps for domestic lighting is widely associated with harmful indoor air pollution. As a product of the combustion reaction, gases such as sulfur dioxide, carbon monoxide and carbon dioxide are produced. Kerosene lamps are a preferred lighting option for the rural and urban poor; and with no or limited access to electricity, this demographic often live in poorly ventilated and crowded living conditions. The use of these fuels in homes with poor or no ventilation is particularly troublesome because this smoke has been associated with a variety of negative health outcomes, the most notable being lung cancer⁹.

The World Health Organization (WHO) has assessed the contribution of a range of risk factors to the burden of disease and revealed indoor air pollution as the 8th most important risk factor which was responsible for 2.7% of the global burden of disease. Globally, indoor air pollution from fossil fuel use is responsible for 1.6 million deaths due to pneumonia, chronic respiratory disease and lung cancer, with the overall disease burden (in Disability-Adjusted Life Years or DALYs, a measure combining years of life lost due to disability and death) exceeding the burden from outdoor air pollution fivefold. In high-mortality developing countries, indoor smoke is responsible for an estimated 3.7% of the overall disease burden, making it the most lethal killer after malnutrition, unsafe sex and lack of safe water and sanitation¹⁰.

⁷ Technical and Economic Performance Analysis of Kerosene Lamps and Alternative Approaches to Illumination in Developing Countries

<http://evanmills.lbl.gov/pubs/pdf/offgrid-lighting.pdf>

⁸ Evan Mills, Ph.D. International Association for Energy-Efficient Lighting and Lawrence Berkeley National Laboratory

http://evanmills.lbl.gov/pubs/pdf/global_lighting_energy.pdf

⁹ Environmental Health and Indoor Air Pollution in China:
http://www.wilsoncenter.org/sites/default/files/indoor_air_may07.pdf

¹⁰ WHO Fact Sheet on In-Door Air Pollution:
<http://www.who.int/mediacentre/factsheets/fs292/en/>



Baseline Technologies:

Fossil fuel based lighting applications are in wide and common use throughout sub Saharan Africa. Common applications include small wick, hurricane and pressurized kerosene lamps. These technologies are often inexpensive to acquire but offer little value for money when an analysis of their lumen output is factored in. The same is evidenced from an excerpt from a report from Dr. Evan Mills who is one of the leading advocates for substitution of fossil fuel based lighting applications in the developing world:

Technical and Economic Performance Analysis of Kerosene Lamps and Alternative Approaches to Illumination in Developing Countries¹¹

Fuel-based lighting (typically kerosene) represents \$38 billion per year in fuel costs and 260 MT of carbon-dioxide emissions worldwide.

Moreover, typical kerosene lamps deliver between 1 and 6 lumens per square meter (lux) of useful light, compared to typical western standards of 300 lux for tasks such as reading. Kerosene lamps also have undesirable effects on indoor air quality, safety, and rely on a fuel that with high price volatility and uncertain availability in many areas.

We measured the energy use and light output of a variety of kerosene lanterns typical of those used in the developing world, and, in a “competitive analysis”, coupled the results with cost and performance data for a variety of battery- and grid-powered electric lighting alternatives.

Measured energy use among kerosene lanterns varied by a factor-of-ten, from 0.005 to 0.042 liters per hour (corresponding to 6 to 53 liters per year). The simplest wick-based lanterns (most common among the poorest households) exhibit the highest costs per unit of light output. To determine both total light output and its spatial distribution, we conducted goniophotometer measurements of kerosene lanterns. We measured total light output of 8 to 82 lumens per lantern and in many cases observed a highly uneven distribution in both the horizontal and vertical planes. As the globes became soiled, non-uniformity increased and total luminous flux declining dramatically (by up to 83%). In one case where we compared the lamp manufacturer’s stated rate of energy use with our own measurements, actual values ranged from 2.4 to 3.0 times the manufacturer’s claim, while average light output was only one-third of advertised values.

¹¹ <http://evanmills.lbl.gov/pubs/pdf/offgrid-lighting.pdf>



Figure 3: Picture of a hurricane (glass covered) kerosene based lamp

Technology transfer is defined as the process of skill transferring, knowledge, technologies, methods of manufacturing, samples of manufacturing and facilities among governments or universities and other institutions to ensure that scientific and technological developments are accessible to a wider range of users who can then further develop and exploit the technology into new products, processes, applications, materials or services. The CME will not be transferring any skills of manufacturing or developing any manufacturing factories within the PoA boundary and therefore there shall be no technology transfer for the CPAs implemented by the CME. Individual CPA operators who do incorporate technology transfer elements into the design of their CPAs will state so explicitly in the CPA DD.

2. General operating and implementing framework of PoA

ToughStuff as CME will coordinate this small-scale Programme of Activities (SSC-PoA) and will implement its own component project activities in within the PoA boundary. It is expected that an SSC PoA with as wide a geographical area as the proposed PoA will attract potential Individual CPA Operators. There is express provision for the inclusion of such CPAs provided they comply with the eligibility criteria developed for this SSC PoA and that they enter contractual agreements ceding all the CERs realized in their individual CPAs to the CME in a CER/Finance sharing structure agreed to in contract. A generic CPA DD template has been prepared and all CPAs (either those implemented by the CME or by the Individual CPA Operators) shall be required to submit their CPA DDs in the format therein presented.

The CME shall communicate directly with the CDM Executive Board with regards to all matters related to this SSC PoA and CPAs included therein. There shall be a top down movement of project lamps from either the CME or Individual CPA Operators therein included and subsequently a bottom to top movement of information collected from end users/distribution data on sold project lamps from CPA distribution records and finally to the CME database.

Movement of finances from CER buyers shall be a function of the transfer of verified and issued CERs from the CDM EB to the CME and finally to the CER buyer. Accordingly distribution of finances to Individual CPA operators shall depend on the number of CERs realized from the Individual CPAs as well as the terms of the contract engaging the CME to the Individual CPA Operator.

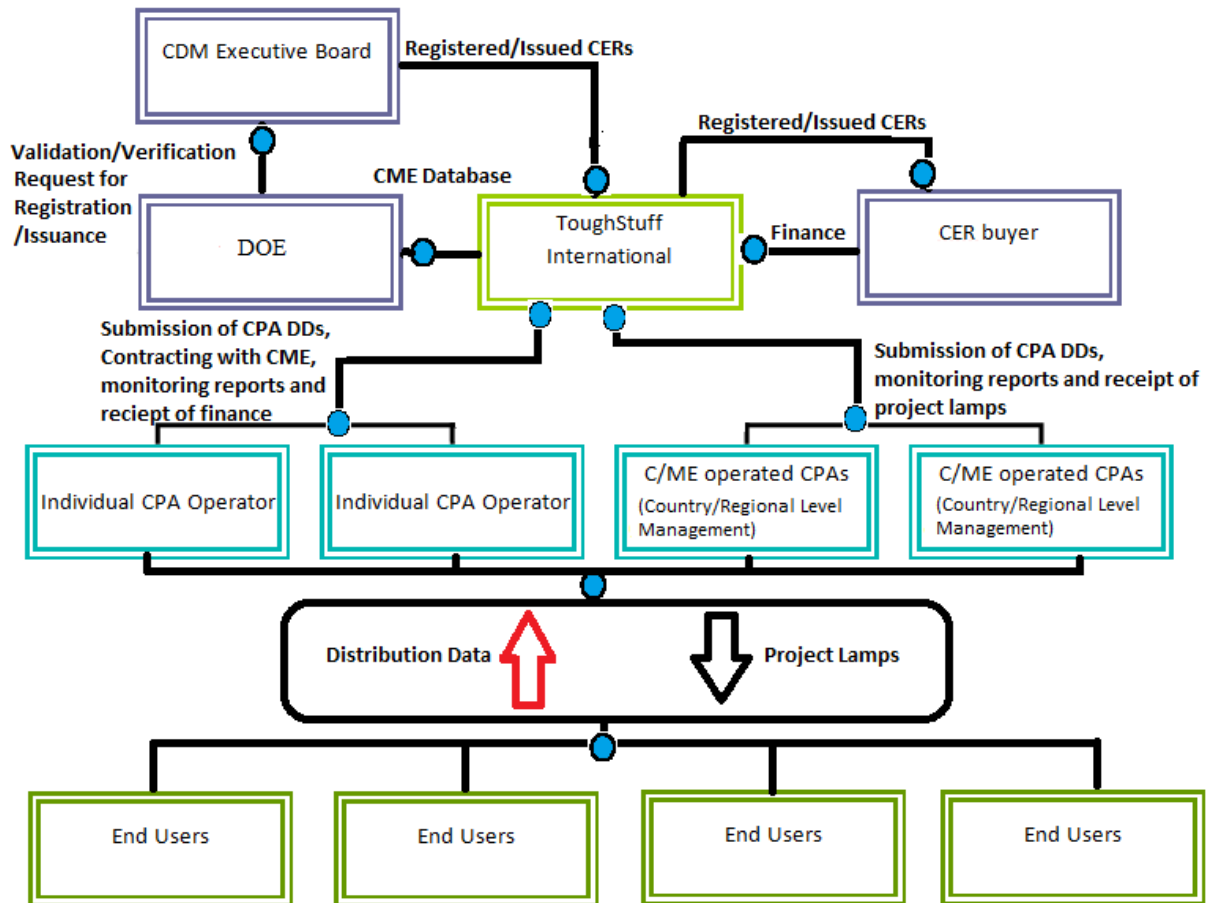


Figure 4: General Framework for the Implementation of the proposed PoA

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

The coordinating/managing entity, ToughStuff herein affirms that the proposed PoA is a voluntary action. There are no policies or statutes prompting any individuals to use project lamps in households or non-residential settings. All participation of the stakeholders to this PoA is voluntary.

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

1. Identity of the CME of the proposed PoA, as the entity which communicates with the Board;

The Coordinating/Managing Entity of the proposed PoA is ToughStuff International whose contact details are provided in Annex 1 of the PoA DD. ToughStuff shall be the entity that communicates with the Executive Board on behalf of the project activity.

2. Project participants to the PoA (project participants may or may not be involved in one of the component project activities (CPAs) related to the PoA).



ToughStuff International is the only project participant & C/ME to the proposed “Project to replace fossil fuel based lighting with Solar LED lamps in Africa” and will implement several CPAs in the host party the Republic of Kenya, which will be included under the PoA.

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

>> The proposed PoA will disseminate project lamps throughout the physical/geographical boundary as defined in Section A.4.1.2 of this PoA DD. These solar lamps will be distributed with the primary objective of replacing the use of kerosene lamps traditionally used for domestic lighting.

A.4.1. Location of the programme of activities:

>> The proposed PoA is will be carried out within the territorial limits of the Republic of Kenya.

A.4.1.1. Host Party(ies):

>> At the time of registration the PoA shall be bound to the terrestrial limits of the Republic of Kenya as the Host Party from whom the project has received authorization for implementation of the project and in which the first CPA included in the project activity shall be implemented.

Going forward, CPAs included under the PoA will be implemented in multiple countries across East and West Africa. Accordingly the boundary of the PoA will be amended post registration according to the procedures established in Annex 26 of the CDM Executive Board decision 60 for the procedures for registration of a programme of activities as a single CDM project activity and issuance of certified emission reductions for a programme of activities¹².

A.4.1.2. Physical/ Geographical boundary:

>> As stated above the physical geographical boundary of the PoA at the time of registration shall be the Republic of Kenya whose geographical coordinates are provided as follows: Latitude 4^o North to 4^o South and Longitude 34^o East to 41^o East¹³.

¹² Annex 26 EB 60: http://cdm.unfccc.int/Reference/Guidclarif/PoA/poa_guid06.pdf

¹³ <http://www.mapsofworld.com/kenya/geography/>

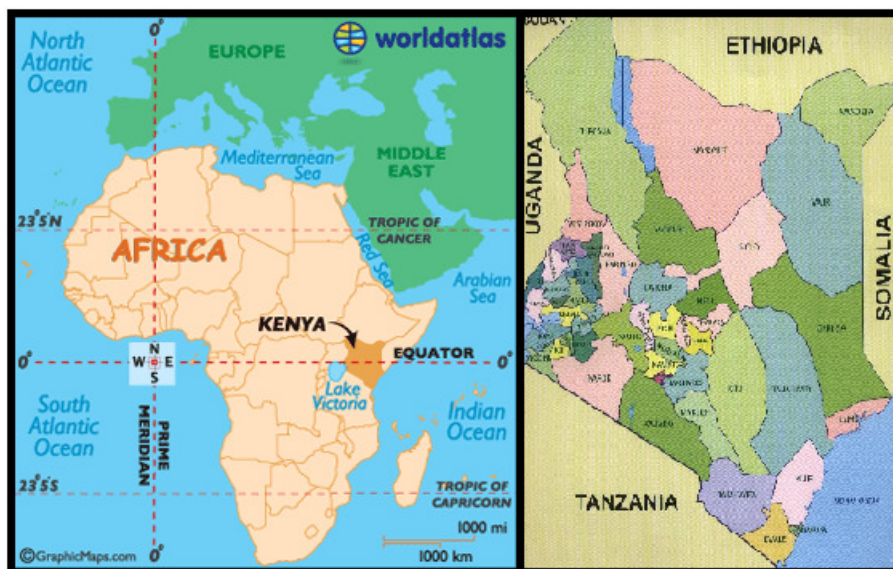


Figure 5: Map of Kenya in Africa as the PoA Boundary

- Applicable national and/or sectoral policies and regulations:

This analysis shall be provided for all the Republic of Kenya which is currently included in the PoA Boundary. Post registration amendments to the PoA boundary therefore shall therefore automatically require a post registration amendment to the PoA DD where this section shall be amended to include any relevant regulations or policies relevant to the PoA and provided for by the new Host Party's existing legislation.

- The Republic of Kenya:

The government of Kenya through its institutional framework at the Ministry of Energy or its regulatory agencies such as the Energy Regulatory commission do not have any policies that promote the use of kerosene nor does the government advocate increased kerosene consumption. The government has endeavoured to create the “kerosene free economy plan” which will in principle seek to promote increased use of renewable energy as a substitute to kerosene for lighting¹⁴. However the policy has not evolved beyond an idea note where the policy has been quoted in associated government policies around renewable energy without the policy being independently codified into a ministerial directive or into any statutory provisions. The policy therefore is not a mandatory policy requiring the project proponents, households or SMEs to use Solar LED lamps.

- Technology Transfer:

This can be defined as the process of skill transferring, knowledge, technologies, methods of manufacturing, samples of manufacturing and facilities among governments or universities and other institutions to ensure that scientific and technological developments are accessible to a wider range of

¹⁴ <http://allafrica.com/stories/201110190028.html>



users who can then further develop and exploit the technology into new products, processes, applications, materials or services¹⁵.

Unless otherwise stated by the Individual CPA operators, project lamps distributed in the proposed PoA shall be final products manufactured with the objective of distribution to end users without any need for further local assembly or manufacture. There is no technology transfer envisioned in the PoA.

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

>> SSC-CPAs to be included in the proposed PoA will distribute project lamps for domestic or non-residential lighting. These lamps will be used to replace fossil fuel based lighting applications, particularly Kerosene lamps, at the point of use in which the lamps are installed.

Each SSC- CPA will be implemented within the territorial limits of the physical/geographical boundary to which the proposed PoA is confined. To prevent double counting the SSC-CPAs each of the project lamps distributed in the individual CPA shall be uniquely identified to each CPA as per the unique marking accorded to each on the lamp and recorded in the CPA databases. The CPAs will be required to comply with the provisions of the baseline and monitoring methodology provided for in AMS III.AR.

As CME, ToughStuff International will coordinate the proposed PoA as well as implement an individual SSC-CPA which will be included in the SSC-PoA.

Throughout the lifetime of the PoA it is envisioned that several CPAs will continue to be included under the PoA. Monitoring for each of these CPAs will be monitored according to the monitoring plan herein described.

Key Implementation Strategies for the typical CPA under the proposed PoA:

- Awareness and Promotion:

SSC-CPAs may conduct promotion campaigns and public meetings to create awareness for the use of the Solar LED systems. These may be conducted as many times as the project operator so wishes, as this option is left to his direction depending on the target locations in which he wishes to implement the CPA.

A proposed mechanism in these proposed promotion mechanisms is that they be conducted amongst Community Based Organizations, (CBOs), Religious groups, Women's groups and other community Welfare organizations. These organizations have been identified as pivotal to the organizational structure for fees collection and member organization.

To this end, each CPA operator will have to secure:

¹⁵ TECHNOLOGY TRANSFER: HOW TO MAKE IT HAPPEN: Dr. Terry Moss, General Manager, Eskom (South Africa):

http://www.google.co.ke/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCIQFjAA&url=http%3A%2F%2Fwww.worldenergy.org%2Fdocuments%2F9_technology_transfer_march_2009_full.ppt&ei=pcxYUKeHFcyQhQe4uIDACA&usg=AFQjCNHqZastvfzj3YBBHqhYSDa6waDqlw



- Payment

The greatest impediment to the implementation of the solar LED Lighting systems is the high ‘up-front’ cost associated with the purchase of such systems. At the discretion of the CPA operator, the option of instalment based payment schemes is available. Project operators are encouraged to take advantage of creative payment solutions such as mobile cash transfer systems that facilitate easier payments over a secure platform.

Sales receipts containing individual solar system numbers are to be issued to users upon completion of payment.

- Distribution without payment

For instances where the CPA operator chooses to distribute the project lamps for free, a record of the distribution data with particular focus on the contact details and location of the end users shall be maintained and availed to the C/ME¹⁶.

- Lighting Quality

Each CPA will need to provide independent third party testing that proves the useful life lighting quality of the solar LED lighting system. These independent tests will have to confirm with international standards as provided for in the baseline and monitoring methodology AMS III AR.

- Monitoring

Each CPA will be accorded its individual identification number for example CPA₀₁, CPA₀₂, CPA_n. Subsequently, each solar LED lighting system will receive its own identification number. Each CPA will provide a total sales record to the CME who will store the data electronically up to 2 years after completion of the CPA.

- Distribution

While lamp distribution models are entirely at the discretion of the CPA Operator, several proposed models, as defined in the following chart, are recommended as they have proven success in the Sub Saharan region.

¹⁶ This is only a requirement for lamps with a seven year crediting period.

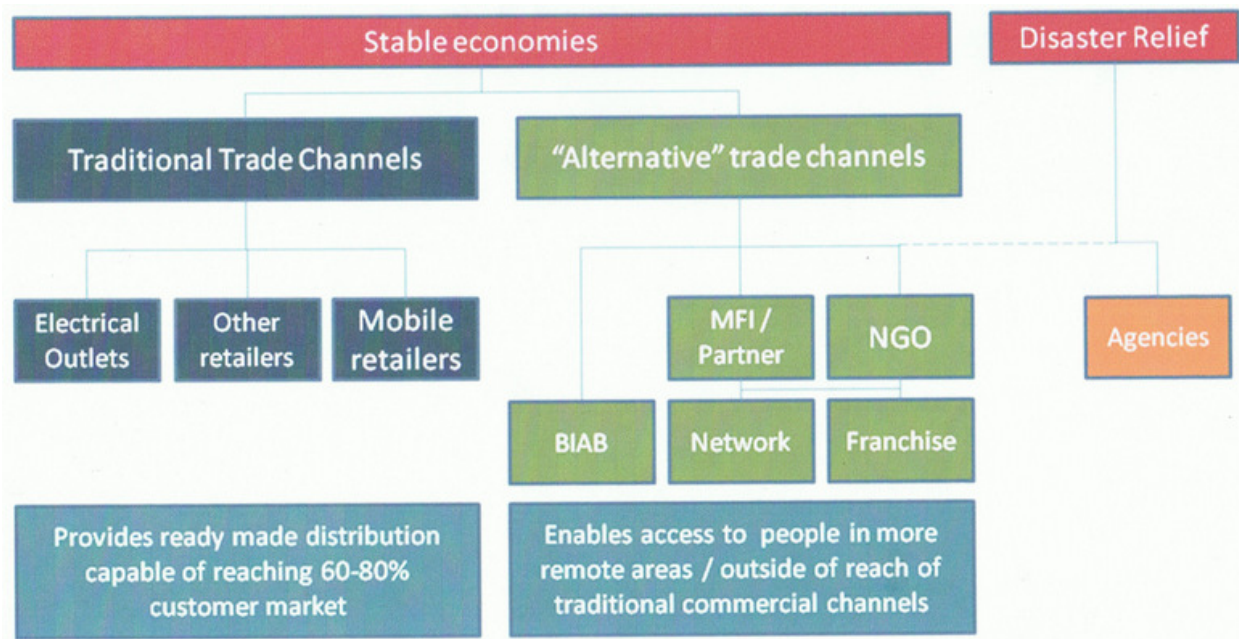


Figure 6: Proposed Distribution channels

CPA Operators will have to approach distribution in accordance with the Monitoring methodology, where considerations of maintenance of the sales record, unique identification of the lamps distributed shall be required for project lamps with a seven year useful life.

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

>>

CPAs included under this PoA will sell or distribute project lamps to replace the use of kerosene based lamps. The introduction of the lamps will primarily seek to achieve the stated goal of the PoA of mitigating GHG emissions.

For purposes of this documentation as Solar LED Lamp shall be defined as portable lighting application consisting of an LED lamp, rechargeable batteries and a photovoltaic solar panel; either as a single unit or a product consisting of all these elements separately. An LED lamp is a solid-state lamp that uses light-emitting diodes (LEDs) as the source of light. The lamp may comprise of a variety of arrangements of the individual LEDs.

Light production from the Solar Panels and LED lamps:

Photovoltaic (PV) Solar Panels generate electricity by the Photovoltaic Effect which is the phenomenon evident in certain materials produce electric current when they are exposed to light. Light from the sun is made up of packets of energy called photons. Each photon carries an amount of energy corresponding to its wavelength of light. When a visible light photon strikes a solar cell it can do one of three things: pass straight through, be reflected, or be absorbed. Where the photon is absorbed, its energy is absorbed by an electron in an atom of the solar cell enabling it to escape from its normal position (photon excitation), cross the junction and fill a hole. Since electrons are physically moving across the PN junction, the positive charge carrying holes are effectively moving in the opposite direction around the load circuit (a



rechargeable battery or light bulb etc.). This completes the circuit providing more holes for the electrons to combine with and providing usable electricity which then powers the LED lamps.

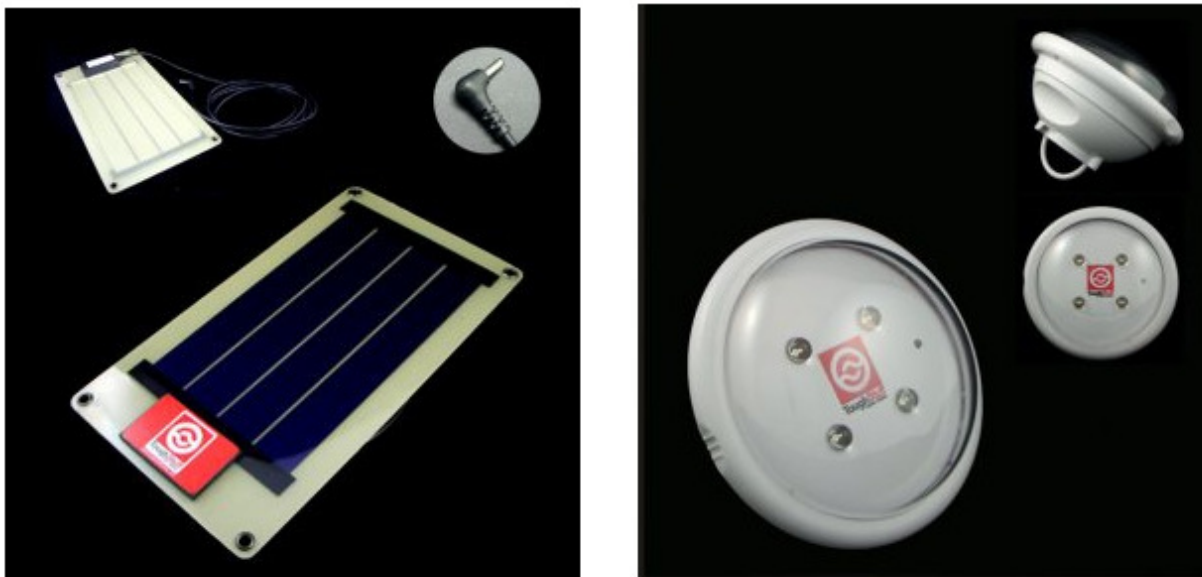


Figure 7: ToughStuff Solar Panel and ToughStuff Solar LED Lamps

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

>> The following eligibility criteria has been developed pursuant to the Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities as provided in Annex 3 of EB 65¹⁷. Accordingly each CPA that seeks inclusion in the proposed PoA shall have to demonstrate each of the following criteria:

Eligibility Criteria		CPA Compliance
Criteria description	1. Geographical boundary: The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;	

¹⁷ Annex 3 EB 65 Version 01.0 STANDARD FOR DEMONSTRATION OF ADDITIONALITY, DEVELOPMENT OF ELIGIBILITY CRITERIA AND APPLICATION OF MULTIPLE METHODOLOGIES FOR PROGRAMME OF ACTIVITIES:
http://cdm.unfccc.int/filestorage/E/6/T/E6TY7DMI28WGCUV5J0K3LAOHBO9RFN/eb65_repan03.pdf?t=OUV8bWFrOWU1fDANYTKPI7iIaCtUSIO3114-



<p><u>Action items for compliance</u></p>	<p>For a CPA to be included in the proposed PoA, the CPA implementer shall have to implement the project activity within the stated geographical boundary. Where the CPA is implemented in a country outside the terrestrial limits of the stated Host Party, the 3 requirements stated in Annex 26 EB 60¹⁸ for post registration amendment of the project boundary shall have to be complied with.</p> <p>This requirements are as follows:</p> <ul style="list-style-type: none"> • The DNA of the Host country shall issue a Letter of Approval authorizing the SSC CPA’s implementation in the Host country¹⁹ and a letter of authorization for the coordinating and managing entity. • The CME shall assess the CPA to ensure that it complies with all the requisite eligibility criteria stated in the PoA DD and the DOE shall validate the same prior to inclusion in the PoA • The existing registered PoA design document (POA-DD) is revised to reflect the changes, in particular, the eligibility criteria for inclusion of CPAs; In particular the PoA boundary shall be amended to ensure consistency with the Host Country included. 	
<p><u>Evidences required to satisfy this requirement</u></p>	<p>Individual CPA operators shall provide:</p> <ol style="list-style-type: none"> 1. A description of the project boundary in the CPA DD stating its conformity to the project boundary 2. A letter of request signed by the CPA implementer requesting to be included in the PoA stating the project boundary of the CPA 3. Confirmation that the CME has already acquired an LoA for the particular Host Country. <p>For CME implemented CPAs the CME shall provide a Letter of Approval from the Designated Operational Authority of the Host Country.</p>	

¹⁸ Annex 26 EB 60 Version 01 : CLARIFICATIONS REGARDING THE “PROCEDURES FOR REGISTRATION OF A PROGRAMME OF ACTIVITIES AS A SINGLE CDM PROJECT ACTIVITY AND ISSUANCE OF CERTIFIED EMISSION REDUCTIONS FOR A PROGRAMME OF ACTIVITIES”

¹⁹ A host Party's letter of approval for a PoA will cover all CPAs included under that PoA which are located within the territory of the party. It is not necessary to obtain a separate letter of approval for each CPA in the same host country.



<u>Criteria description</u>	2. Double counting: Conditions that avoid double counting of emission reductions like unique identifications of product and end-users (e.g. programme logo);	
<u>Action items for compliance</u>	Each project lamp distributed under the proposed PoA shall be uniquely identified to avoid double counting. Whereas the requirement for unique identification on the project lamp is only a requirement for project lamps with a seven year effective useful life, project lamps with a 2 year effective useful life will still have to assign a unique ID to the project lamps distributed within the CPA which will be monitored in the C/ME database to eliminate potential double counting of emission reductions that could occur, for example, if more than one entity (e.g. lamp manufacturers, suppliers of solar and/or battery equipment, etc.) claims credit for emission reductions for the project lamps.	
<u>Evidences required to satisfy this requirement</u>	Individual CPA operators shall be required to provide: <ul style="list-style-type: none"> • A signed declaration that their project lamps have not been included in any other CDM or voluntary carbon financing schemes. CME implemented CPAs shall provide: <ul style="list-style-type: none"> • A statement within PoA DD and CPA DDs that the CME's project lamps have not been included in any other CDM or voluntary carbon financing programmes. 	
<u>Criteria description</u>	3. Start date of the CPA: Conditions to check the start date of the CPA through documentary evidence;	
<u>Action items for compliance</u>	The CPA start date shall not begin before the date of validation of the PoA. The CPA operator shall provide shall documentary evidence by way of receipts/sales/distribution records that prove that the CPA start date at the very earliest does not commence before the commencement of validation of the PoA (i.e. commencement of the Global Stakeholder Consultation Process). This is in line with the provisions of Annex 38 of the CDM EB 55 ²⁰ .	
<u>Evidences required to satisfy this requirement</u>	Schedule of implementation of the project lamps.	
<u>Criteria</u>	4. Compliance with methodology:	

²⁰ PROCEDURES FOR REGISTRATION OF A PROGRAMME OF ACTIVITIES AS A SINGLE CDM PROJECT ACTIVITY AND ISSUANCE OF CERTIFIED EMISSION REDUCTIONS FOR A PROGRAMME OF ACTIVITIES Annex 38 EB 55



<u>description</u>	Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs; The PoA is developed around the single approved baseline and monitoring methodology AMS-III.AR.	
<u>Action items for compliance</u>	<p>This category comprises activities that replace portable fossil fuel based lamps (e.g. wickbased kerosene lanterns) with battery-charged LED or CFL based lighting systems in residential and/or non-residential applications (e.g. ambient lights, task lights, portable lights)This methodology is applicable only to project lamps whose batteries are charged using one of the following options:</p> <p>(a) Charged by a 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</p> <p>This PoA, however is only applicable to project lamps charged under Option (a) above, specifically Solar charged LED lamps.</p> <p>For Option 2, project lamps shall be marked for clear, unique identification to associate them with each unique CPA</p>	
<u>Evidences required to satisfy this requirement</u>	<p>The CPA implementer shall provide manufacturer certification or test results from a third party laboratory affirming that the project lamps distributed in the CPA are indeed Solar LED lamps.</p> <p>The CPA implementer shall provide a baseline study report, literature review or national statistics that clearly demonstrate Kerosene as the most dominant fuel source for lighting.</p> <p>The CPA operator shall provide a description of the unique identification on project lamps as it will appear on the CPA sales record for Option 2 project lamps</p>	
<u>Action items for compliance</u>	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-user.	



<u>Evidences required to satisfy this requirement</u>	The CPA implementer shall provide a sample of the warranty card which meets the criteria established in the methodology and stated above.	
<u>Action items for compliance</u>	The project design document shall explain the proposed distribution method of the project lamps. It shall also explain how the proposed project activity will: (a) Ensure that the replaced baseline lamps are those that directly consume fossil fuel. (b) Ensure compliance with prevailing regulations pertaining to the use and disposal of batteries	
<u>Evidences required to satisfy this requirement</u>	(a) Documentation of the common practice of fuel usage for lighting in the project region (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; (b) The CPA implementer shall provide a description in the CPA DD of all environmental legislation or regulations pertaining to the use and disposal of batteries. If there exists any such regulation the CPA implementer shall provide in the CPA DD a description of the CPA’s compliance with such laws or regulations.	
<u>Action items for compliance</u>	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.	
<u>Evidences required to satisfy this requirement</u>	The CPA operator shall provide a distribution records demonstrating the number of project lamps purchased per consumer for Option 2 project lamps which require unambiguous identification of the end user. For Option 1 project lamps which do not require such identification the CME shall include for crediting a maximum of 5 lamps per end user. Where project lamps are sold in bulk to an intermediary the CPA implementer shall provide contractual evidence that the project lamps will be used by end users and such contract shall restrict the end user to a maximum of 5 lamps per end user.	



<p>Technical specifications of the project technology required by the methodology shall be described under eligibility criteria 12.</p>		
<p>Criteria description</p>	<p>5. <u>Local stakeholder consultations and environmental impact analysis:</u> The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis</p>	
<p>Action items for compliance</p>	<p>The C/ME has categorically stated in Section C & D of this SSC PoA DD that the environmental analysis and Local Stakeholder Consultations shall be conducted at the CPA level. Given the potentially geographically dispersed nature of the project activity envisioned in the proposed PoA, conducting either the environmental impact assessment or the LSC at PoA level does not offer a practical approach to address either concern within the communities in which the project activity shall be implemented.</p>	
<p><u>Evidences required to satisfy this requirement</u></p>	<p>Each CPA DD shall provide a full description of the LSC and Environmental Analysis confirming that both activities were carried out at the activity level.</p> <p>Evidences for the LSC include newspaper advertisement, public posters or other means of invitation and recording that has been officially recorded by the CPA implementer.</p> <p>Environmental Analysis may be evidenced by EIA/EIA exemption certificates. Literature review documenting the lack of necessity of an EIA in accordance with statutes may also be used however this is only acceptable where the Host Country of the CPA has issued a Letter of Approval for the implementation of the PoA within the jurisdiction of the DNA.</p>	
<p>Criteria description</p>	<p>6. <u>Official development assistance:</u> 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>Action items for compliance</p>	<p>In addition to the requirement within the SSC CPA DD to provide a statement with regards to any ODA diversions, the CPA Operator (applicable only to CPA Operators other than the C/ME) shall have to provide in writing an attestation that there is no Funding from Annex 1 parties or that any funding for the SSC CPA from Annex 1 parties does not result in a diversion of official development assistance. The C/ME shall provide a written statement of attestation that the project activity does not receive any ODA from an Annex 1 country</p>	



<u>Evidences required to satisfy this requirement</u>	The CPA implementer shall provide a signed ODA declaration to the CME who shall furnish the same to the DOE. The CME shall also sign an ODA which shall be provided to the DOE and shall be inclusive of all CPAs implemented by the CME.	
Criteria description	<p align="center">7. <u>Target group & distribution mechanisms:</u></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>	
Action items for compliance	The CPA Operator shall be required to state in writing the distribution plan that will be employed in the distribution of project technologies within the SSC CPA. Such description will also require a description of the target group intended for distribution of the project technology by way of a baseline survey of the target group population characteristics or relevant national statistics or peer reviewed literature.	
<u>Evidences required to satisfy this requirement</u>	The distribution plan stated above shall be verified using baseline surveys or literature review which the CPA implementer shall provide to the CME and the DOE.	
Criteria description	<p align="center">8. <u>Sampling requirements</u></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>	
Action items for compliance	<p>Sampling shall be invariably relied upon in the proposed PoA under two circumstances:</p> <ul style="list-style-type: none"> • Where the CPA relies on baseline surveys to quantify baseline emissions from fossil fuel based baseline lamps If monitoring is required, (option 2 project lamps) per paragraphs 20-23, to determine the percentage of project lamps distributed to end-users that are operating and in service, such monitoring will take place in the third year of crediting period of each CPA and the results shall be used for operational years 4, 5, 6 and 7 of the project lamps of that CPA. <p>In either circumstance the CPA shall be required to follow the express provisions as described in Annex 4 of EB 69 with regards to the standard for sampling and surveys for CDM project activities and programme of activities and the guidelines for sampling and surveys for CDM project activities and programme of activities based on the provisions of Annex 5 of EB 69</p>	



<p><u>Evidences required to satisfy this requirement</u></p>	<p>Accordingly the CPA operator shall be required to demonstrate the following:</p> <ul style="list-style-type: none"> • That the sample size established meets a 90/10 confidence/precision level and shall not be conducted for anything less than 100 individual samples. And that the provisions of the guidelines for sampling and surveys for CDM project activities and programme of activities were used in conducting the sample. • That the survey is representative of the target population. • Respondents are selected at random regardless of the sampling method selected. • The sampling method/ approach used shall be justified in the CPA DD citing specific justification for the applicability of the approach selected. • Only mean values shall be used for computation of the parameter of interest. <p>Where baseline surveys have been used a baseline report shall be submitted to the CME which clearly demonstrates compliance with the stated eligibility criteria. This report shall be verified by the DOE prior to the inclusion of the CPA into the PoA.</p>	
<p>Criteria description</p>	<p>9. <u>Small-scale or micro scale threshold criteria:</u> Where applicable, the conditions that ensure that every CPA in aggregate meets the small-scale or micro scale threshold criteria and remains within those thresholds throughout the crediting period of the CPA;</p>	
<p>Action items for compliance</p>	<p>CPA Operators shall be required to prove that the number of project lamps installed in the CPA will not realize emissions reduction in excess of the 60 kilo tonne limit for type III small scale methodologies. Micro Scale CPAs shall demonstrate that it will generate less than 20 kilo tonnes per annum.</p>	
<p><u>Evidences required to satisfy this requirement</u></p>	<p>The CPA implementer shall provide the CME and the DOE with a copy of the ex-ante estimation of the CERs realized in the project activity in an excel format.</p>	
	<p>10. <u>Debundling check</u> Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or micro scale project categories.</p>	



Action items for compliance	The CPA DD shall adequately describe how the SSC CPA or Micro Scale PoA meets the requirements of the debundling test as provided for in Annex 13 of EB 54.	
<u>Evidences required to satisfy this requirement</u>	The CPA implementer shall describe in the CPA DD through calculation of the CERs that individual project lamps are exempt from the debundling check.	
Criteria description	<p align="center">11. <u>Additionality:</u></p> <p>The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as specified in Guidelines on the Demonstration of Additionality of Small-Scale Project Activities as per the provisions of EB 68 Annex 27.</p>	
Action items for compliance	<p>CPA DDs shall demonstrate how the CPA meets the criteria for the demonstration of additionality established in the PoA DD as follows:</p> <ul style="list-style-type: none"> • That the project lamps shall be distributed to households, SMEs or Small Communities. • That the project lamps are isolated units • That none of the project lamps shall abate more than 3,000 tCO₂e per annum. 	
<u>Evidences required to satisfy this requirement</u>	<ol style="list-style-type: none"> 1. The CPA DD shall expressly state the distribution structure for the CPA which shall confirm the intended target group and end users envisioned. 2. Ex-Ante emissions calculations spreadsheets. 	
Criteria description	<p align="center">12. <u>Specifications of technology:</u></p> <p>The specifications of technology/measure, including the level and type of service, performance specifications including compliance with testing/certifications;</p>	
<u>Action items for compliance</u>	Third Party Certification that proves that project lamps distributed within the CPA complies with the technical requirement of the baseline and monitoring methodology AMS-III.AR which are listed below shall be provided to the C/ME and subsequently to the DOE. Third party certification may be obtained from local or international laboratories so long as the tests are performed under the test protocols identified in Appendix 1 of the baseline and monitoring methodology.	



<u>(Specific) Action items for compliance</u>	<u>Option 1 project lamps:</u> At a minimum Project Lamps shall be certified by their manufacturer to have a rated average life of at least: 5,000 hours	
	<u>Option 2 project lamps:</u> At a minimum Project Lamps shall be certified by their manufacturer to have a rated average life of at least: 10,000 hours.	
<u>Evidences required to satisfy this requirement</u>	The CPA implementer shall provide the CME and or the DOE with the manufacturer or test certification confirming that this requirement has been met.	
<u>(Specific) Action items for compliance</u>	<u>Option 1 project lamps:</u> 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%.	
	<u>Option 2 project lamps:</u> 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 15%.	
<u>Evidences required to satisfy this requirement</u>	The CPA implementer shall provide the CME and or the DOE with the test certification confirming that this requirement has been met.	
<u>(Specific) Action items for compliance</u>	The Autonomous Time of the Project Lamps shall be equal to or greater than 150% than the DBT of the Project Lamps (Option 1) project lamps	
	The Autonomous Time of the Project Lamps shall be equal to or greater than 150% of the DBT of the Project Lamps (Option 2) project lamps	
<u>Evidences required to satisfy this requirement</u>	The CPA implementer shall provide the CME and or the DOE with the test certification confirming that this requirement has been met.	
<u>(Specific) Action items for compliance</u>	DBT shall be equal to or greater than 3.5 hours;	
<u>Evidences required to satisfy this requirement</u>	The CPA implementer shall provide suitable evidences from baseline surveys or literature review confirming that the Daily Burn Time is greater than or equal to 3.5 hours.	
<u>(Specific) Action items for compliance</u>	The Solar Run Time for the Project Lamp in each month of the year shall be greater than or equal to the DBT;	



<u>Evidences required to satisfy this requirement</u>	The CPA implementer shall provide the CME and or the DOE with the test certification confirming that this requirement has been met or that the software tools that have been used to calculate the SRT accurately confirm that the SRT equals to or is greater than the DBT.	
<u>(Specific) Action items for compliance</u>	<p>The CPA Operator shall provide the following design specifications for project lamps:</p> <p>(a) Lamp wattage (in Watts) and luminous flux output (in lumens);</p> <p>(b) Rated lamp life (in hours);</p> <p>(c) Where applicable, the type and rated capacity of the renewable energy equipment used for battery-charging (in Watts);</p> <p>(d) Type (e.g. NiMH, Lead-Acid, Li-ion), and rated capacity of the batteries (in Ampere Hours);</p> <p>(e) Type of charge controller (e.g. active or passive);</p> <p>(f) Autonomous Time and Daily Burn Time;</p> <p>(g) Solar Run Times(s) (SRT) for products with solar energy charging systems</p> <p>(h) Physical protection against environmental factors (e.g. rain, heat, insect ingress). With regard to physical ingress and water protection, the Project Lamps shall achieve a minimum level of protection, based on the type of lamp, in accordance with IEC 60529, or an equivalent national standard, or the approved norms indicated in Annex 1.</p>	
<u>Evidences required to satisfy this requirement</u>	The CPA implementer shall provide the CME and or the DOE all test or manufacturer certification confirming all the parameters stated above.	

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

>> The following shall be demonstrated here:

- (i) The proposed PoA is a voluntary coordinated action;

The proposed PoA is a voluntary action under the coordination of ToughStuff International acting in the capacity of project participant and CME to the PoA. ToughStuff Ltd is a private entity which has built a business model around providing sustainable and affordable technology solutions to communities across the developing world. In this regard the CME embarks on this project concept voluntarily in the absence



of any mandatory legislative or regulatory policy mandating the use of Solar LED lamps within the project boundary.

- (ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;

As an SSC PoA the demonstration of additionality for the proposed PoA is based exclusively on the Guidelines on the Demonstration of Additionality of Small-Scale Project Activities as per the provisions of Annex 27 of EB 68²¹ Version 09.0.

The guidelines offer two approaches for which additionality can be demonstrated. Paragraph 2 of the guidelines clearly indicates that SSC projects are exempt from a barrier analysis where the PP can prove that the project technology meets the requirements created for a set list of positive technologies which are automatically additional.

The CME shall demonstrate additionality based on the specific provisions of Paragraph 2 (c) which provides the following:

“Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds;”

- i. Project activities solely composed of isolated units

The proposed PoA and all CPAs distributed thereunder shall distribute project lamps to households and institutions across the PoA boundary. These project lamps are point of use appliances which shall be used to meet the lighting needs of the households or small non-residential institutions where the lamps are installed and used. It is envisioned that each household will use one project lamp to displace the use of a singular kerosene lamp hence qualifying as isolated units.

- ii. The users of the technology/measure are households, or communities or Small and Medium Enterprises (SMEs)

The project lamps are designed intentionally for use in households and other non-residential setting such as shops and small business outlets. The lighting capacity of the lamps at a minimum of 20 lumens does not allow for the use of the lamp at facilities that require a larger lighting capacity than that required for households or SMEs.

- iii. The size of each unit is no larger than 5% of the small-scale CDM thresholds

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http://cdm.unfccc.int/filestorage/c/p/I5FZTH0DK3O2QLA1VRWU9X7SE6MBY8.pdf/eb68_repan27.pdf?t=dGV8bWJtbWdhfDDajKOLwx_SJ1nWUKUp6Lrf



The small scale CDM threshold for Type III project activities such as the proposed project activity is 60 kilo tonnes. Accordingly 5% of the CDM threshold is 3 kilo tonnes. The equation below fully demonstrates that the size of each project lamp is far below this estimate.

<u>Parameter</u>	<u>Description</u>	<u>Value</u>	<u>Source</u>
FUR	Fuel use rate (litres per hour)	0.03	Default value
O	Utilization rate (hours)	3.5	Default value
U	Annual utilization (days per year)	365	Default value
EF	Fuel emissions factor (tCO ₂ emission factor for kerosene per litre)	0.0024	Default value
LF	Leakage factor	1.0	Default value
N	Number of fuel-based lamps replaced per project lamp	1.0	Default value
NTG	Net-to-gross adjustment factor	1.0	Default value
DV	Lamp Emission Factor	0.092	Calculated

This demonstration using default values from the baseline and monitoring methodology AMS-III. AR demonstrates that a typical project lamp will abate 0.092 tCO₂e per annum which is dramatically below the 5% threshold for small scale project lamps to qualify under automatic additionality.

In the reverse it would approximately 32,000 project lamps abate 3,000 tCO₂e per annum.

Based on this provision the CME has demonstrated that the project lamps qualify under the positive list of technologies which are automatically additional.

- (iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;

The proposed PoA is a voluntary action and will not be implementing any mandatory policies.

- (iv) If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

The proposed PoA is a voluntary action and will not be implementing any mandatory policies.

The information presented here shall constitute the demonstration of additionality of the PoA as a whole.

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):
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A.4.4.1. Operational and management plan:

>> Description of the operational and management arrangements established by the coordinating/ managing entity for the implementation of the PoA, including:

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

Record keeping points within the PoA will be as follows:

1. At the point of delivery of the project lamps to the CPA operator/ intermediary including the batch number of the project lamps delivered.
2. Sales receipts and invoices between the CPA Operator and or the intermediary
3. Warranty cards and receipts from the project lamp owners
4. Sales/Distribution records maintained by the CPA operator

The baseline and monitoring methodology AMS-III.AR describes two options for LED Lamp effective useful life, these options are:

1. Option 1: Where project lamps are assumed to operate for two years after project lamp distribution to end users.
2. Option 2: where project lamps are assumed to operate for seven years after project lamp distribution to end users.

Given the differences in the monitoring requirements for either useful life there shall be a variation in the record keeping system for project lamps sold under either option.

I. CPA Database 1: General CPA Database

The CME will keep and maintain an electronic database for each CPA included in the PoA. This shall be a general database which will allow the CME to have a quick and overview of each CPA and whose records will include the following:

<u>CPA Database 1: General CPA Database</u>	
Name of the CPA operator	
Unique ID number of the CPA	
Date of inclusion of the CPA to the registered PoA	
Start date of the CPA	
CERs realized in the CPA	
Host Party	

This database shall be developed and updated by the CPA database manager for the CPA.

II. CPA Database 2: Specific CPA Database

This CPA database will include a detailed report of the CPA with specific details on the project lamps included in the CPA.



CPA Database 2: Specific CPA Database		
1	Unique ID number of the CPA	
2	Effective Useful Life of the Project Lamps in the CPA	(either/ both options allowed within the CPA)
3	Total Number of Project Lamps sold	
4	Sequence of the serial numbers assigned to the project lamps in the PoA	
5	Lamp Wattage	
6	Battery type	
7	Date of Distribution ²²	
8	Name of final recipient of project lamp ²³	
9	Mobile Phone number of the final recipient	
10	Unique Marking as it appears on the project lamp.	
11.	Geographical Location of the final project lamp recipient	

This database shall be developed and updated by the CPA database manager for the CPA. These records shall be made available to the C/ME in this prescribed format with all the parameters described therein complete. The C/ME shall submit these documents to the verifying DOE. The CME shall keep these records up to two years after the end of the life of the PoA.

The CPA database manager shall be an individual recruited by the CME or CPA implementer who shall have a demonstrable knowledge of database management software such as Excel or Ms- Access as well as knowledge of the stated database management system described in this PoA.

- (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,

The CME affirms that none of the project lamps distributed in the CPAs implemented by the CME will have been included in any other CDM PoAs, stand lone project activities or any other voluntary carbon trading schemes. Individual CPA operators shall be required to provide a written attestation confirming that none of the project lamps in their individual CPAs have been included in any other CDM PoAs, stand lone project activities or any other voluntary carbon trading schemes.

All CPAs implemented in the proposed PoA shall distribute project lamps and include them for crediting after the start date of the PoA. Accordingly the unique numbering system assigned to each of the project lamps shall ensure that the date of sale or distribution (or estimate thereof) can be tracked to ensure that none of the credited project lamps was distributed prior to the CPA start date. This will prevent a situation where project lamps which were sold before the start date of the PoA are not included in the PoA. This

²² Footnote 9 of the baseline and monitoring methodology AMS-III.AR.)

²³ Conditions 8, 9, 10 and 11 are only applicable to project lamps with a seven year effective useful life. The CPA operator may propose to use any other methods apart from the stated parameters which are capable of “unambiguously identifying the final recipient of the project lamp.” This shall be a written statement to the C/ME describing the choice of data parameters.



also has the direct benefit of ensuring that none of the CMEs project lamps which belong to other CPAs or as standalone project activities are included in the PoA.

Individual CPA operators shall provide details of the date of sale/distribution of project lamps. Furthermore Individual CPA operators shall have to attest in writing that their project lamps are not included in any other CDM standalone project activities or in CPAs of other PoAs.

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

The CME as the sole project participant affirms that it has not registered any other CDM project activity or SSC PoA for the purpose of the distribution of Solar LED lamps. Furthermore, because of the low emissions reductions per project lamp (each independent sub-system distributed under the proposed PoA) CPAs under the proposed PoA including the first SSC CPA shall be exempt from the de-bundling assessment. This is in line with paragraph 7 in Section B.3 of the Guidelines on Assessment of de-bundling For SSC Project Activities which provides:

If each of the independent subsystems/measures (e.g., biogas digesters, residential solar energy systems, kerosene or incandescent lighting replacements) included in one or more CDM project activities is no greater than 1% of the small scale thresholds defined by the applied methodology and the subsystems/measures are indicated in the PDDs to be each implemented at or in multiple locations (e.g., installed at or in multiple homes) then these CDM project activities are exempted from performing a de-bundling check, i.e., considered as being not a de-bundled component of a large scale activity.

Using default values provided in the baseline and monitoring methodology AMS-III.AR a typical project lamp will abate 0.092 tCO₂e. This value is far below the 600 tCO₂e threshold for independent sub systems which are exempt from the 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 CME shall implement several CPAs under the proposed and as the sole project participant is aware that its CPAs will be included in the PoA. Individual CPA operators who seek to be included in the PoA will have to sign written attestation that they have agreed to voluntarily participate in the PoA in a structure that transfers all the CERs to the CME for subsequent redistribution of CER revenue amongst all parties (namely the CME and Individual CPA operators.)

Paragraph 17 of Annex 3 EB 65²⁴ requires the C/ME to prove his competence in relation to the proposed CDM SSC PoA and inclusion of potential CPAs to the PoA. Accordingly the CME shall develop and implement a management system that includes the following made available to the DOE at the time of validation of the PoA:

(a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;

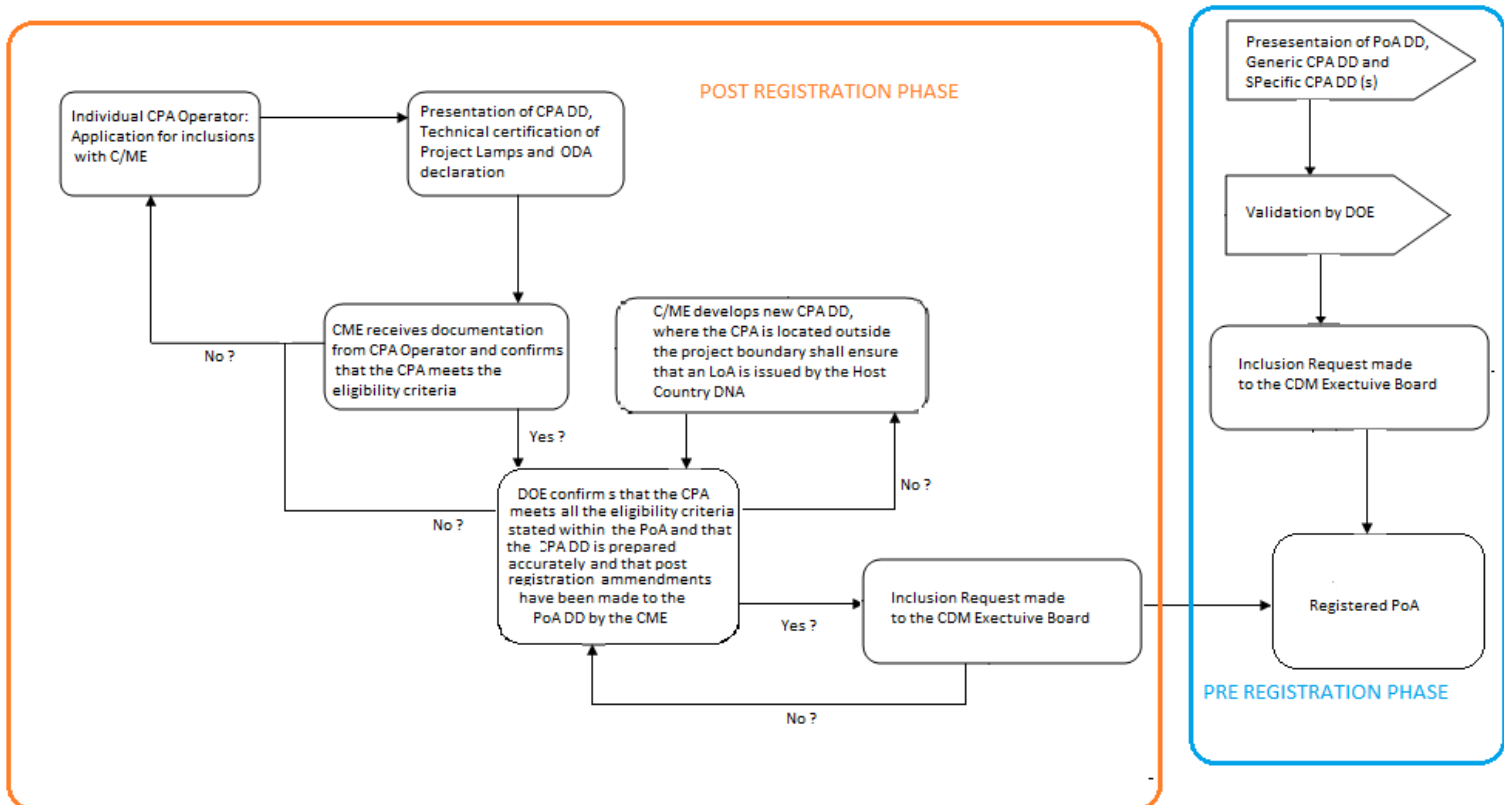
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http://cdm.unfccc.int/filestorage/E/6/T/E6TY7DMI28WGCUV5J0K3LAOHBO9RFN/eb65_repan03.pdf?t=T3F8bTZjYXAxDA1E6o4BCp1d-JxFyPEDz8E



A definition of roles and responsibilities for the inclusion of CPAs in the PoA has been provided below:

The inclusion of CPAs is a dual system operating in the pre-registration and post registration phases as identified in the flow chart below:



Pre-Registration Phase Inclusion:

Responsibilities:

The C/ME shall prepare the PoA DD, Generic CPA DD and Specific CPA DDs for inclusion at the time of validation. The DOE shall be responsible at the time of validation for ensuring that the CPA DDs and PoA DDs are compliant with the baseline and monitoring methodology AMS-III.AR which has been selected as the single methodology for the proposed PoA. The DOE shall also validate the compliance of the PoA DD and CPA DDs for compliance with the sampling standard and project standard identified in the PoA DD. The DOE shall validate that at the time of validation, that the CME has received an LoA from the Host country included at the time of validation. Upon successful validation the DOE shall submit a registration request for the first CPA DD and the PoA DD.

Competencies:



The CME shall assign the duties of development of the design documentation to CDM consultant who has a demonstrable knowledge of the CDM.

Post-Registration Phase Inclusion:

Roles:

The CME shall ensure consistency of the CPA DDs with the stated eligibility criteria of the registered PoA DD. The same shall be submitted to a DOE for validation and inclusion. Individual CPA operators shall enter written contractual agreements providing terms and conditions for their voluntary participation in the PoA. The Individual CPA operator shall develop a CPA DD around the stated eligibility criteria of the registered PoA DD. Test certificates and manufacturer specifications shall be provided to the CME as supporting documents to the claims stated in the CPA DD. Only CPA DDs which have meet all the eligibility criteria shall be presented before a DOE for inclusion.

Competencies:

The CME shall assign the task of assessment of CPA compliance with eligibility criteria to a CPA review manager. This person shall have a demonstrable knowledge of the PoA as well as knowledge of the CDM methodology AMS-III.AR and in particular a demonstrable knowledge of how to assess the validity of test certificates or manufacturer certification to ensure compliance with test protocols provided in the baseline and monitoring methodology AMS-III.AR.

For contractual agreements between the CME and the Individual CPA operator this responsibility shall be assigned to a legal expert who has a demonstrable understanding of the CDM or voluntary emissions trading platforms.

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

Roles:

The CME shall institute measures to ensure that staff that will be used for implementation of the PoA shall be trained regularly. The CME shall especially seek to develop the capacity of staff that are responsible for monitoring, sampling, database management and technical review.

Competencies:

The database manger shall be a person recruited from a demonstrable statistical or data management software background. Training and capacity development of these personnel shall be assigned to a consultant or firm of consultants with proven field experience in the same background.

The monitoring and sampling manager shall be a person(s) recruited from a background that demonstrates knowledge of the CDM and monitoring efforts under CDM project activities. Training of such staff shall be assigned to a consultant or consultant firm who has demonstrable field experience with sampling



households using strict statistical boundaries around sample sizes and strict observance to the designed sampling plan.

The review manager shall be a person recruited from a background of knowledge of the PoA DD, the baseline and monitoring methodology AMS-III.AR as well as knowledge of test protocols included in the methodology. Training and capacity development of the review manager shall be assigned to a CDM consultant with a demonstrable knowledge of the baseline and monitoring methodology AMS-III.AR.

(c) Procedures for technical review of inclusion of CPAs;

Technical review shall be a function of the review manager.

Roles:

The technical review shall constitute an assessment of the technical specifications of the technology as affirmed by test certificates and or manufacturer certification. The review manager shall ensure that all CPAs provide test certificates for lamps which have been tested using international or local testing protocols that meet the requirements of Appendix 1 of the baseline and monitoring methodology AMS-III.AR. Technical review shall also ascertain that all the other eligibility criteria have been met and strictly adhered and demonstrated in the CPA DD. .

Competencies:

The review manager shall be a person recruited from a background of knowledge of the PoA DD, the baseline and monitoring methodology AMS-III.AR as well as knowledge of test protocols included in the methodology.

(d) 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);

Roles:

The review manager shall ascertain that the CPA DD properly defines the unique numbering system for project lamps distributed under the proposed PoA. The review manager shall also ensure that the individual CPA operators sign attestation confirming that the project lamps distributed have not been included in any other CDM project activities or CPAs or voluntary carbon trading schemes. The database manager shall ensure that none of the project lamp unique numbers have been re-entered/ repeated for multiple CPAs included in the PoA by verifying the numbers against the CE database which shall have a composite list of all distributed project lamps under the PoA.

Competencies:

The review manager shall be a person recruited from a background of knowledge of the PoA DD, the baseline and monitoring methodology AMS-III.AR as well as knowledge of test protocols included in the methodology.



The database manager shall be a person recruited from a demonstrable statistical or data management software background.

(e) Records and documentation control process for each CPA under the PoA;

Roles:

At the CPA level there shall be a CPA level database manager who shall update CPA distribution records. This CPA database manager shall be the single entity responsible for management of the records of that CPA and shall provide the same to the CME Database manager. The PoA database manager shall collate all data received from individual CPA databases into a single CME database. These databases shall then be made available to the DOE and stored for up to 2 years at the conclusion of the CPA crediting period.

Competencies:

Both database managers (i.e. at the CPA level and the CME level) shall be a person recruited from a demonstrable statistical or data management software background.

(f) Measures for continuous improvements of the PoA management system;

Roles:

In principle measures for continuous improvements of the PoA management system are centred upon the development of the records and documentation systems which is also defined above. Such measures shall include:

- Increased use of information technology for data collection and recording at the point of sale or distribution
- Increased frequency of monitoring interviews before annual monitoring pre verification to ensure after sales support and proper use of the project lamps.

Competencies:

The CME shall be required to train the CME database manager and this shall be assigned to a database consultant or consultant firm with a proven record of managing and improving database management systems for large databases.

(g) Any other relevant elements.

C/ME Duties and Rights:

As C/ME, ToughStuff International shall have the following duties and rights within the proposed PoA.

1. Develop/ Contract a CDM consultant to the Project Design Document (PoA DD), the Generic SSC CPA Design Document (CPA –DD) and the Specific CPA Design Document for the first CPA included in the proposed PoA.
2. Obtain Letters of Approval and authorization from each of the Host Countries in the project boundary of the proposed PoA.
3. Develop standard monitoring plans for use by each of the CPAs contracted by the C/ME for inclusion in the PoA.



4. Collate monitoring reports collected from the contracted CPAs for purposes of verification and monitoring of the PoA.
5. Communicate with the CDM Executive Board directly for all matters relating to the proposed PoA
6. Contract validating and verifying Designated Operational Entities (DOE)
7. Transaction of the CERs realized in the proposed PoA and distribution of the CERs or net CER revenues realized thereunder to the contracted CPAs.

Contracted individual CPA Implementers shall have the following duties and rights within the proposed PoA:

1. To comply strictly with the stated eligibility criteria contained in this PoA DD
2. To provide sufficient evidentiary documentation that proves that the CPA Implementer has complied with methodological requirements of the testing of project lamps, copies of which shall be made available to the CME.
3. To comply with the stated monitoring procedure as defined in this PoA DD and avail the necessary resources such as staff for the purposes of validation and verification
4. Attest to their voluntary participation in the proposed PoA and cede all CERs realized in the PoA to the CME.

Individual CPA operators shall however enter a contractual agreement with the CME which shall at the minimum state:

- That all CERs realized in the CPA have been ceded from the Individual CPA operator to the CME.
- If any CER sharing agreements are entered to these shall be expressly stated in the contract with an affirmation that at the time of issuance the CME shall distribute such a number of CERs as agreed to in the contract to the Individual CPA operator within a stipulated time frame.
- That the individual CPA operator shall agree to comply strictly with the sampling and monitoring plan provided for in this PoA DD and that such CPA operator shall provide monitoring reports within the time frame stipulated in this PoA DD.
- Attestation that none of the project lamps included in the PoA DD have been included in any other CDM standalone project activity or component project activity of another PoA
- Witten attestation of the CPA's compliance with the requirement of non-diversion of official developmental assistance.

All CPA DDs shall be developed based on the generic CPA DD template developed by the CME. The CME shall then submit all completed CPAs to the validating DOE at the time of inclusion

A.4.4.2. Monitoring plan:

>> Here the following information will be provided:

- (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 CME has not selected this option.

(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;

The PP has selected to verify each CPA independently. To ensure transparency under the monitoring plan defined in section E. 7 .2 of this PoA DD, the CME shall develop a monitoring and verification track sheet that will track the verification of each CPA accordingly. Monitoring shall be a function of determining the number of operational project lamps in the third year of the CPA. Therefore the CME verification track sheet shall ensure that monitoring occurs at the third year of each CPA depending on the start date of that CPA. This track sheet shall have unique IDs for each CPA which will prevent a situation that allows for double counting and facilitate a situation that that allows for the CME to track the status of the verification at any time for each CPA.

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

>>No public funding will be used for the activity. However if a CPA does receive public funding it will be required to prove that the finance is not a diversion of official development assistance and is separate from and is not counted towards the financial obligations of the Host Party to which it operates under.

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

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

>>27/12/2012 or effective date of registration, whichever is later

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:

The CME to the project activity has selected to have the Environmental analysis conducted at the SSC CPA level. The justification for this decision is to avoid the assumptions of a generic description or the



considerations of a single Host Country as to the impact of the project activity on the local environment in which the CPA's is conducted. Given the potentially large geographic boundary of the proposed PoA post registration, it is also preferable that the CPA operators conduct Environmental Impact at the SSC level so as to adequately describe the statutory regimes in effect within the Republic of Kenya..

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:

>> Environmental analysis conducted at SSC-CPA level.

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 analysis conducted at SSC-CPA 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 consultation meetings will be held at SSC-CPA level to ensure that these dynamics in the target population are adequately represented in the PoA.

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

>> Local stakeholder consultation is done at SSC-CPA level

D.3. Summary of the comments received:

>> Local stakeholder consultation is done at SSC-CPA level

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

>> Local stakeholder consultation is done at SSC-CPA level

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:

>> All CPAs included in the PoA will subscribe to the approved baseline and monitoring methodology described below:

AMS III AR Substituting fossil fuel based lighting with LED/CFL lighting systems (Version 3)²⁵

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

²⁵ CDM UNFCCC:

http://cdm.unfccc.int/filestorage/3/3/SJ9KPXL0EU8Z2NYHVOW57Q4T1GRDIC.pdf/EB%2068_repan20_Rev%20AMS-%20III.AR_ver%2003.0.pdf?t=Y118bWNjamdpfDCuXf3u9dP7ZPNiDgXwmVwx



>>

AMS.III.AR Criteria	Justification
<p>This category comprises activities that replace portable fossil fuel based lamps (e.g. wick based kerosene lanterns) with battery-charged LED or CFL based lighting systems in residential and/or non-residential applications (e.g. ambient lights, task lights, portable lights)</p>	<p>The proposed SSC PoA is only applicable to a single project technology namely, Solar Charged LED lamps. Typical CPAs shall demonstrate compliance with this methodological requirement by providing a description of the project lamp with a demonstration of widespread use of kerosene based lamp in the CPA boundary. In doing so the CPA will demonstrate the Solar Charged LED lamps will replace the use of fossil fuel based lamps. .</p>
<p>This methodology is applicable only to project lamps whose batteries are charged using one of the following options: (a) Charged by a 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.</p>	<p>All the project lamps placed under this PoA will have rechargeable batteries charged by Solar Photo Voltaic Panels. A typical SSC CPA shall describe the project lamps to demonstrate compliance with the stated methodology within the section on the eligibility criteria of the CPA DD.</p>
<p>At a 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 manufacturer or responsible vendor as being the time at which the lamp’s 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, is 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%.</p>	<p>This will be a compulsory requirement for all CPAs instituted under the PoA to provide certification proving minimum average life of 5,000 hours or 10,000 hours depending on the useful life of the Solar LED lamp. As this PoA is only open to Solar PV charged LED lamps there shall be no requirement for manufacturer certification for the battery circuit efficiency..</p>
<p>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</p>	<p>All project lamps included in the CPA shall accord the user a minimum one year warranty which will cover replacement/repair of failed lamps, batteries</p>



<p>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.</p>	<p>and solar panels. The warranty shall only commence at the point of distribution of the project lamp to the end user.</p>
<p>Project Lamps shall meet or exceed the following minimum performance characteristics, which should be proven by third-party test results:</p>	
<p>Light Output: luminous flux of 20 lumens or illuminance of 25 lux over an area ≥ 0.1 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);</p>	<p>CPA Operator shall provide third party testing confirming Project lamps' compliance with this methodological requirement dependent on the effective useful life of the Solar LED lamp. Third party testing for this eligibility criteria shall be based on the express provisions of Appendix 1 of the baseline and monitoring methodology AMS-III.AR</p>
<p>(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;</p>	<p>The indicative baseline and monitoring methodology defines Daily Burn Time as the total number of hours per day that the lighting system must provide light that is bright enough to satisfy the light output requirements stipulated and is expressed in hours.</p> <p>The CPA operator shall provide third party testing that affirms that the project lamp meets or exceeds the 3.5 hour DBT requirement.</p>
<p>(ii) For charging option 2(a) the Autonomous Time of the Project Lamps shall meet the following requirements: – For Option 1, paragraph 11, the Autonomous Time shall be equal to or greater than 150% than the DBT of the Project Lamps; – For Option 2, paragraph 12, the Autonomous Time shall be equal to or greater than 150% of the DBT of the Project Lamps;</p>	<p>The indicative baseline and monitoring methodology defines the Autonomous time as time measured from switching on the light in a mode that is bright enough to satisfy the light output requirements stipulated to the point in time where the light output reaches 70% of its initial brightness or where low voltage triggers battery cut-off, whichever is earlier. The test must be performed with a fully charged battery. AT indicates maximum possible burn time or run time and is also known as battery autonomy. AT is expressed in hours.</p> <p>The CPA operator shall provide third party testing that affirms compliance of the project lamps with this requirement depending on the selected effective useful life option.</p>



<p>(iv) For charging with solar PV under option 2(a) the Solar Run Time for the Project Lamp in each month of the year shall be greater than or equal to the DBT;</p>	<p>The indicative baseline and monitoring methodology defines the Solar Run time as operational time in a mode that is bright enough to satisfy the light output requirements stipulated from a day of solar charging under standard solar day conditions. SRT is expressed as a number of hours of operation.</p> <p>The CPA has three options for computation of the SRT:</p> <ol style="list-style-type: none"> 1. If regional solar data is unavailable , use the standard solar day of 5 kWh/m2 2. Use regional solar data and computed using simulation software or it can be compute using the method indicated in the test procedure included in the methodology
<p>The project design document shall explain the proposed distribution method of the project lamps. It shall also explain how the proposed project activity will:</p> <p>(a) Ensure that the replaced baseline lamps are those that directly consume fossil fuel. This can be done through documentation of the common practice of fuel usage for lighting in the project region (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;</p> <p>(b) Eliminate potential double counting of emission reductions that could occur, for example, if more than one entity (e.g. lamp manufacturers, suppliers of solar and/or battery equipment, etc.) claims credit for emission reductions for the project lamps. At a minimum, project lamps shall be marked as CDM project lamps;</p> <p>(c) Ensure compliance with prevailing regulations pertaining to the use and disposal of batteries.</p>	<p>The CPA implementing party shall describe the following in the CPA DD:</p> <ol style="list-style-type: none"> 1. That the project lamps shall replace baseline lamps which traditionally consumed fossil fuel. Here the CPA implementing party has the following options: sample surveys, official data or peer reviewed literature that demonstrates that fossil fuel is a commonly used fuel for lighting; 2. used fuel for lighting; 3. CPA operators shall have to demonstrate that separate components of the project lamps such as batteries or solar panels are not separately credited this can be done by a statement that describes whether the project lamps are sold as single units or individual components. 4. Compliance with prevailing regulations pertaining to the use and disposal of batteries shall be described in detail in the Environmental analysis section of the CPA DD.



<p>The project design document shall include the minimum requirements for the design specifications of project lamps including the following specifications:</p>	<p>The CPA implementing party shall describe the following parameters within the CPA DD</p> <ul style="list-style-type: none"> (a) Lamp wattage (in Watts) and luminous flux output (in lumens); (b) Rated lamp life (in hours); (c) Where applicable, the type and rated capacity of the renewable energy equipment used for battery-charging (in Watts); (d) Type (e.g. NiMH, Lead-Acid, Li-ion), and rated capacity of the batteries (in Ampere Hours); (e) Type of charge controller (e.g. active or passive); (f) Autonomous Time and Daily Burn Time; (g) Solar Run Times(s) (SRT) for products with solar energy charging systems. If regional solar data are available, the maximum, minimum and average estimated SRT values for each month of a typical year shall be provided. If regional solar data are not available the standard solar day (5 kWh/m²) shall be used to estimate SRT; (h) Where applicable, the amount of time to fully charge the product using mechanical means or a centralized charging system (e.g. the national grid); (i) Physical protection against environmental factors (e.g. rain, heat, insect ingress).
<p>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.</p>	<p>CPA DDs shall state the distribution structure for the proposed CPA and demonstrate the recording procedure used therein which will prevent inclusion of more than 5 lamps per household or non-residential premise. This shall be a sufficient demonstration of compliance with this requirement for Option 1 project lamps.</p> <p>CPAs with Option 2 lamps will be required however to state the distribution structure within the CPA DD as well as demonstrate compliance ex-post with the total sales record.</p>



Measures are limited to those that result in emissions reductions of less than or equal to 60 kt CO ₂ equivalent annually.	The CPA operator will not be allowed to claim CERs from the project activity that exceeds 60 kilo tonnes annually as demonstrated in the Equation limiting the number of project lamps below.
If monitoring is required, per paragraphs 20-23, to determine the percentage of project lamps distributed to end-users that are operating and in service, such monitoring will take place in the third year of crediting period of each CPA and the results shall be used for operational years 4, 5, 6 and 7 of the project lamps of that CPA.	In the third year of the CPA crediting period a monitoring survey shall be conducted to assess the percentage of Option 2 project lamps distributed to end-users that are operating and in service, such monitoring will take place in the third year of crediting period.
For Option 2, paragraph 12, project lamps shall be marked for clear, unique identification to associate them with each unique CPA.	All Option 2 project lamps shall have unique identification on the project lamps which shall be recorded in the total sales record.

As a small scale Programme of Activities, each CPA will be required not to exceed the 60,000 tCO_{2e} annual cap for small scale project activities.

Accordingly each CPA shall have to state the number of project lamps to be distributed within the CPA and further demonstrate that the Emissions Reductions realized do not exceed the 60 kilo tonne limit based on the calculated emission factor of the project lamps. The number of distributed project lamps is recorded in the CPA database. The calculation of the maximal number of project lamps to be distributed per CPA in order to remain under the 60 kilo tonne limit is according to the following equation:

$$\underline{60,000 \text{ tCO}_2\text{e annually}} > BE_y \cdot N_{ij} \dots\dots\dots (1)$$

Because N_{ij} is not known at the time of validation the Equation 1 above can be modified to set a CPA on the number of project lamps that can be distributed in a CPA based on the Baseline Lamp emission Factor for project lamps:

$$N_{ij} > \frac{\underline{60,000 \text{ tCO}_2\text{e annually}}}{BE_y} \dots\dots\dots (2)$$

For purpose of demonstration of how the Equation 2 above is to be applied the default lamp emission factor has been used in calculating the baseline emissions factor as follows:

$$N_{ij} > \frac{\underline{60,000 \text{ tCO}_2\text{e annually}}}{0.092} \dots\dots\dots (3)$$



The maximum number of project lamps that can therefore be distributed under a CPA with a default Emissions Factor of 0.092 tCO₂e is 750,000.

However a micro scale CPA which has a cap of 20,000 tCO₂e shall have a maximum of 250,000 project lamps or however many project lamps as the alternative BE_y value shall allow given the following equation:

$$N_{ij} > \frac{20,000 \text{ tCO}_2\text{e annually}}{BE_y} \dots\dots\dots (4)$$

LED Lamp Effective useful life

Project operators may choose Option 1 or option 2 for the determination of the useful life of the project lamp.

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 CPA implementing parties who choose Option 2 the criteria established in paragraphs 12 (a) to (e) must be fulfilled. :

1. Useful life of 10,000 hours: This must be confirmed by third party testing based on an applicable standard and testing protocol.
2. Project lamps must use a replaceable, chargeable battery with documented measures in place to ensure that lamp owners have access to replacement batteries of comparable quality;
3. With regard to physical ingress and water protection, the Project Lamps shall achieve a minimum level of protection, based on the type of lamp, in accordance with IEC 60529, or an equivalent national standard, or the approved norms indicated in Annex 1. Subsequent rules applicable to specific Project lamps in sub paragraphs (i), (ii) and (iii).
4. Conditions 12(a) and 12(c) are confirmed by a third-party testing organization based on sample tests of Project Lamps using applicable national standards where such are available, or alternatively, the standards or test protocols indicated in Annex I of this methodology may be used. The laboratory conducting and certifying the tests shall comply with the requirements of a relevant national or international standard, e.g. ISO/IEC 17025. If the testing results are not available *ex ante*, they shall be made available at project verification;
5. Project Lamps shall be marked for clear, unique identification to associate them with each unique CDM project.
6. The Autonomous Time shall be equal to or greater than 150% of the DBT of the Project Lamps;

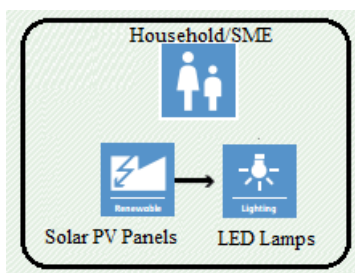


E.3. Description of the sources and gases included in the SSC-CPA boundary

>> The definition of the SSC CPA project boundary is defined in accordance with provisions of paragraph 10 of the baseline and monitoring methodology AMS-III.AR as follows:

If the project lamps are charged by a renewable energy system, then the project boundary includes the physical, geographical site of the renewable energy system;

Accordingly the CPA project boundary is the LED lamps and the Solar Panels which provide the renewable energy required to light the lamps as demonstrated in the flow diagram below:



	Source	Gas	Included?	Justification
Baseline	Traditional Fuel based lighting systems	CO ₂	Yes	Main Source of emissions
		CH ₄	No	Excluded to maintain conservativeness
		N ₂ O	No	Excluded to maintain conservativeness
Project	LED Lighting System (Project Lamp)	CO ₂	No	No attributable emissions from project activity
		CH ₄	No	No attributable emissions from project activity
		N ₂ O	No	No attributable emissions from project activity

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

>>The baseline scenario is the use of kerosene lighting applications for domestic/non-residential lighting needs. This is in accordance with the baseline and monitoring methodology AMS III AR which states “ This category comprises activities that replace portable fossil fuel based lamps (e.g. wickbased kerosene lanterns) with battery-charged LED or CFL based lighting systems in residential and/or non-residential applications (e.g. ambient lights, task lights, portable lights).

The baseline scenario is analysed from three perspectives: 1) access and reliability of grid electricity; 2) Household consumption of kerosene; and 3) Quality of light provided by these sources. Several comprehensive studies have been conducted that adequately demonstrates the baseline scenario.

Lighting Africa: Quantitative Assessment 2008 Kenya

1. Access and Reliability of the Grid

As of 2008, grid connection rates across Kenya stood at just 10%.

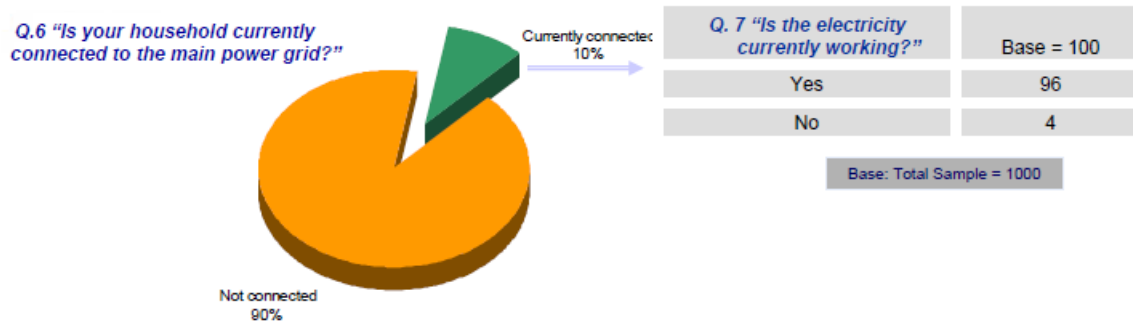


Figure 8: Access to the Grid in Kenyan Households

The East African region (in which Kenya is located) generally, for example represents the lowest grid connection on the African Continent. With 50 million households not connected to the grid the most plausible scenario, as will be described below, is that these houses are dependent on fossil fuel based lighting applications such as candles, kerosene lamps or biomass combustion as combined source of cooking and lighting energy. Kenya for example had a 10% electricity access rate however further analysis has been conducted to determine the reliability of the electrical grid for these households. It has been determined that grid reliability also presents significant problem for these households/users.

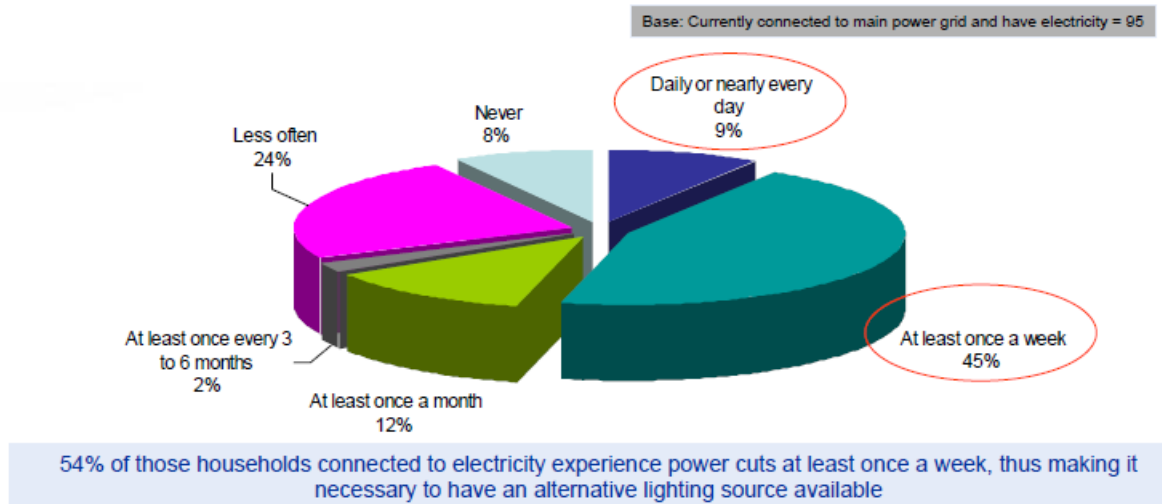


Figure 9: Reliability of grid connections in Kenyan House holds

In the absence of a widespread access to the national grid or reliability of electricity connections many households have resorted to consumption of kerosene for fossil fuel based lamps as is demonstrated in the graph below which shows that 72% of the households rely on kerosene for lighting needs.

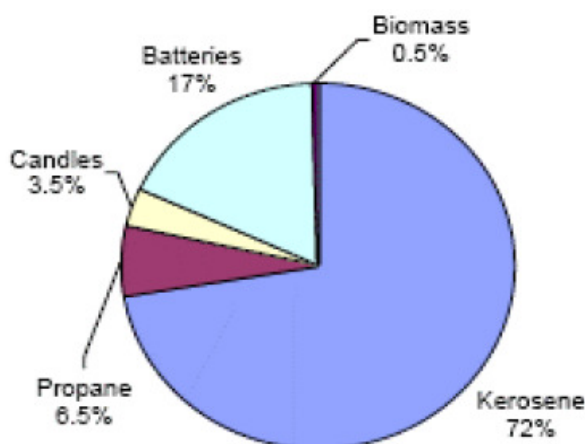


Figure 10: Kerosene Consumption in Kenya

The indicative simplified baseline and monitoring methodology AMS III AR provides the following default values for calculation of baseline emissions:

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:

>>

Each SSC CPA included in the proposed CPA shall demonstrate additionality for the proposed PoA is based exclusively on the Guidelines on the Demonstration of Additionality of Small-Scale Project Activities as per the provisions of Annex 27 of EB 68²⁶ Version 09.0.

Paragraph 2 of the guidelines clearly indicates that SSC projects are exempt from a barrier analysis where the PP can prove that the project technology meets the requirements created for a set list of positive technologies which are automatically additional.

The CPA DD shall demonstrate additionality based on the specific provisions of Paragraph 2 (c) which provides the following:

“Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds;”

- i. Project activities solely composed of isolated units

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http://cdm.unfccc.int/filestorage/c/p/I5FZTH0DK3O2QLA1VRWU9X7SE6MBY8.pdf/eb68_repan27.pdf?t=dGV8bWJtbWdhfDDajKOLwx_SJ1nWUKUp6Lrf



The proposed CPA shall distribute project lamps to households and/or small institutions across the CPA boundary. The CPA DD shall demonstrate that the project lamps are isolated units by stating their intended points of use or target groups as well as the fossil fuel based lamp to project lamp displacement ratio.

- iv. The users of the technology/measure are households, or communities or Small and Medium Enterprises (SMEs)

The CPA DD shall provide a description of the intended end users of the project lamps in conformity to the above stated requirement.

- v. The size of each unit is no larger than 5% of the small-scale CDM thresholds

The small scale CDM threshold for Type III project activities such as the proposed project activity is 60 kilo tonnes. Accordingly 5% of the CDM threshold is 3 kilo tonnes. The CPA DD shall use appropriate methodological based equations to calculate the ex-ante emissions reductions per project lamp to demonstrate compliance with the above stated requirement.

As has been demonstrated in section A. 4. 3 of this PoA DD using default values from the methodology, the project lamps will abate far less than the 3, 000 tCO₂e limit established for type III project activities. CPA DDs shall have to provide values used in calculating the lamp emission factor which demonstrate compliance with this requirement in the same manner used for demonstration in this PoA DD.

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

>> The PoA would not be implemented in the absence of consideration of revenues generated from CERs in this proposed SSC CDM PoA. Additionality has been proved at the PoA level and the following key criteria shall be used to ascertain the additionality of CPAs under the PoA.

- Confirmation that the CPAs will distribute Solar PV LED lamps as isolated units for domestic/residential use
- Confirmation that the SSC CPA does not exceed the 60 kilo tonne limit for type III small scale project activities.

Where these two conditions have been met then the CPA shall be deemed to be automatically additional.

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:



>> **Baseline Emissions:**

The CPA implementing party shall choose either the default factors provided in the methodology AMS III AR as follows:

- (a) FUR Fuel use rate (litres/hour): 0.03 litres/hour;
- (b) O Utilization rate (hours/day): 3.5 hours per day;
- (c) U Utilization (days/year): 365 days per year;
- (d) EFFuel emissions factor: 2.4 kgCO₂/litre;
- (e) LF Leakage factor: 1.0;
- (f) *n* Number of fuel-based lamps replaced per project lamp: 1.0;
- (g) NTG Net-to-Gross factor: 1.0.

If the CPA operator does not rely on the default values provided in the baseline and monitoring methodology the CPA operator shall use alternative values for parameters identified above (e.g. Fuel use rate, utilization rate) where adequate research/monitoring and documentation is provided by the project proponent e.g. strategic surveys and research conducted by national or local organizations, initiatives by international organizations or non-governmental organizations or the project proponent to collect reliable and comprehensive data.

The CPA implementing party shall choose either option for the effective LED Lamp Effective Useful Life but must strictly adhere to the requirements established in paragraph 11 of the methodology if Option 2 is selected.

Project Emissions:

In either scenario CPAs implemented under this PoA will be Project lamps which qualify under paragraph 2 a of methodology AMS III AR (charged by renewable energy system (e.g. photovoltaic systems). There are no project emissions (PE_y = 0).

Third Party Testing:

Each CPA operator will have to have independent third party testing for the Project lamps to be credited in the CPA. The testing procedures for the individual components of the LED lamps will have to be conducted in accordance with the Norms, Specifications and Test Procedures as provided for in the indicative baseline and monitoring methodology.

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

>> **Baseline Emissions:**

$$BE_y = DV \times GF_y \times DB_y \tag{1}$$

Where:

BE Baseline emissions per Project Lamp in year y (tCO₂e)

GF Grid Factor in year y,



DB Dynamic Baseline Factor

DV Lamp Emission Factor

The default value for the DV is 0.092tCO₂e per project lamp²⁷. However where CPA operators choose to use alternative values the following equation shall be used to compute the DV per project lamp.

$$DV = FUR \times O \times U \times EF/1000 \times LF \times n \times NTG \quad (2)$$

A description of the parameters used in calculation has been provided in Section E.6.1 of this PoA DD.

Project Emissions:

There are no project emissions ($PE_y = 0$) if the project lamp charging mechanism utilized is as defined in paragraph 2(a) of the baseline methodology AMS.III.AR which defines the charging mechanism as project lamps charged using renewable energy systems such as the photovoltaic systems as envisioned for the project activity.

$$PE = 0 \quad (3)$$

Emission Reductions:

$$ER_y = \sum_{i,j} N_{i,j} \times (BE_{y,i} - PE_{y,i,j}) \times (OF_{y,i,j}) \quad (4)$$

Where:

ER_y Emission reductions in year y (tCO₂e)

$N_{i,j}$ Number of project lamps distributed to end users of type i with charging method j

$OF_{y,i,j}$ 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 .

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

²⁷ This is the default value provided by the baseline and monitoring methodology AMS-III.AR Version 03 at the time of validation. This value may change post registration in accordance with subsequent revisions to the methodology.



Data / Parameter:	GF
Data unit:	Fraction
Description:	Grid Factor in year y
Source of data used:	Baseline and monitoring methodology AMS III AR
Value applied:	1.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Project lamps included in this PoA will be charged by a photovoltaic solar panel. Therefore satisfying the condition that the LED lamps are charged by a renewable energy source as described in paragraph 2a.
Any comment:	

Data / Parameter:	O
Data unit:	Hours/Day
Description:	Utilization rate
Source of data used:	Baseline and monitoring methodology AMS III AR
Value applied:	3.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	The figure provided by the baseline and monitoring methodology is conservative and will be used by each CPA throughout the crediting period.
Any comment:	

Data / Parameter:	EF
Data unit:	kgCO ₂ /litre
Description:	Fuel emissions factor
Source of data used:	Baseline and monitoring methodology AMS III AR
Value applied:	2.4
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value provided by the baseline and monitoring methodology.
Any comment:	

Data / Parameter:	LF
Data unit:	Dimensionless
Description:	Leakage Factor
Source of data used:	Baseline and monitoring methodology AMS III AR
Value applied:	1.0
Justification of the choice of data or description of	Default value provided by the baseline and monitoring methodology.



measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	<i>n</i>
Data unit:	Dimensionless
Description:	Number of fuel-based lamps replaced per project lamp
Source of data used:	Baseline and monitoring methodology 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 the baseline and monitoring methodology.
Any comment:	

Data / Parameter:	FUR
Data unit:	(litres/hour)
Description:	Fuel use rate
Source of data used:	Default value provided or Value quantified based on baseline surveys or literature review
Value applied:	Default Value of 0.03 ²⁸ or figure derived from baseline surveys or literature review of the respective host country or regional data within Host Party within which the CPA is to be implemented.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The baseline and monitoring methodology provides a default value for Fuel Use Rate. However the methodology AMS III AR has a provision in paragraph 15 that allows CPA operators to use alternative values based on strategic surveys and research conducted by national or local organizations, initiatives by international organizations or non-governmental organizations or the project proponent to collect reliable and comprehensive data. All reports/ baseline survey results must be provided to the CME and DOE upon request for validation and verification purposes.
Any comment:	

Data / Parameter:	DV_v
Data unit:	tCO _{2e}
Description:	Default Emissions Factor
Source of data used:	Default value as provided in the baseline and monitoring methodology or as calculated based on Fuel Use Rate derived from baseline surveys/literature review.

²⁸ This is the default value provided by the baseline and monitoring methodology AMS-III.AR Version 03 at the time of validation. This value may change post registration in accordance with subsequent revisions to the methodology.



Value applied:	Default value of 0.092 or value derived from baseline surveys/literature review
Justification of the choice of data or description of measurement methods and procedures actually applied :	The values provided above are in accordance with the baseline and monitoring methodology with dual scenarios of default or alternative values.
Any comment:	

Data / Parameter:	DB_v
Data unit:	Dynamic Baseline Factor
Description:	Change in baseline fuel, fuel use rate, and/or utilization during crediting period) in year y.
Source of data used:	AMS III AR and literature review of documented national growth rate of kerosene fuel use in lighting from the preceding years.
Value applied:	1 + (FFG)Fraction derived from national kerosene fuel growth rate
Justification of the choice of data or description of measurement methods and procedures actually applied :	This parameter accounts for increased fuel use for lighting as it affects the baseline fuel consumption throughout the crediting period.
Any comment:	Where alternative values are used this shall become a monitored parameter

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_{ij}
Data unit:	Figure
Description:	Number of Project Lamps Distributed
Source of data to be used:	A figure describing the number of lamps/sold or projected to be sold within the CPA crediting period.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA Sales Record
Description of measurement methods and procedures to be applied:	A sales record will be established per CPA which shall highlight <ol style="list-style-type: none"> 1. the number of project lamps distributed, 2. the lamp wattage, battery type, 3. date of sale



QA/QC procedures to be applied:	The sales record will be developed to include all established data parameters identified in the methodology AMS III AR and will be maintained for 2 years after end of individual crediting period.
Any comment:	

Data / Parameter:	USN
Data unit:	Figure
Description:	Unique Identification of each lamp sold under the PoA for lamps to be credited for up to 7 years.
Source of data to be used:	CPA Sales Record
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Each CPA will be accorded a unique number and furthermore each CPA will accord each solar lamp its own unique filter number. For example CPA ₁ will have a filter number x1y2z3. The Total Sales Record maintained by the C/ME will read CPA ₁ x1y2z3.
Description of measurement methods and procedures to be applied:	An electronic database with maintained by both the CPA and C/ME which incorporates the unique serial number of solar lamp and CPA implementing party.
QA/QC procedures to be applied:	The unique identification of both CPA and Solar Lamp will prevent double counting and provide a verifiable data base with contact details of each customer for monitoring and verification purposes.
Any comment:	This parameter is only applicable to CPAs with an effective useful life of 7 years (Option 2)

Data / Parameter:	U
Data unit:	Days/year
Description:	Annual utilization
Source of data used:	Sales Records
Value of data applied for the purpose of calculating expected emission reductions in section B.5	365 days or the number of calendar days used between the date of purchase and the end of the yearly verification period.
Description of measurement methods and procedures to be applied:	The baseline and monitoring methodology requires that part of the monitored information include the date of sale accordingly this parameter shall be monitored based on the sales record.
QA/QC procedures to be applied:	The baseline and monitoring methodology AMS III AR provides that the date of sale can be an accurate date or a conservative estimate based on the Sales Record data.

Data / Parameter:	OF_{v,i,j}
Data unit:	Percentage
Description:	Percentage of distributed lamps which are in service and operational in year <i>i</i> .
Source of data to be used:	Monitoring surveys at year 3 of the CPA crediting period.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	A percentage of the total sales based on the monitoring survey which will prove operational lamps within the third year from the CPA start date.



Description of measurement methods and procedures to be applied:	Monitoring surveys will be conducted from year 3 of the individual CPA crediting period using random sampling methods. This survey shall assess the number of operational 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 distribution). For Option 2 project lamps the data to unambiguously identify each recipient of a project lamp, for all the project lamps distributed that will claim emission reductions for up to seven years, as per Option 2, paragraph 12.
QA/QC procedures to be applied:	QA & QC procedures for the monitoring surveys has been described in section E.7.2.
Any comment:	

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

As stated in Section A.4.4.2, the CME has elected to verify each CPA independently for the proposed PoA. Therefore, the requirements placed on each SSC CPA for monitoring are that each SSC CPA shall collate all data required for the CPA database as provided in Section A.4.4.1 of this PoA DD as well as to conduct monitoring surveys in year 3 of the CPA.

Sampling Plan:

1. Definition of Terms

Sample: “A sample is a subset of a population”. In the proposed PoA the sample shall be defined as the selected sub set derived from all the final recipients of project lamps distributed in the respective CPAs.

Parameter: “A characteristic of the population”. In the proposed CPA the parameter of interest is the number of operational project lamps in the CPA. This parameter is unknown at the time of development of this CPA and therefore a representative sample shall be used to determine this parameter and the value so obtained shall be used in calculation of CERs realized in the proposed CPA.

Data types: Proportion values “values (that) are derived from data that are described as attributes, yes/no data or binary data”. The parameter of interest, the number of operational lamps, shall be determined based on questionnaires and spot checks therefore it is applicable as a proportion value.

The parameter estimates that are calculated from the sample data should be:

- (a) Unbiased and
- (b) Reliable estimate

An unbiased estimate is one that does not systematically underestimate or overestimate the parameter value it is representing. Non-sampling errors are a main cause of estimates being biased. Non-sampling errors arise due to various causes right from initial stage when the survey is being planned and designed to the final stage when data are processed and analysed.

Brieumer and Lyberg (2003) identify five components of non-sampling error, namely specification, frame, nonresponse, measurement and processing error²⁹.

²⁹ http://unstats.un.org/unsd/demographic/meetings/egm/Sampling_1203/docs/no_7.pdf



The CME affirms to implement the following measures to prevent non-sampling errors occurring in the survey:

Non Sampling Error Source	Definition	Mitigation
Specification error	This occurs when the concept implied by the question is different from the underlying construct that should be measured.	The parameter of interest is the number of operational lamps. The question in the questionnaire shall assess the frequency of use of the project lamp followed by a spot check to identify that the project lamps is in operational order and that the project lamp has unique identification which identifies it and the final recipient as described in the CPA distribution records.
Coverage or frame error	The demarcation of sample clusters is not properly carried out during census mapping (sampling plan design) thus households may be omitted or duplicated in the second stage frame.	A multi stage cluster approach has been selected and shall be described in this sampling plan. Accordingly, to eliminate the probability of this non-sampling error, the unique identification of project lamps and final recipients shall be cross checked to ensure that no project lamps are surveyed twice. The sampling frame shall be created from distribution data and subsets shall be randomly identified from the total distribution record this will mitigate the possibility of non-coverage or omission of subsets from the sample.
Nonresponse	Nonresponse refers to the failure to measure some of the sample units. Thus failure to obtain observations on some units selected for the sample	To mitigate this non-sampling error the following measures shall be instituted: <ul style="list-style-type: none"> • Develop a good sampling frame. A sampling frame shall be developed to account for all possible parameters that will enable the CPA operator/ CME to identify and track project lamps and the final recipients. • Interview training, selection and supervision. Enumerators/ surveyors shall be trained on best practice to increase response in the field. Interviewers shall also be categorized according to



		the physical geographical region in which they operate so as to reduce the possibility of non-response because of respondents being interviewed by surveyors who cannot respond to local circumstances and language. There shall also be close supervision of interviewers.
Measurement error	These errors arise from the fact that what is observed or measured departs from the actual values of sample units. These errors centre on the substantive content of the survey such as definition of survey objectives, their transformation into usable questions, and the obtaining, recording, coding and processing of responses. These errors concern the accuracy of measurement at the level of individual units.	To mitigate this risk, the interviewers shall be trained before the survey process commences and thereafter in analysis of data collected. Questionnaires shall be made as simple as possible for interpretation of the interviewers and respondents while addressing all parameters that seek to derive information on the parameter of interest.
Processing errors	Processing errors comprise - Editing errors. - Coding errors. - Data entry errors. - Programming errors et	Questionnaires shall be simplified as much as possible to have multiple choice scenarios so as to eliminate the risk of optional responses that vary between respondents. The parameter of interest shall be a binary response (either yes/no).

The reliability of a sample-based estimate directly increases with the numerical size of the sample and inversely with the variability of the parameter in the population to be sampled. Thus, prior to drawing a sample, project participants should calculate the size required to achieve a required level of reliability based on a forecast or expectation of the variability of the parameter in the population.

In accordance with the provisions of the baseline and monitoring methodology AMS-III.AR, the verification surveys shall select the sampling frame based on a 90/10 confidence/precision level.

Desired precision/Expected Variance and Sample Size

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 as a simple random sampling technique has been selected the sample size shall be calculated using Equation 1 of EB 69 Annex 5 as is shown below

The sample size shall be determined based on the following criteria³⁰:

1. The level of precision,

³⁰ http://www.soc.uoc.gr/socmedia/papageo/metapyxiakoi/sample_size/samplesize1.pdf



2. The level of confidence or risk,
3. The degree of variability in the attributes being measured

Level of Precision:

The precision level is fixed at 10%. This is in accordance with the general guidelines for sampling and surveys for small-scale CDM project activities³¹.

The Level of confidence or risk:

Applying a confidence level of 90% a standard normal of 1.645 will be used in computation of the sample size³².

The degree of variability

To be conservative this sampling plan shall assume a maximum variability of 50%.

Therefore applying these parameters the sample size shall be calculated as follows in accordance with the provisions of EB 69 Annex 5 on the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities³³ using equation 1 in Example 1 of the guidelines

Sample Size Calculation:

$$n \geq \frac{1.645^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.645^2 p(1-p)}$$

Where *n* = the sample size

N = Total number project lamps distributed

1.645= standard normal at a 90 confidence level

p = is the estimated proportion of an attribute that is not present in the population (non-operational project lamps) (0.50)

0.10 = Represents the 10% relative precision (0.10 ×.5 × 0.05 = 5% points either side of

p)

To account for non-response the CPA operator shall employ an oversampling technique where the sample size shall be increased by 20%..

Sampling Objective

³¹ http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid20.pdf

³² <http://www.stat.yale.edu/Courses/1997-98/101/confint.htm>



The objective of the sampling is to accurately determine the number of project lamps which are in service and operational in the third year of crediting of the CPA. The target population is the project lamp final recipients.

1. Physical location of domestic/non-residential setting of project lamp owner (only applicable for project lamps with a seven year effective useful lifetime)
2. Date of sale/distribution of the project lamp(only applicable for project lamps with a seven year effective useful lifetime)

The method of data collection shall be closed questionnaires and physical spot checks by the interviewer.

Target Population and Sampling Frame

For CPA operators who use option 2 of the Effective useful life there shall be a Sales/ Distribution Record which shall be used to unambiguously trace the end users of the project lamps. This list shall be used to draw a sampling frame. All sampling frames shall be produced in electronic copies which shall be used to uniquely identify the location and final recipient of the project lamps.

Sample Method

A simple random survey shall be conducted for each CPA..

Field Measurement Objectives and Data to be collected

Monitoring surveys shall seek to establish the following parameters:

1. Unique Identification of the CPA
2. Unique Identification of the Solar Lamp (spot check by the interviewer only applicable for project lamps with a seven year effective useful lifetime).
3. Confirmation that project lamp meets the technical description entered against it in the CPA Database including details on lamp wattage, battery type, charging method, the date of distribution);
4. Proper usage and maintenance of the project lamp (spot check by the interviewer only applicable for project lamps with a seven year effective useful lifetime)
5. Date of survey
6. Number of lamps installed per household

In accordance with the baseline and monitoring methodology AMS-III.AR the sampling effort is only a requirement in the third year of the crediting period of the CPA.

Procedures for Administering Data Collection

1. Procedures for Data Collection

Trained surveyors will conduct closed questionnaires to identify the stated parameters. This data will then be stored electronically and advanced to from the CPA operator for secondary storage on the C/ME database. One trained surveyor shall conduct the sampling for the cluster assigned.



Training can be conducted by the CPA operator or a relevant institution familiar with conducting household surveys. Training shall be centred on the project activity, the necessity for a closed questionnaire, contacting project lamp owners and the expected time frame within which the surveys need to be collected and reported. To maximize field responses the minimum sample size has been set at 125 this is a corrective measure by way of over-sampling, any respondents who cannot be traced will be deleted from the secondary unit lists in the particular geographical sample. An increase of 30% is common practice to account for non-response³⁴. The survey is conducted by site visits with closed questionnaires for the observational units who are household members and spot checks for the functioning of the project lamps and only persons over age 12 are interviewed. Where the household members present are children under 12, the surveyors will have to conduct a repeated visit and where there are no older respondents, then the sample unit shall be treated as non-responsive.

Quality control and assurance

The CME shall ensure quality control and assurance of the sampling effort by:

- Ensuring that the monitoring survey adheres to the procedures for data collection stated above, these requirements shall be reiterated during the training of enumerators for the sampling effort.
- Training of field personnel shall be initiated by the CME but an identified survey team shall be trained by a CDM consultant as well as a consultant with a back ground in statistical analysis and field surveys.
- To account for non-response the sample size has been increased by 20%
- Data shall be analysed within the first two weeks of its collation. Any immediate inconsistencies or sampling results which were established in a manner inconsistent with the approach herein described shall be evaluated and if deemed to be flawed because of improper procedures for sampling shall be repeated at a different randomly selected household.

Analysis:

The proportion values realized from the sampling effort shall be extrapolated for all Option 2 project lamps included in the PoA. After the raw data has been collated and evaluated for any anomalies the results shall be collated and a single percentage derived for the number of operational lamps within the PoA.

Implementation

The sampling effort shall begin prior to the close of the third year of the crediting period of the CPA.

There shall be three phases which shall each require different skill sets:

1. Phase 1: Training and development of survey protocol: A CDM consultant and a statistical expert shall train identified enumerators on how to conduct the sampling effort in a manner that is statistically sound and which adheres to the requirements of the methodology and the PoA DD.
2. Phase 2: Enumerators shall begin surveys and shall be supervised in field. Enumerators need not have an advanced knowledge of surveys or sampling provided that they receive proper and documented training before the sampling effort begins.

³⁴ http://www.soc.uoc.gr/socmedia/papageo/metapyxiakoi/sample_size/samplesize1.pdf



3. Phase 3: An appointed CME sampling database manager shall, together with a team of data entry personnel collate all the sample results and derive the final percentage which shall be extrapolated to all other option 2 project lamps included in the CPA.

Implementation schedule:

1. Collation of CPA databases
 - a. CME shall collate all CPA databases and organize the same into a central CPA database
 - b. The CME shall review CPA databases to ensure there is minimal chance of CPA database having erroneous data entries such as double counting of project lamps or final recipients having more than 5 project lamps in their entry.
 - c. The CME shall confirm that the project lamp useful life time is selected before distribution and that the date of sale (or conservative approximation thereof) is stated for each project lamp distributed.
2. The CME shall ensure that where ex-post monitoring surveys have been conducted the general guidelines for sampling and surveys for small-scale CDM project activities have been followed strictly by the enumerators recruited by the CME.
3. Enumerators selected for the ex-post monitoring shall receive training before hand as well as field scenario demonstrations on the applicability of the interviews to provide adequate opportunity for the interviewers to understand the questionnaires as well as asses the interviewer's ability to interpret the data required objectively to the respondent.
4. Monitoring surveys from CPAs shall be collated and this data base shall be provided to the DOE for verification. The DOE shall examine the general CPA databases as well as results from the monitoring surveys and then is the DOE so chooses conducts a separate field tests/site visits to assess the accuracy of the monitoring surveys. The values derived from the CPA monitoring survey shall be used for years 4, 5, 6 and 7 of that CPA's crediting period.

Each SSC CPA included in the proposed PoA shall be required to produce monitoring reports yearly which provide the data established in Section A.4.4.1 of this PoA DD. This data shall be collated and stored in the CME database. The verifying DOE shall then sample a population of project lamps within the PoA to determine the accuracy of sales records as well as to verify the percentage of operational lamps as required by the baseline and monitoring methodology.

The SSC CPA shall be required to construct the following based on the CPA selection of the effective useful life of the project lamps:

Option 1: (Paragraph 11 AMS-III.AR.)

Recording of Lamp Distribution data; at the very minimum, the CPA shall provide a record of all distributed project lamps. This data shall not be required to be so detailed as to identify the owner but shall identify the date of sale, quantify that warranty is placed against each project lamps and that no more than 5 project lamps are distributed per recipient.

Option 2: (Paragraph 12 AMS-III.AR.)

Monitoring shall include recording of lamp distribution data as well as ex-post monitoring surveys in the third year of the crediting period. In this scenario there shall be provided in the CPA database, data that



unambiguously identifies the final recipient as well as confirmation that project lamps have unique marking. Monitoring surveys shall be conducted in the third year of CPAs with option 2 project lamps.

- 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;
- Sampling must be statistically robust and relevant, i.e. the survey has a random distribution and is representative of the target population (size, location);
- The method to select respondents for interviews is random;
- The survey is conducted by site visits;
- Only persons over age 12 are interviewed;
- The CPA DD must contain the design details of the survey.

Accordingly the sampling approach taken and the techniques embodied therein shall be based on the general guidelines for sampling and surveys for small-scale CDM project activities³⁵.

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)

>> The application of the baseline study and monitoring methodology was completed on 18th September 2012 by Mr Kyle Denning of Viability Africa, LLC. Viability Africa, LLC is the contracted CDM consultant for the proposed PoA and is not a project participant.

Kyle Denning,

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³⁵ http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid20.pdf



Annex 1

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

Organization:	ToughStuff International
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E-Mail:	colin.green@toughstuffonline.com
URL:	www.toughstuffonline.com
Represented by:	
Title:	Group Carbon Manger
Salutation:	Mr
Last Name:	Green
Middle Name:	
First Name:	Colin
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	



Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding for the PoA. An ODA declaration signed by the CME has been submitted to the DOE.

Annex 3

BASELINE INFORMATION

Annex 4

MONITORING INFORMATION