MICROENERGY CREDITS – MICROFINANCE FOR CLEAN ENERGY PRODUCT LINES – AFRICA – SOLAR LAMPS AND EFFICIENT COOKSTOVES – 10341 – CPA -0002

Document Prepared by MicroEnergy Credits Corporation

Project Title	MicroEnergy Credits – Microfinance for Clean Energy Product Lines – Africa – Solar Lamps & Efficient cook stoves – 10341 –CPA - 0002
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Prepared By	MicroEnergy Credits Corporation
Contact	1201 Alaskan Way Ste 200 WA 98109 Seattle United States of America sriskandh@microenergycredits.com

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1 PROJECT DETAILS

1.1 Summary Description of the Project

A summary description of the technologies/measures to be implemented by the project

In the rural areas in Kenya, the predominant means of cooking are traditional cook stoves that use charcoal or wood as fuel. The smoke and fumes from these inefficient stoves contribute heavily to indoor air pollution, and affects human health. In rural areas of Kenya there is either no grid connection or frequent power outages and low voltage so rural households must use kerosene for indoor lighting, which also contributes to indoor air pollution.

The project activity involves marketing, distributing, and financing approximately 600,000 solar lighting systems (SLS), and 10,000 improved cook stoves (ICS), for low income households, community organisations and small/medium enterprises across Kenya. These products provide clean, renewable energy for cooking and lighting.

Under the project activity, MicroEnergy Credits Corporation (MEC) works with project partners to develop a successful and diversified clean energy-lending program. The clean energy program addresses typical barriers for low-income clients including education, price, finance, and supply and aftersales service. MicroEnergy Credits Corp trains project partners to implement the clean energy lending program, as well as a robust and transparent carbon credit monitoring and tracking system to quantify and record the volume of carbon emission reductions created through the clean energy program. The carbon finance is used to expand and sustain the clean energy program through:

- Client education and marketing
- Internal training and capacity building
- Onlending funds to local SMEs producing the clean energy products
- Aftersales service and maintenance
- Lowering the interest or principal cost to the client

The location of the project

The products sold will be restricted to the boundary of the Republic of Kenya. The activity will involve households across the host country. The location of each clean energy installation as per the household address or the address of the nearest bank branch that has distributed product of provided loan will be recorded in MicroEnergy Credit's Credit Tracker Platform.

An explanation of how the project is expected to generate GHG emission reductions or removals

The products provide clean energy for cooking and renewable energy for lighting. The cookstoves distributed under the project activity replace traditional cookstoves thereby reducing the amount of fuelwood used for cooking in the baseline by households and thus reducing GHG emissions corresponding to the fuelwood saving by the project activity. The solar lighting systems replace kerosene-based lamps in households, which would have resulted in GHG emissions due to burning of fossil fuel i.e. kerosene.

A brief description of the scenario existing prior to the implementation of the project

For solar lighting systems, in the baseline scenario, the households receiving these solar lighting systems are either not connected to the grid or have intermittent electricity supply from the grid resulting in use of kerosene for lighting in the baseline scenario.

For cook stoves, the households receiving these efficient cook stoves, are using inefficient cooking devices in the baseline, thus resulting into higher wood or charcoal consumption in the baseline. The targeted end user group for this project includes, individual households, community organisations and small/medium enterprises in Kenya.

An estimate of annual average and total GHG emission reductions and removals

The activity will reduce annual average emissions of 90,914 tCO_2 and total emission reductions is 636,399 tCO_2.

Yearly distribution of these products would follow the schedule as per the operation numbers provided in the tables below.

Year	Improved Cookstoves
1	5,000
2	10,000
3	15,000
4	75,000
5	75,000
6	75,000
7	75,000

Year	Solar Lighting Systems
1	650,000
2	650,000
3	650,000
4	650,000
5	650,000
6	650,000
7	650,000

1.2 Sectoral Scope and Project Type

The project includes the following sectoral scopes and project type –

- Improved cookstoves – 3 (Energy demand); Type II - Energy efficiency improvement project.
- Solar lighting devices – 1 (Energy industries (renewable - / non-renewable sources); Type III - Other projects reducing annually up to 60 $ktCO_2e$.

The project is not a grouped project

1.3 Project Eligibility

The project falls within the scope of the VCS Program. Also, the project does not fall under the category of excluded projects mentioned in the VCS Standard v4.1 and is therefore eligible under the scope of the VCS Program.

Table 1: VCS Program scope

Scope	Applicability
The six Kyoto Protocol greenhouse gases.	The project reduces GHG emissions associated with the combustion of cooking fuels and/or lighting. Gases included are CO_2, CH_4, N_2O.
Ozone-depleting substances	The project does not involve ODS
Project activities supported by a methodology approved under the VCS Program through the methodology approval process.	The ICS component of the project uses the methodology "VMR006 Methodology for Installation of High Efficiency Firewood Cookstoves v1.1." that was approved through VCS methodology approval process
Project activities supported by a methodology approved under a VCS approved GHG program, unless explicitly excluded under the terms of Verra approval.	The SLS component of the project uses the methodology "AMS-III.AR.: Substituting fossil fuel based lighting with LED/CFL lighting systems --- Version 5.0" that are approved under the CDM, an approved GHG program under VCS

Table 2: Excluded project activities under the VCS Program

Excluded Activity	Applicability
Activities that reduce hydrofluorocarbon-23 (HFC-23) emissions	N/A. The project reduces GHG emissions associated with the combustion of cooking fuels and/or lighting
Grid-connected electricity generation using hydro-power plants/units	N/A The project activities are energy efficiency measures and do not generate electricity from hydro-power plants/units.
Grid-connected electricity generation using wind, geothermal, or solar power plants/units	N/A. The project activities are energy efficiency/clean lighting measures and do not generate electricity from wind, geothermal, or solar power plants/units.
Utilization of recovered waste heat for, inter alia combined cycle electricity generation and the provision of heat for residential, commercial or industrial use	N/A. The project activities are energy efficiency/clean lighting measures and do not utilize recovered waste heat for any purposes.
Generation of electricity and/or thermal energy using biomass. This does not	N/A.

include efficiency improvements in thermal applications (e.g., cookstoves)	The project activities are energy efficiency/clean lighting measures and do not generate electricity using biomass. The project includes energy efficiency improvements in thermal applications, i.e. cookstoves.
Generation of electricity and/or thermal energy using fossil fuels, including activities that involve switching from a higher carbon content fuel to a lower carbon content fuel	N/A. The project activities do not include the generation of electricity and/or thermal energy using fossil fuels, including activities that involve switching from a higher carbon content fuel to a lower carbon content fuel.
Replacement of electric lighting with more energy efficient electric lighting such as the replacement of incandescent electrical bulbs with CFLs or LEDs	N/A. The project activities do not include the replacement of electric lighting.
Installation and/or replacement of electricity transmission lines and/or energy efficient transformers	N/A. The project activities do not include the installation and/or replacement of electricity transmission lines and/or energy efficient transformers.

Further, as per VCS Standard v4.2 following eligibility conditions need to be fulfilled for transition of registered CDM project to VCS.

Eligibility condition	Applicability
The approved GHG program validation (or verification, where the approved GHG program does not have a validation step) or VCS validation shall be completed within the relevant validation deadline as set out in Section 3.7 of the Standard v4.2 (Non-AFOLU projects shall complete validation within two years of the project start date). Validation (or verification) is deemed to have been completed when the validation (or verification) report that is submitted to the relevant program to request registration has been issued.	The inclusion report date for the project is 27/10/2020 and the project start date is 01/10/2018. This project has received as exemption from VERRA on the new rules to allow this project to apply the new rules although they do not meet the criteria stating that the inclusion date on the CPA inclusion form shall be within two years of the project start date.
Projects registered under another GHG program, with activities that are included within the scope of the VCS Program (see	The project is registered as CPA under a PoA registered with CDM GHG program. The

Section 2.1), shall only be eligible to complete a gap validation and/or transfer to the VCS Program where the following applies: a) For a project that does not include afforestation and/or reforestation activities: i) The project shall have an original project crediting period start date on or after 1 January 2016 with another GHG program; or ii) Where the project has an original project crediting period start date from 1 January 2013 to 31 December 2015, the project shall have issued credits during the period 1 January 2016 to 5 March 2021, or shall have a status of "issuance requested" on the relevant GHG program registry by 5 March 2021. b) For a CDM Component Project Activity (CPA) that does not include afforestation and/or reforestation activities: i) The CPA shall be part of a Program of Activities (PoA) with an original program crediting period start date on or after 1 January 2016; or ii) Where the CPA is part of a Program of Activities (PoA) with an original program crediting period start date from 1 January 2013 to 31 December 2015 and where the CPA has an original crediting period start date from 1 January 2013 to 31 December 2015, the CPA shall have issued credits during the period 1 January 2016 to 5 March 2021, or shall have a status of "issuance requested" by 5 March 2021; or iii) Where the CPA is part of a PoA with an original program crediting period start date from 1 January 2013 to 31 December 2015 and where the CPA has an original crediting	project is being transitioned from CDM to VCS and is included within the scope of the program as per table 1 of this document. The project is a CPA which is part of a Program of Activities (PoA) with an original program crediting period start date after 1 January 2016 i.e. 21/02/2017.

period start date on or after 1 January 2016, no prior credit issuance is required. c) For a project with afforestation and/or reforestation activities, the project shall have been registered under another GHG program on or after 1 January 2013. d) For a CDM CPA with afforestation and/or reforestation activities, the CPA shall be part of a PoA that was registered on or after 1 January 2013.	
Further, the following applies with respect to vintages: a) For a project that does not include afforestation and/or reforestation activities, only emission reductions with vintages beginning on or after 1 January 2016 are eligible for VCU issuance. b) For a project with afforestation and/or reforestation activities, only emission reductions with vintages beginning on or after 1 January 2013 are eligible for VCU issuance	The project does not include afforestation and/or reforestation activities and shall claim emission reductions with vintages after 1 January 2016 only as the start date is 1 October 2018.

1.4 Project Design

The project is designed as single installation of an activity.

Eligibility Criteria

N/A as this is not a grouped project.

1.5 Project Proponent

Organization name	MicroEnergy Credits Corporation
Contact person	Sriskandh Subramanian
Title	Technical Director

Address	1201 Alaskan Way Ste 200 WA 98109 Seattle United States of America sriskandh@microenergycredits.com
Telephone	+91-9999997592
Email	sriskandh@microenergycredits.com

1.6 Other Entities Involved in the Project

Organization name	N/A
Role in the project	N/A
Contact person	N/A
Title	N/A
Address	N/A
Telephone	N/A
Email	N/A

1.7 Ownership

The project ownership is with MEC. During the distribution of the ICS/SLS, the participating household will sign an End User Agreement to confirm that the ownership rights of the carbon assets generated from this project lie with MEC.

1.8 Project Start Date

01-October-2018 i.e. date of sale of first clean energy product under the proposed project activity.

1.9 Project Crediting Period

Crediting Period: Renewable, 7 years

Total number of years: 21 years

Start and End Date: 01 Oct 2018 – 30 Sep 2025

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	YES
Large project	

Year	Estimated GHG emission reductions or removals (tCO_2e)
2018	63,100
2019	66,400
2020	69,700
2021	109,300
2022	109,300
2023	109,300
2024	109,300
Total estimated ERs	636,399
Total number of crediting years	7
Average annual ERs	90,914

1.11 Description of the Project Activity

The technologies that will be employed by this project activity would include low cost clean energy products that meet the basic needs of Kenya's low income demographic. In general, these technologies are deployed in homes and small businesses. All of the technologies employed by the project activity provide development benefits as well as environmental benefits.

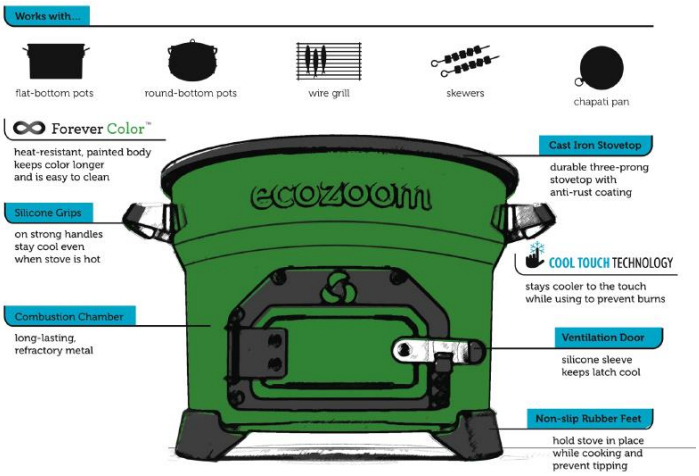
- Improved cookstoves

There will be various different models of improved cookstoves that would be disseminated under this project activity. At the time of completion of the project activity there are two models that are being distributed. In future PP plans to distribute various other models of cookstoves during the course of implementation of the project activity. The complete list would be provided during verification. Technical specification of the two models currently being distributed are provided below:

1. The Zoom Jet cook stove

The technology has the following description:

The Zoom Jet cook stove by ecozoom is a single burner, high efficiency cookstove that delivers fuel savings up to 76% and minimizes harmful emissions of CO, CO2 and Particulate Matter. The rated thermal efficiency is 45%[12]. In the absence of the project activity, the households with improved cookstoves would have continued to use inefficient traditional cookstoves, including three-stone fired and conventional stoves built of mud/clay lacking a chimney and grate to provide energy for cooking. These stoves use charcoal as the fuel. The efficiencies of these conventional stoves are low and are of the order of 10%. The technical specifications[3] of the clean energy products are as follows:



Physical dimension of the stove is provided below:

Height: 21cm

Weight: 7kg

Stove top diameter: 28cm

The lifetime of the cook stove as per manufacturer's specifications is 10 years and the fuel used in these stoves in Charcoal.

2. Burn Jikokoa G3 efficient cookstove

The technology has the following description:

The Jikokoa cook stove by burnstoves is a single burner, high efficiency cookstove that delivers fuel savings up to 50% and minimizes harmful emissions of CO, CO2 and Particulate Matter. The rated thermal efficiency is 45%. In the absence of the project activity, the households with improved cookstoves would have continued to use inefficient traditional cookstoves, including three-stone fired and conventional stoves built of mud/clay lacking a chimney and grate to provide energy for cooking. These stoves use charcoal as the fuel. The efficiencies of these

[1] Ecozoom efficiency test results_WBT

[2] As per stove testing results (water boiling test carried out by University of Nairobi)

[3] Manufacturer's certificate on specifications

conventional stoves are low and are of the order of 10%. The technical specifications[4] of the clean energy products are as follows -

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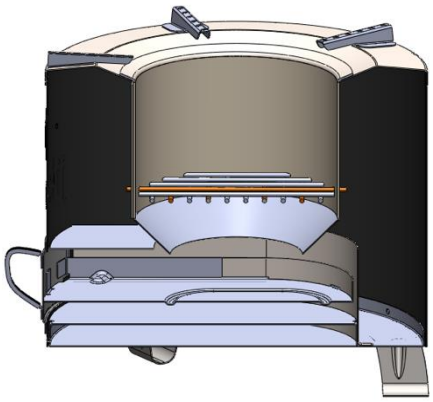

Physical dimension of the stove is provided below:

Height: 25.4cm

Diameter: 26.2cm

The lifetime of the cookstove as per manufacturer's specification is 10 years.

Below is the summary of production process of these cookstoves.

3. Punching/forming, which makes parts from raw materials, primarily sheet metal
4. Powder coating, which coats the stoves
5. Final assembly which is a continuous flow production line that takes parts and assembles them into finished goods

Other models of efficient cook stoves may also be offered under the project activity as long as they meet all the requirements of the methodology.

- **Solar Lighting System**

There will be various models of solar lighting technologies = disseminated under this project activity. Households receiving these solar lighting systems are either not connected to the grid or have intermittent electricity supply from the grid resulting in use of kerosene for lighting in the baseline scenario. The models where LED/CFL lighting system has more than one LED/ CFL lamp connected to a single rechargeable battery system, every LED/CFL lamp would be considered as one project lamp. The technology has the following description and technical specifications[5] –

1. Sun King Pro 2[6]
   The technical specifications of this product are –

[4] Manufacturer's certificate on specifications

[5] As per manufacturer's product information sheet

[6] www.lightingglobal.org/products/glp-sunkingpro2

Type and Solar panel Wattage: Polycrystalline/3 W
Lighting Wattage: 1.1
Luminous flux output (Lumens): 160
Lumen maintenance (for 2,000 hours): 96%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 1
Battery type/capacity– lithium ion phosphate battery/2900mAh
Type of charge controller – NA
Solar Run time(SRT): 5.5 hours
Warranty – 2 years

2. Sun King Home 60[7]
The technical specifications of this product are –
Type and Solar panel Wattage – Polycrystalline/6.3 W
Lighting Wattage: 2.64
Luminous flux output (Lumens) – 305
Lumen maintenance (for 2,000 hours): 99%
Rated lamp life: greater than 10,000 hours
Lighting points (number of project lamps) – 3
Battery Type/capacity – 5900 mAh (lithium ion phosphate battery)
Type of charge controller:
Solar Run time(SRT): 5.6 hours
Warranty – 2 years

3. d.light S300
The technical specifications of this product are –
Type and Solar panel Wattage – Monocrystalline/1.6 W
Lighting Wattage: 1.0
Luminous flux output (Lumens) – 100
Lumen maintenance (for 2,000 hours): 97.97%
Rated lamp life: greater than 10,000 hours
Lighting points (number of project lamps) – 1
Battery Type/capacity – 1.8 Ah (lithium ferro phosphate battery)
Type of charge controller: Active
Solar Run time(SRT): 5 hours
Warranty – 2 years

4. d.light D20
The technical specifications of this product are –
Type and Solar panel Wattage – Polycrystalline/5.4 W
Lighting Wattage: 1.7
Luminous flux output (Lumens) – 170
Lumen maintenance (for 2,000 hours): 97.97%

[7] http://www.lightingglobal.org/products/glp-skhome/

Rated lamp life: greater than 10,000 hours
Lighting points (number of project lamps) – 2
Battery Type/capacity – 3 Ah (lithium ferro phosphate battery)
Type of charge controller: Active
Solar Run time(SRT): 7 hours
Warranty – 2 years

5. d.light D30
   The technical specifications of this product are –
   Type and Solar panel Wattage – Polycrystalline/10.0 W
   Lighting Wattage: 3.6
   Luminous flux output (Lumens) – 360
   Lumen maintenance (for 2,000 hours): 97.97%
   Rated lamp life: greater than 10,000 hours
   Lighting points (number of project lamps) – 3
   Battery Type/capacity – 3 Ah (lithium ferro phosphate battery)
   Type of charge controller: Active
   Solar Run time(SRT): 5 hours
   Warranty – 2 years

6. d.light D31
   The technical specifications of this product are –
   Type and Solar panel Wattage – Polycrystalline/10.0 W
   Lighting Wattage: 3.6
   Luminous flux output (Lumens) – 360
   Lumen maintenance (for 2,000 hours): 97.97%
   Rated lamp life: greater than 10,000 hours
   Lighting points (number of project lamps) – 3
   Battery Type/capacity – 3 Ah (lithium ferro phosphate battery)
   Type of charge controller: Active
   Solar Run time(SRT): 5 hours
   Warranty – 2 years

7. d.light D100R
   The technical specifications of this product are –
   Type and Solar panel Wattage – Polycrystalline/9 W
   Lighting Wattage: 4.8
   Luminous flux output (Lumens) – 480
   Lumen maintenance (for 2,000 hours): 97.97%
   Rated lamp life: greater than 10,000 hours
   Lighting points (number of project lamps) – 3
   Battery Type/capacity – 9 Ah (lithium ferro phosphate battery)
   Type of charge controller: Passive
   Solar Run time(SRT): 6 hours
   Warranty – 2 years

8. d.light D330
   The technical specifications of this product are –
   Type and Solar panel Wattage – Polycrystalline/6.5 W
   Lighting Wattage: 4.4
   Luminous flux output (Lumens) – 440
   Lumen maintenance (for 2,000 hours): 97.97%
   Rated lamp life: greater than 10,000 hours
   Lighting points (number of project lamps) – 3
   Battery Type/capacity – 6 Ah (lithium ferro phosphate battery)
   Type of charge controller: Active
   Solar Run time(SRT): 4 hours
   Warranty – 2 years

9. d.light X740
   The technical specifications of this product are –
   Type and Solar panel Wattage – Polycrystalline/30 W
   Lighting Wattage: 10 W
   Luminous flux output (Lumens) – 1000
   Lumen maintenance (for 2,000 hours): 97.97%
   Rated lamp life: greater than 10,000 hours
   Lighting points (number of project lamps) – 4
   Battery Type/capacity – 6 Ah (lithium ferro phosphate battery)
   Type of charge controller: Active
   Solar Run time(SRT): 7 hours
   Warranty – 2 years

10. d.light X850
    The technical specifications of this product are –
    Type and Solar panel Wattage – Polycrystalline/40 W
    Lighting Wattage: 12 W
    Luminous flux output (Lumens) – 1200
    Lumen maintenance (for 2,000 hours): 97.97%
    Rated lamp life: greater than 10,000 hours
    Lighting points (number of project lamps) – 5
    Battery Type/capacity – 6 Ah (lithium ferro phosphate battery)
    Type of charge controller: Active
    Solar Run time(SRT): 6 hours
    Warranty – 2 years

All the project lamps/devices are physically protected against any environmental factors such as rain, heat, insects and ingress etc. All products contain a solar panel, lights as shown in the photograph –

All the lamps under this project activity would fall under Option 2: Project lamps are assumed to operate up to seven years after the distribution to end users. Therefore, under this option, emission reductions may only be claimed up to seven years.

Other models of solar lighting systems may also be offered under the project activity as long as they meet all the requirements of the methodology.

MEC's Credit Tracker Platform is used to maintain records for the project activity. The MEC Credit Tracker Platform has been designed specifically for accelerating microfinance access to clean and efficient energy. The Credit Tracker Platform is used to collect and store the information related to the unique identification number, location, installation date, and usage status of each clean energy product (CEP) in project activity, making it easy to identify, locate and verify any or all of the installations that pertain to the project activity. The MEC Credit Tracker Platform is a hosted internet service, limiting the risk of loss of data.

The Credit Tracker Platform enables Micro Energy Credits to maintain consistent data on project activity and product installations. The process for entering data into the Credit Tracker Platform is consistent across all CEPs in the project activity. At the time of installation, a Booking Record (in paper or electronic format) is created that captures detailed data on the installation:

- Household name
- Location of household (address)
- Product type installed
- Product model installed
- Date of installation
- Unique identifier number (s) for CEPs

Once the installation is complete, it is ensured that all the data from the Booking Record created at the time of installation is accurately captured in the electronic Booking Record in the Credit Tracker Platform.

Internal checks are done to verify the accuracy of data entry and to ensure that the data captured in Credit Tracker is identical to the data recorded at the time of installation.

1.12 Project Location

The products sold will be restricted to the boundary of the Republic of Kenya. The activity will involve households across the host country. The location of each clean energy installation as per the household address or the address of the nearest bank branch that has distributed product of provided loan will be recorded in MicroEnergy Credit's Credit Tracker Platform.

1.13 Conditions Prior to Project Initiation

Prior to the project activity these rural households were using inefficient traditional stoves and kerosene lamp for lighting which is same as the baseline scenario. The baseline scenario has been described in detail in section 3.4

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

As per the current applicable laws[8], a full scale EIA is not required as per the list of industries published by the Host Country[9].

There are no other local, regional or national laws that are applicable.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

This project activity is registered as CPA 2 of the CDM PoA 10341. The link to this activity on the CDM website is provided

https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/0PKNJ3W4RXQE7S6YDOMLHGIVTU5C8A/view

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected by any GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The project does not reduce GHG emissions from activities that are included in any emissions trading program.

1.16.2 Other Forms of Environmental Credit

The project has not sought or received any other form of GHG – related environmental credits.

[8] http://www.nema.go.ke/index.php?option=com_content&view=article&id=42&Itemid=142

[9] http://www.nema.go.ke/index.php?option=com_content&view=article&id=42&Itemid=142

1.17 Additional Information Relevant to the Project

Leakage Management

For the cookstoves component, leakage is addressed through application of a default factor of 0.95

For the solar lighting component, there are no leakage sources identified by the applied methodology. AMS.III.AR v5.

Commercially Sensitive Information

There is no commercially sensitive information

Sustainable Development

The project will apply for certification under SD Vista and all sustainable Development related issues will be addressed as part of SD Vista. The project contributes to social, environmental, economic and technological benefits which contribute to sustainable development of the local environment and the country as follows:

- Education benefits: Households will have less air pollution along with better and more reliable lighting. This will reduce the risk of air pollution-related diseases for the families and enable people to work and/or study for longer hours without straining their eyes.
- Social benefits: Reduces drudgery to women (due to reduced fuel wood use) who spend long hours and travel long distances to collect fuel wood. Provides better quality of life for the rural communities as they get more time to spend together. Economic benefits:
    - Households and microentrepreneurs will achieve energy savings from reduced spending on biomass fuel and kerosene
    - Microentrepreneurs will be able to spend more time on income-generating activities due to lesser cooking times and better lighting in the evenings
    - The expansion of the clean energy supply chain to rural regions will generate jobs
- Health benefits: It will reduce health hazards from fumes from inefficient stoves and kerosene. There will also be lesser fire risks from kerosene for families and microentrepreneurs
- Environmental benefits: It will reduce emissions of greenhouse gases from usage of inefficient stoves and kerosene

Further Information

There are no additional relevant legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and/or temporal information that may have a bearing on the eligibility of the project, the net GHG emission reductions or removals, or the quantification of the project's net GHG emission reductions or removals.

2 SAFEGUARDS

2.1 No Net Harm

There are no potential negative environmental and socio-economic impacts

2.2 Local Stakeholder Consultation

The procedures or methods used for engaging local stakeholders

Local stakeholder consultation was held at Equity Centre, Upper Hill,9th Floor, Nairobi Kenya on 25th Feb 2016.

For the project level stakeholder consultation, stakeholders were invited by email and sms to attend the physical stakeholder consultation meetings held at the above address.

Outcome of the local stakeholder consultation

A detailed LSC report is prepared and would be provided to DOE mentioning the detailed account of invitation process, timelines, attendance during the meeting and accounts of comments received.

The invited stakeholders included:

- Existing customers from various locations in the boundary of the project activity
- Technology / CEP providers
- Bank representatives
- Government representatives
- Local NGO

Minutes were recorded for the consultation and a detailed stakeholder consultation report was compiled.

Stakeholder Feedback

Overall, during the meeting and in telephonic communications, the project received significant interest from stakeholders and positive feedback. The stakeholders generally felt that the project offered significant environment, development, and empowerment impacts by making proven clean energy products affordable and accessible to low-income households and microentrepreneurs. Stakeholders agreed that the project will be successful in providing affordable clean energy access to the people of Kenya.

Majority of the stakeholder felt that the project would benefit the local environment and would have positive impact on health and society at large. The specific comments received during the meeting are as follows:

Category of the Stakeholder	Comments received

End-user	Clean energy project will improve the lives of the society. It is also money saving venture.
Agent	Ensure proper logistics and distribution of products to agents
End-user	The project will go a long way in poverty eradication in Kenya
Agent	Add more variety of products

2.3 Environmental Impact

No EIA is carried out as it is not required per host country laws.

2.4 Public Comments

This section will be filled after the public comment period is completed.

2.5 AFOLU-Specific Safeguards

Since this is a non AFOLU project, this section is not filled.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The Project applies both of the following two approved methodologies under VERRA and CDM:

- VMR0006 Methodology for Installation of High Efficiency Firewood Cookstoves – version 1.1
- AMS-III.AR.: Substituting fossil fuel based lighting with LED/CFL lighting systems --- Version 5.0

The associated tools and guideline documents in the project activity include:

- CDM TOOL01 “Tool for the demonstration and assessment of additionality” Version 07;
- CDM TOOL21 “Demonstration of additionality of small-scale project activities” Version 13.1;
- CDM TOOL30 “Calculation of the fraction of non-renewable biomass” Version 03;
- CDM Guideline “Sampling and surveys of CDM project activities and programmes of activities” version 04;

- CDM Standard "Sampling and surveys for CDM project activities and programmes of activities" version 09.

3.2 Applicability of Methodology

The applicability criteria of the methodologies and tools used are justified at the project activity level. This is reflected in the following tables in this section.

Methodology AMS-III.AR.: Substituting fossil fuel based lighting with LED/CFL lighting systems — Version 5.0.

The applicability conditions of this methodology are presented in the table below:

Fulfilment of AMS-III.AR. Applicability criteria:

S. No.	Applicability Condition	Justification of applicability
1	This category comprises activities that replace portable fossil fuel-based lamps (e.g. wick-based kerosene lanterns) with battery-charged light-emitting diode (LED) or compact fluorescent lamps (CFL) based lighting systems in residential and/or non-residential applications (e.g. ambient lights, task lights, portable lights).	Since the activity undertakes distribution of solar lighting systems (LED or CFL) to replace wick-based kerosene lamps, thus this meet this applicability condition
2	This methodology is applicable only to project lamps whose batteries are charged using one of the following options4: (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.	Since the activity involves the lights that are charged by solar energy using solar PV which is a renewable source of energy, hence this applicability criterion is met
3	At a minimum project lamps shall be certified by their manufacturer to have a rated average operational life of at least: (a) 5,000 hours for Option 1, paragraph 4(a);	The activity chooses to apply option 2, and the manufacturers specification for the lighting devices under the PA would demonstrate that rated average operational life is above 10,000 hours based on the appropriate testing results.

	(b) 10,000 hours for Option 2, paragraph 4(b).	
4	Project lamps shall meet warranty requirements of the Lighting Global Minimum Quality Standard. The project lamps shall have a warranty of a minimum of one year from the time the end-user takes ownership or begins using the lamp. 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 clearly communicated and supported through the supply chain and available to end-users of the project lamps during the warranty period. 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. The full warranty terms shall be available in writing, in a regionally appropriate language and included with each unit.	This condition is fulfilled by the project lamps. The project lamps carry warranty of 24 months (more than 1 year) and meet the warranty requirements of the lighting global minimum quality standards. Same can be verified from the manufacturer's product specification/warranty card (in a regionally appropriate language) available with each project lamp. The manufacturer's product specification/warranty cards are available with each project lamp and hence the end-users are communicated about their warranty on the product.
5	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 per cent. In addition, for project lamps charged using Option 3(c) as provided for in paragraph 3 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 per cent. For project lamps charged under option indicated in paragraph 3(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 per cent.	This condition will be fulfilled by the all the models of the lamps distributed under this activity. Rated life would be certified by the lamps manufacturer in accordance with the requirement of this condition. The project lamps are not charged either using 3(c) or 3(b) options in the methodology. All the project lamps are charged using 3(a) option.

6	Measures are limited to those that result in emissions reductions of less than or equal to 60 kt CO2 equivalent annually.	The total emission reductions per lamp (considered as project activity) are less than the small scale threshold of 60,000 t CO2 equivalent annually, as demonstrated in the ER sheet.
7	Project lamps shall meet or exceed the following minimum performance characteristics, which should be proven by third-party test results: (a) Light Output - luminous flux of 25 lumens or illuminance of 50 lux over an area ≥0.1 m2 when suspended at a distance of 0.75 meters or self-supported. The light output over a 2,000 hour lumen maintenance test should not decline by more than 15%;	Models under distribution meets and the performance exceeds these eligibility criteria based on manufacturer's product specification
8	Run Time and Battery Capacity - Daily Burn Time (DBT, also defined as solar run time) shall meet the following requirements: (i) DBT shall be equal to or greater than 4 hours; (ii) For charging Option 3(a) with solar PV, the DBT is defined by the Solar Run Time for the project lamp (as determined per paragraph 9(g)); (iii) For other technologies in Option 3(a), the DBT is defined based on typical expected patterns of use; (iv) For charging Options 3(b) and 3(c): a. The maximum claimed DBT shall be less than or equal to the typical capabilities of the regional or local energy system at delivering reliable power sufficient for recharging; b. The autonomous (full battery) run-time of the project lamps shall be equal to or greater than 200 per cent of the DBT of the project lamps;	DBT for the project lamps is greater than 4 hours based on manufacturer's product specification. Charging option used by project lamps is 3(a) and DBT is defined as the Solar Run Time for the project lamp. Charging options 3(b) and 3(c) have not been used in the project.

	c. The project lamp shall be fully recharged from a discharged state after eight hours of charging.	
8	The project design document shall explain the proposed distribution method of the project lamps. It shall also explain how the proposed project activity shall: (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; (b) Encourage the consumers, targeted by the project activity, to use the project lamps and discourage hoarding; (c) 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; (d) Ensure compliance with prevailing regulations pertaining to the use and disposal of batteries.	The activity proposed to distribute the solar lamps through established sales channel or through manufacturer sales channel. (a) Fossil fuel-based lighting is a common practice in Kenya. Also, for all the lamps distributed under the PA, type of baseline lamps and fuel used in the lamps would be recorded at the time of distribution. Only those sales would be recorded as project lamps where the baseline is identified as consumption of fossil fuel for lighting. (b) Consumers are explained about the salient features of the product and are encouraged to use the products through disseminating the knowledge of the savings on fossil fuel. Consumers spend large proportion of their income on fossil fuels and the project lamps helps them avoid this expenditure. So there in a built in incentive for users to use the project lamps. (c) Each project lamps distributed under the project is uniquely identified. For each of the lamps, records pertaining to three or more of the following identifiers: Purchaser name, household address, phone number, bank ID number, national ID number, product unique identifier number, are captured and stored in the online product database. In addition, each of the lamp distributed under the project would be physically marked as project lamp. A carbon title transfer form will be signed by each user, which would ensure that all carbon title is transferred to the project implementer.

		(d) There are no prevalent regulations in Kenya. However, the project implementer would follow any regulations that come up during the crediting period of the PA.
9	The project design document shall include the minimum requirements for the design specifications of project lamps including the following specifications: (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, Lithium-iron-phosphate, etc.), nominal voltage, and rated capacity of the batteries (in Ampere hours); (e) Type of charge controller (e.g. active or passive); (f) Autonomous time and DBT; (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).	All the requisite details for each model of the solar lamp have been mentioned in this VCS PD.

Option 2:	
Project lamps are assumed to operate for up to seven years after distribution to end users, and thus emission reductions can be claimed for up to seven years per project lamp, if all of the following conditions are met: (a) Unless specified otherwise in this document, the currently-applicable requirements to meet the Lighting Global Minimum Quality Standards at the time of project application shall be met by project lamps based on IEC/TS 62257-9-5 and IEC 60529, or an equivalent national standard, or the approved norms indicated in paragraph 15(h); (b) At a minimum, project lamps must be certified by their manufacturer to have a useful operational life of 10,000 hours. Within this time span, the relative luminous flux shall not decrease by more than 30 per cent as per equation (1). Such claims shall be confirmed by a third-party testing organization using an applicable standard and testing protocol. As an alternative to long-term measurement of light output over the full lifetime of the lamp, a shortened measurement period of 2,000 hours may be chosen. If a 2,000 hour test period is used, the relative luminous flux shall not decrease by more than 15 per cent during the 2,000 hours of continuous operation. If the average life value is not available ex ante, it shall be made available for verification.	Project lamps meets all the conditions to meet the sever years of crediting period as mentioned below: 1. The project lamps meet the Lighting Global minimum Quality Standards based on IEC/TS 62257-9-5 and IEC 60529. 2. The project lamps are certified with useful operational life of more than 10,000 hours. Additionally, shortened measurement of 2,000 hours have less than 5% decrease in luminous flux (which is less than 15% as per requirement). The third-party testing certificate is also provided for the models included in this project. If any new product models are implemented during the crediting period all the required criteria will be met which can be verified at the time of verification.
The project lamps use a replaceable, rechargeable battery. In addition, there must be documented measures in place to ensure that lamp owners have access to replacement batteries of comparable quality	The project lamps uses replaceable and rechargeable battery. The project activity also provides servicing support and access to battery replacement of the same quality when requested by lamp owners.
With regard to physical ingress and water protection, mechanical durability, and the quality of workmanship the project lamps shall achieve a minimum level of protection, based on the type of lamp, in accordance with Lighting Global Minimum Quality Standards, IEC/TS 62257-9-5 and IEC 60529, or an equivalent national	Physical protections standards are followed in accordance with Lighting Global Minimum Quality Standards against ingress, rain, water protection, quality of workmanship etc.

standard, or the approved norms indicated in paragraph 15;	
Compliance with the technical requirements in paragraph 18 are confirmed by a third-party testing organization based on appropriately sampled (random or market-selected) tests of project lamps using applicable national standards where such are available, or alternatively, the standards or test protocols indicated in paragraph 15 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 such as ISO/IEC 17025. If the testing results are not available ex ante, they shall be made available at project verification;	Technical requirements in paragraph 18 of the methodology AMS III.A.R v5 is met and the third party testing results are provided. The samples for the tests are part of the quality check of the product where the tests are conducted on a random basis and at different environmental settings conducted in a laboratory meeting all the relevant international standards.
Project lamps shall be marked for clear, unique identification to associate them with each unique CDM project. The method to meet this requirement includes, but is not limited to, the following: (i) Permanent marking of CDM project number and name on each of the project lamps along with other specifications; (ii) Marking using special codes, for example each project is permanently marked 'for CDM project, not for sale/resale' followed by project specific marking/labelling; (iii) Other forms of identification using communication technologies (e.g. GPS, mobile phone networks) or lease/rental payment.	Project lamps can be identified with the marking of the CDM project number in the device. Additionally, as all the lamps GPS locations, lease/rental payment or full address can be tracked from the MEC Credit Tracker systems.

VMR0006 Methodology for Installation of High Efficiency Firewood Cookstoves – version 1.1

Fulfilment of VMR0006 Applicability criteria:

S.No.	Applicability Condition	Justification of applicability
1	Project activities (PA) shall be implemented in domestic premises or in community-based kitchen	The project activities involves deployment of ICS only in households i.e domestic premises.
2	The project stove is a single pot or multi pot portable or an in-situ cookstove using only woody biomass;	The project stoves are single pot or multi pot devices and are using only woody biomass/charcoal.

3	Project stoves to be implemented shall have specified high-power thermal efficiency of at least 25%; and	All the project stoves have thermal efficiency of more than 25%
4	Both 'Projects' and 'Large Projects' can use the methodology	Each project activity will be Projects
5	Non-renewable biomass has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports or statistics; and	Several studies have highlighted the pace of decline of natural forest in Kenya since 1960. The area under population has increased 4 times in the period of 80 years and this in turn has affected the environment. The forest ecosystems, which occupied 30% of the total surface of the country in 1930 has been reduced to 8.9% as by the year 2000. Thus it can be concluded that non-renewable biomass is in use in the project region.
6	For the specific case of biomass residues processed as a fuel (e.g. briquettes, wood chips), it shall be demonstrated that: (a) It is produced using exclusively renewable biomass (more than one type of biomass may be used). (b) The consumption of the fuel should be monitored during the crediting period and (c) Energy use for renewable biomass processing (e.g. shredding and compacting in the case of briquetting) may be considered as equivalent to the upstream emissions associated with the processing of the displaced fossil fuel and hence disregarded.	This condition is not relevant for the project activity.
7	The PA shall explain the proposed method for distribution of project devices including the method to avoid double counting of emission reductions such as unique identifications of product and end-user locations (e.g. project logo).	The method of distribution of stoves is described in Section 1.11. Each stove is issued with a unique ID which avoids double counting.
8	The PA shall also explain how the proposed procedures prevent double counting of emission reductions, for example to avoid	A distribution/exclusivity agreement is signed by all manufacturers, distribution partners stating that they will not claim

	that project stove manufacturers, wholesale providers or others claim credit for emission reductions from the project devices.	any emission reductions from the distributed cookstoves.

3.3 Project Boundary

Improved Cookstove

Source		Gas	Included?	Justification/Explanation
Baseline	Emission from use of non-renewable biomass	CO_2	Yes	Primary source of emissions
		CH_4	Yes	Major source
		N_2O	Yes	Major source
		Other	No	Not applicable
Project	Emission from use of non-renewable biomass	CO_2	Yes	Primary source of emissions
		CH_4	Yes	Major source
		N_2O	Yes	Major source
		Other	No	Not applicable

Solar Lighting System

Source		Gas	Included?	Justification/Explanation
Baseline	Combustion of kerosene fuel for lighting	CO_2	Yes	Primary source of emissions
		CH_4	No	Excluded for simplification. Minor source of emissions. Conservative
		N_2O	No	Excluded for simplification. Minor source of emissions. Conservative
		Other	No	Not applicable
Project	Renewable energy source solar lighting systems used for light	CO_2	Yes	Primary source of emissions
		CH_4	No	Excluded for simplification. Minor source of emissions. Conservative
		N_2O	No	Excluded for simplification. Minor source of emissions. Conservative
		Other	No	Not applicable

The map of the project boundary is provided in Section 1.1.

3.4 Baseline Scenario

Baseline scenario for Solar Lamps and methodology AMS-III.AR.: Substituting fossil fuel based lighting with LED/CFL lighting systems — Version 5.0

The project activity involves the introduction of solar lighting systems into households throughout Kenya. Solar lighting systems replace the main baseline fuel, kerosene.

In Kenya, only 19% of the population is connected to the grid, leaving 34M people without access to affordable and reliable electricity.[10] This lack of grid connectivity hinders the productivity as it limits daily activities such as schoolwork, household chores, and business at night or in the early morning. Given the slow rates of electrification coupled with high population growth, the grid supply versus demand crises will only be exacerbated. 92% of rural households rely on kerosene for lighting but it is expensive and takes up a huge proportion of family budgets.[11]

Additionally, as per the lighting Africa research study, commissioned by World Bank & IFC, 83% of the respondents say that Kerosene is the main source of energy. 96% of the overall population uses Kerosene for lighting[12].

The baseline technology uses fossil fuel based lighting i.e Kerosene which will be replaced by renewable technology-solar lighting system.

Upon asking, 82% of the households responded that they do not have any other source or power than Kerosene[13]. The study also points out that due to its wide availability kerosene is the most popular source of power in many businesses, just like in many households. Candles are also used, though to a lesser extent.[14]

Further, the study summarises in the end (page 124 of the study) the key power and Lighting Habits in Kenya:

Kerosene is the most popular source of power for lighting with 96% of households using it as the main power source

Use of light in households starts much later after dark so as to reduce the amount of time the lights are on and thus save on costs

Only a few rooms are lit after dark (often 1 or 2), the longest lit room is the living room – where the majority of family members will gather during the evening, while the least lit is the outside; patio and toilet.

The main problem experienced after dark is the lack of lighting; as a result, other areas of the house and personal development suffer the most

About 7 in every 10 households say their households are poorly lit and introduction of more lights would be the ultimate solution.

[10] https://solar-aid.org/wp-content/uploads/2016/09/Kenya-report-2014-1.pdf

[11] SolarAid Kenya Country Report 2014.

[12] Page 49 of Kenya-off-grid-lighting-market-Quantitative-study

[13] Page 54 of Kenya-off-grid-lighting-market-Quantitative-study

[14] Page 71 of Kenya-off-grid-lighting-market-Quantitative-study

To ensure that the baseline requirements of the methodology are complied with by the project activity, the PP also carried out a baseline survey to determine the baseline at time of project activity inclusion in CDM. This survey was carried out through a random representative approach by considering end-users in all counties where sales were made.

A representative sample survey (90% confidence interval, +/- 10% error margin) was carried out in the project population to determine their pre-project fuel. All respondents said that they used kerosene in wick lamps in the baseline scenario and are not connected to the grid.

A survey was conducted in January 2016 in the project boundary using 90/10-confidence precision for sampling.

Methodology for the sample survey:

The total sample size required to meet (90% confidence interval, +/- 10% error margin) was calculated using http://www.raosoft.com/samplesize.html.

The number of final samples taken will be more than the sample size required (Requirement-68 and Samples considered-70) to meet 90% confidence interval, +/- 10% error margin to cover for contingencies like residents not being in the house, residents not willing to talk etc.

A questionnaire will be prepared for conducting the survey. The questionnaire will include the name of the product owner, address and ask questions on what their baseline fuel was. The questions are designed to make sure that they are not leading and ensure that the respondents are not asked questions with bias.

MEC enumerators will visit the selected households during the day (between 9 AM and 6 PM) to ask them the questions and collect the answers

As an additional measure, since solar sales in this project activity will be made in a phased manner across several counties in Kenya, and to ensure that the baseline requirements of the applied methodology AMS III.AR v5 are met. As part of the monitoring, it will be recorded whether or not households being given the solar lighting system used kerosene in the pre-project scenario. Only those households that used kerosene for lighting in the baseline scenario are included in the project activity for crediting.

Hence, it can be established that for households with solar lighting systems in the proposed project activity, the baseline is use of kerosene.

According to Methodology AMS III.AR v5, the default energy baseline is the use of Kerosene based wick lamps. Thus it has been established that the project lamps would replace the Kerosene based wick lamps and thus the project can use the default baseline option under the methodology.

Baseline scenario for Improved Cookstoves and methodology VMR0006 Methodology for Installation of High Efficiency Firewood Cookstoves – version 1.1

The baseline scenario has been identified as the continuation of the current practice of the preparation of meals, using conventional inefficient stoves. In the baseline scenario, the greenhouse gas emissions are therefore determined based on the amount of energy used by the cooking fuel used in the conventional stove application. The baseline scenarios before the

implementation of this Project activity is the use of non-renewable biomass/Charcoal for cooking in households throughout the project boundary.

The baseline scenario has been identified by applying the procedures stipulated in TOOL30 "Calculation of the fraction of non-renewable biomass". It is assumed that in the absence of the project activity, the baseline scenario would be the use of non-renewable biomass to meet similar thermal energy needs as those provided by the project devices.

3.5 Additionality

Improved cookstoves

The methodology uses activity method for the demonstration of additionality.

Activity Method

Step 1: Regulatory Surplus There is no mandated government programme or policy in host country of this project ensuring the distribution of domestic fuel-efficient cookstoves. The project is not mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework. Households may only participate voluntarily in this project.

It is hereby confirmed that the proposed project is a voluntary coordinated action by MEC.

Step 2: Positive List As per Section 3.2, the project meets the applicability conditions of the methodology which represent the positive list. The project installs the ICS at zero cost to the household and has no other source of revenue other than the sale of GHG credits.

The project is not implemented as part of government schemes or supported by multilateral funds.

Conclusion: As the project fulfils the conditions above, it is deemed additional.

Solar Lighting Systems

The project installs the Solar Lamps at zero cost to the household and has no other source of revenue other than the sale of GHG credits.

The project is not implemented as part of government schemes or supported by multilateral funds.

Conclusion: As the project fulfils the conditions above, it is deemed additional.

3.6 Methodology Deviations

The project does not apply any methodology deviations.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Equation for Improved Cookstove as per VMR0006 version 1.1.

Methodology VMR0006 does not account for baseline emissions separately, but instead quantifies emission reductions as a function of the reduction in the amount of non- renewable biomass fuel consumption in the efficient project stoves as compared to baseline stoves. See section 4.4 below.

Equation for Solar Lamps as per CDM small scale methodology – AMS III.AR, version 5.0

$$DV=FUR\times O\times U\times EF\div 1000\times LF\times n\times NTG \quad \text{Equation (1)}$$

Where:

DV = , Lamp Emission Factor (0.092 t CO2e per project lamp, assumed for ex-ante estimate)

FUR = , Fuel use rate (0.03 liters/hour)

O= , Utilization rate (3.5 hours/day)

U= , Annual utilization (365 days/year)

EF= , Fuel emissions factor (2.4 kgCO2/liter)

LF = , Leakage factor (1.0)

n= , Number of fuel-based lamps replaced per project lamp (1.0, assumed for ex-ante estimate)

NTG = , Net-to-gross adjustment factor (1.0)

$$BEy=DV\times GFy\times DBy \quad \text{Equation (2)}$$

Where:

BE, = , Baseline emissions per project lamp in year y (t CO2e)

GF, = , Grid Factor in year y chosen equal to 1.0 since solar energy is used to charge the solar lamps

DB, =, Dynamic Baseline Factor chosen as equal to 1.0 as per Option 1 given in equation (3) of the methodology

4.2 Project Emissions

Equation for Improved Cookstove as per VMR0006 version 1.1

Methodology VMR0006 does not account for project emissions separately, but instead quantifies emission reductions as a function of the reduction in the amount of non- renewable biomass fuel consumption in the efficient project stoves as compared to baseline stoves. See section 4.4 below.

Equation for Solar Lamps as per CDM small scale methodology – AMS III.AR, version 5.0

Project emissions, PEy = 0 since project lamps have photovoltaic system that are charged using solar energy.

4.3 Leakage

Equation for Improved Cookstove as per VMR0006 version 1.1

Leakage shall be considered as default 0.95 in accordance with section 8.3 of VMR0006.

Equation for Solar Lamps as per CDM small scale methodology – AMS III.AR, version 5.0

Leakage factor is assumed equal to 1.0 as per the methodology.

4.4 Net GHG Emission Reductions and Removals

Equation for Improved Cookstove as per VMR0006

$$ERy = \sum_{i} \sum_{j} ERy,i,j$$

Equation 3

Where:

Parameter	Unit	Type	Value
i	-	-	Indices for the situation where more than one type/model of improved cook stove is introduced to replace three-stone fire
J	-	-	Indices for the situation where there is more than one batch of improved cook stove of type i
ER_y	tCO_{2e}	Calculated	Emission reductions during year y in t CO_2e
$ER_{y,i,j}$	tCO_{2e}	Calculated	Emission reductions by improved cook stove of type i and batch j during year y in t CO_2e

Equation 4

$$ER_{y,i,j} = B_{y,savings,i,j} \times f_{NRB,y} \times NCV_{wood\ fuel} \times \left(EF_{wf,CO2} + EF_{wf,non\ CO2}\right) \times N_{y,i,j} \times 0.95$$

Where:

Parameter	Unit	Type	Value
$B_{y,savings}$	tonnes	Calculated	Quantity of woody biomass that is saved in tonnes per improved cook stove of type i and batch j during year y
$f_{NRB,y}$	-	Fixed	Fraction of woody biomass that can be established as non-renewable biomass
$NCV_{woodfuel}$	TJ/tonne	Fixed	Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0295 TJ/tonne)
$EF_{wf\ CO2}$	tCO2/TJ	Fixed	CO_2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO_2/TJ)
$EF_{wf\ non\text{-}CO2}$	tCO2/TJ	Fixed	Non-CO_2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO_2/TJ)
$N_{y,i,j}$	-	Monitored	Number of improved cook stoves of type i and batch j operating during year y
0.95	-	Fixed	Discount factor to account for leakage

The quantify of woody biomass saved $B_{y,savings,i,j}$ due to implementation of improved cook stoves will be estimated as follows:

$$B_{y,savings,i,j} = B_{old} \times \left(1 - \frac{\eta_{old}}{\eta_{new,i,j}}\right)$$

Equation 5

Where:

Parameter	Unit	Type	Value
B_{old}	tonnes/ household /year	Calculated	Annual quantity of woody biomass that would have been used in the absence of the project activity (in tonnes per device) to generate useful thermal energy equivalent to that provided by the improved cook stove. The value of B_{old} has been sourced from independent third-party baseline surveys. .
n_{old}	%	Fixed	Efficiency of baseline cookstoves
$n_{new,i,j}$	%	Calculated	Efficiency of the improved cook stove type i and batch j determined through water boiling test (WBT).

Efficiency of the improved cookstove will be updated as per equation below:

$$\eta_{new,i,y} = \eta_p \times (DF_n)^{y-1} \times 0.94$$

Equation 6

Where:

Parameter	Unit	Type	Value
n_p	%	Fixed	Efficiency of project stove (fraction) at the start of project activity
$(DF_n)^{y-1}$	-	Fixed	Discount factor to account for efficiency loss of project cookstove per year of operation (fraction). This value may be based on actual monitoring or based on manufacturer's declaration on expected loss in efficiency or through publicly available literature on relevant industry standards. Alternatively default value of 0.99 efficiency loss per year can be considered.
0.94	-	Fixed	Adjustment factor to account for uncertainty related to project cookstove efficiency test.

If project households continue to use baseline cookstoves along with improved cookstoves, B_{old} shall be adjusted ex-post based on the percentage of project households found to continue such practice according to Equation 5 below. For such cases, the quantity of woody biomass saved $B_{y,savings,i.j}$ due to implementation of improved cook stoves shall be calculated using an adjusted value to account for ex-post use of baseline stoves in addition to improved cookstove.

$$B_{old,adjusted} = B_{old} \times \left(1 - \mu_y\right)$$

Equation 7

Where:

Parameter	Unit	Type	Value
$B_{old,adjusted}$	tonnes/ household /year	Calculated	Adjusted B_{old} to account the ex-post usage of firewood in baseline cookstove(s) by project households in addition to improved cookstove (in tonnes per device)
μ_y	-	Monitored	Baseline stove usage factor to account for use of baseline cookstoves along with improved cookstoves.

Sample ex-ante calculations for Improved Cookstoves:

Quantity of woody biomass that is saved in tonnes per improved cook stove of type i and batch j during year y	$B_{y,savings,l,j}$	0.1851	tonnes per stove per year
Fraction of woody biomass that can be established as non-renewable biomass (fNRB)	$f_{NRB,y}$	0.92	-
Net calorific value of the non-renewable woody biomass that is substituted or reduced	$NCV_{woodfuel}$	0.0295	TJ/tonne
CO2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel	$EF_{wf,CO2}$	112	tCO_2/TJ
Non-CO2 emission factor for the use of wood fuel in baseline scenario	$EF_{wf,non\text{-}CO2}$	26.23	tCO_2/TJ
Number of improved cook stoves of type i and batch j operating during year y	$N_{y,i,j}$	1	-
Discount factor to account for leakage	-	0.95	
Annual quantity of woody biomass that would have been used in the absence of the project activity (in tonnes per device) to generate useful thermal energy equivalent to that	B_{old}	0.333333	tonnes per stove per year

provided by the improved cook stove.			
Efficiency of baseline stove	n_{old}	0.2	%
Efficiency of the device of each type i and batch j implemented as part of the project activity	$n_{new,i,j}$	45%	%
Emission reductions	ER_y	0.6599	tCO_{2e}

Emission reductions resulting from 5,000 improved cookstoves in first year = 5,000 * 0.6599 = 3,300 tCO_2e.

Sample ex-ante calculations for Solar Lighting System:

Symbol	Definition	Value	Unit	Source
Ni,a	Number of solar lamps type i	1	Number	To be monitored
DV	Lamp Emission Factor	0.092	t CO2/project lamp	Default as per methodology AMS III.AR v5
GF	Grid Factor	1		Default as per methodology AMS III.AR v5 for the lamps using Solar PV for charging
DB	Dynamic Baseline Factor	1		Default as per methodology AMS III.AR v5in absence of relevant information
BE	Baseline Emissions per Lamp	0.092	tCO2/project lamp	$BE_y = DV \times GF_y \times DB_y$
PE	Project Emissions per lamp	0	tCO2/project lamp	Default as per methodology AMS III.AR v5 for the lamps using Solar PV for charging

OF	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. Assumed to be equal to 100 per cent for years 1, 2	100%		Default as per methodology AMS III.AR for the first two years
ER	Emissions reductions generated by all the proposed lamps in the project activity	0.092		$ER_{y=}\sum_{i\ j} N_{i,j} \times (BE_{y,i} - PE_{y,i,j}) \times (OF_{y,i,j})$

Emission Reductions resulting from 650,000 Solar lighting systems in first year = 59,800 tCO_2e

Table Below provides the Ex-ante calculation (estimate) of net GHG emission reductions and removals:

Year	Estimated baseline emissions or removals (tCO2e)	Estimated project emissions or removals (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
Year 1	63,100	0	0	63,100
Year 2	66,400	0	0	66,400
Year 3	69,700	0	0	69,700
Year 4	109,300	0	0	109,300
Year 5	109,300	0	0	109,300
Year 6	109,300	0	0	109,300
Year 7	109,300	0	0	109,300
Total	**636,399**	0	0	**636,399**

5 MONITORING

5.1 Data and Parameters Available at Validation

Improved Cookstove

Data / Parameter	B_{old}
Data unit	tonne/annum
Description	Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices
Source of data	Methodology default
Value applied	0.3333 tonnes per household per annum (charcoal)
Justification of choice of data or description of measurement methods and procedures applied	Methodology default
Purpose of Data	Calculation of emission reductions.
Comments	B_{old} will remain fixed for the entire crediting period.

Data / Parameter	n_p
Data unit	Fraction
Description	Efficiency of project stove at the start of project activity
Source of data	Manufacturer's Specification
Value applied	45%
Justification of choice of data or description of measurement methods and procedures applied	This data is fixed ex-ante as per applied methodology VMR0006 version 1.1.
Purpose of Data	Calculation of n_{new}
Comments	N/A

Data / Parameter	Life Span
Data unit	Years
Description	State the operating lifetime of project device for projects opting Equation 6 (above) for updating project stove efficiency during project crediting period.
Source of data	Manufacturer's specifications
Value applied	10 years
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	N/A
Comments	N/A

Data / Parameter	$NCV_{biomass}$
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass charcoal
Source of data	IPCC default for charcoal
Value applied	0.0295 TJ/tonne
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of emission reductions
Comments	N/A

Data / Parameter	$EF_{wf\ CO2}$
Data unit	tCO2/TJ
Description	CO2 emission factor for the use of wood fuel in baseline scenario
Source of data	IPCC

Value applied	112 tCO2/TJ
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of emission reductions
Comments	N/A

Data / Parameter	$EF_{\text{wf non-CO2}}$
Data unit	tCO2/TJ
Description	Non-CO2 emission factor for the use of wood fuel in baseline scenario
Source of data	IPCC
Value applied	26.23 tCO2/TJ
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of emission reductions
Comments	N/A

Data / Parameter	LF
Data unit	Fraction
Description	Leakage factor applied to account for increase in NRB use outside the project boundary
Source of data	Default as per VMR0006
Value applied	0.95
Justification of choice of data or description of measurement methods and procedures applied	Default value allowed by VMR0006

Purpose of Data	Calculation of emission reductions
Comments	N/A

Data / Parameter	$f_{NRB,y}$
Data unit	Fraction
Description	Fraction of woody biomass that can be established as non-renewable biomass
Source of data	CDM Tool 30
Value applied	0.92
Justification of choice of data or description of measurement methods and procedures applied	-
Purpose of Data	Calculation of emission reductions
Comments	N/A

Solar Lighting System

NONE

5.2 Data and Parameters Monitored

Improved Cookstove

Data / Parameter	$N_{y,i,j}$
Data unit	Number
Description	Number of project devices of type i and batch j operating during year y
Source of data	Monitoring surveys
Description of measurement methods and procedures to be applied	Measured directly from Project database. A discount shall be applied based on the percentage of devices that are operational during the monitoring period, as determined by the sample survey. For instance, if survey results show that 10% of the devices are nonoperating, an adjustment factor of 0.9 shall be applied

	to number of project devices commissioned in a particular batch. Separate samples shall be taken for each batch. Simple random sampling approach will be used in sampling surveys. Minimum sample size will be determined as per the following guidelines: Project target population < 300: Minimum sample size 30 Project target population 300 – 1000: Minimum sample size 10% of group size Project target population > 1000: Minimum sample size 100
Frequency of monitoring/recording	Atleast once every two years
Value applied	5,000 (Year-1)
Monitoring equipment	Surveys
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of emission reductions.
Calculation method	N/A
Comments	Proportion of operational stoves obtained from the survey is multiplied by the total commissioned stoves to arrive at this value.

Data / Parameter	Date of commissioning of batch j
Data unit	Date
Description	To establish the date of commissioning, the devices will be grouped in "batches" and the latest date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch.
Source of data	Internal records
Description of measurement methods and procedures to be applied	Recorded during distribution of last device in batch.
Frequency of monitoring/recording	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch.

Value applied	N/A
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of emission reductions.
Calculation method	N/A
Comments	N/A

Data / Parameter	Date of commissioning of project stove i
Data unit	Date
Description	Actual date of commissioning of the project device.
Source of data	Internal records
Description of measurement methods and procedures to be applied	Recorded during distribution of each device.
Frequency of monitoring/recording	Fixed and recorded at the time of commissioning/distribution.
Value applied	N/A
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of emission reductions.
Calculation method	N/A
Comments	N/A

Data / Parameter	n_{old}
Data unit	Fraction

Description	Efficiency of baseline stove
Source of data	Default value as specified in VMR0006 methodology
Description of measurement methods and procedures to be applied	If the device is a three stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney, a default value of 0.1 is used as per the applied methodology; for other types of devices, a default value of 0.2 is used.
Frequency of monitoring/recording	Fixed for each individual household at first HH visit
Value applied	0.1 or 0.2
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of emission reductions.
Calculation method	N/A
Comments	Once determined, n_{old} will remain fixed for the entire crediting period.

Data / Parameter	$n_{new,i,j}$
Data unit	Fraction
Description	Efficiency of the device of each type i and batch j
Source of data	This will be determined each year as per equation (6) above
Description of measurement methods and procedures to be applied	Efficiency of the improved cookstoves will be estimated each year using equation (6) above where loss in efficiency per year is calculated, and therefore no direct measurement is involved.
Frequency of monitoring/recording	Annually
Value applied	N/A
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A

Purpose of data	Calculation of emission reductions
Calculation method	As per equation (6) above
Comments	N/A

Data / Parameter	μy
Data unit	Fraction
Description	Adjustment to account for any continued use of pre-project devices during the year y
Source of data	Monitoring
Description of measurement methods and procedures to be applied	Surveys will be conducted to record the average continued operation of baseline cookstoves in a sample of households. The surveys will be designed to capture the cooking habits and stove usage of households in the region, including quantification of use of baseline cookstoves, by formulating questions and/or collecting evidences to determine the frequency of usage of both the improved cookstoves and baseline cookstoves. For example, if there were 3 baseline cookstoves in a household and it was determined during the survey that use of one of them continues during the crediting period then a conservative adjustment factor of 0.33 is applied to Bold. Another example would be the case where there was only one baseline cookstove per household and its use during the project period continues along with the improved cookstove to meet 25% of the cooking needs of the household in which case the adjustment factor will be 0.25. Another example would be to interview the household and have them estimate the time of usage of the baseline cookstoves and improved cookstove on an average day. For example, if a household reports to be preparing 3 meals in a day using 35 minutes each, out of which one meal is prepared on the baseline stove, then cooking time on secondary stove and project stove would be 0.33 and 0.66 respectively. Simple random sampling approach will be used in sampling surveys. Minimum sample size will be determined as per the following guidelines: Project target population < 300: Minimum sample size 30

	Project target population 300 – 1000: Minimum sample size 10% of group size Project target population > 1000: Minimum sample size 100
Frequency of monitoring/recording	Atleast once every two years
Value applied	N/A
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of emission reductions
Calculation method	N/A
Comments	N/A

Solar Lighting System

Data / Parameter	$N_{i,j}$
Data unit	Number of lights
Description	Number of lights distributed to end users, i, type, j
Source of data	Internal records
Description of measurement methods and procedures to be applied	Recorded during distribution of each device.
Frequency of monitoring/recording	Once at time of distribution of project devices
Value applied	650,000 (Year-1)
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of emission reductions.
Calculation method	N/A

Comments	Internal records will unambiguously identify each recipient of a project lamp. Project lamps shall be marked for clear, unique identification to associate them with VERRA project.

Data / Parameter	GF_y
Data unit	Fraction
Description	Grid factor in year y
Source of data	AMS III.AR, version 05.0
Description of measurement methods and procedures to be applied	In line with para 27 of the methodology, this parameter has been considered equal to 1.0 as charging option deployed is the Solar Charging.
Frequency of monitoring/recording	Default value
Value applied	1
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of baseline emissions.
Calculation method	N/A
Comments	N/A

Data / Parameter	DB_y
Data unit	Fraction
Description	Dynamic baseline factor in year y
Source of data	AMS III.AR, version 05.0
Description of measurement methods and procedures to be applied	Option 1: default of 1.0 in the absence of relevant information Option 2: value of 1.0+FFg where FFg is the documented national growth rate of kerosene fuel use in lighting from the preceding

	years (use the most recent available data for a three or five years average (fraction))
Frequency of monitoring/recording	Default value
Value applied	1 (ex-ante)
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of baseline emissions.
Calculation method	N/A
Comments	N/A

Data / Parameter	$OF_{y\ i,j}$
Data unit	Fraction
Description	The percentage of project lamps distributed to end users that are operating and in service
Source of data	AMS III.AR, version 05.0
Description of measurement methods and procedures to be applied	See comments below.
Frequency of monitoring/recording	Monitoring survey to be conducted in 3rd year of crediting period.
Value applied	100% for years 1, 2 and 3 Based on monitoring surveys for years 4, 5, 6 and 7
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of emission reductions.
Calculation method	N/A

Comments	The result of a sampling survey of the first batch will be used as a proxy to subsequent batches (e.g. the operating rate in year 4 for the project lamps installed in year 1 will be used for the operating rate in year 5 for the project lamps installed in year 2. Ex-post monitoring surveys to determine percentage of project lamps distributed to end users that are operating and in service shall be conducted during the third year of the crediting period. While the percentage of project lamps that are operating and in service can be assumed to equal 100 per cent in year 1, 2, and 3, the result of ex post monitoring survey undertaken during the third year shall be used in years 4, 5, 6 and 7.

Data / Parameter	Baseline fuel in lamps
Data unit	Fuel type consumed in the baseline lamps
Description	This parameter would capture the fuel type used in baseline lamps that are getting replaced with the project lamps. Project lamps will only be distributed to the households that are using fossil fuel for lighting in the baseline lamps
Source of data	Internal records
Description of measurement methods and procedures to be applied	Recorded during distribution of project devices
Frequency of monitoring/recording	Once at time of distribution of project devices
Value applied	100% fossil fuel
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of baseline emissions.
Calculation method	N/A
Comments	This parameter not used directly in calculation of baseline emissions. A particular project lamp would be counted only if fossil fuel based baseline lamp is getting replaced as monitored by this parameter.

Data / Parameter	DV
Data unit	tCO2
Description	Annual emission factor for the baseline lamp
Source of data	Internal records
Description of measurement methods and procedures to be applied	Number of baseline lamps replaced per project lamp is recorded during distribution of project devices
Frequency of monitoring/recording	Once at time of distribution of project devices
Value applied	0.092 (for ex-ante estimation only)
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of baseline emissions
Calculation method	Based on equation (1) in section 4.1 above.
Comments	This is based on calculation provided in the methodology based on fuel use rate (0.03 litres/hour), Utilization Rate (3.5 hours/day), Annual Utilization (365 days/year), Fuel Emission Factor (2.4 kgCO2/litre), Leakage Factor (1), Number of lamps replaced per project lamp (1.0 or more) & Net to gross adjustment factor of 1.0. Number of baseline lamps replaced per project lamp will be monitored during distribution of project devices and value of 'DV' will be calculated accordingly.

5.3 Monitoring Plan

Monitoring for project activity is described below. The monitoring activity provides a framework for project preparation and monitoring processes that will be undertaken at the project level.

This schedule takes into account the key parameters that are needed during the crediting periods of the project. All required monitoring and documentation would be implemented, reported, consolidated and managed by the PP or a qualified expert partner to meet verification requirements. Monitored data will be stored in a suite of monitoring databases. These will be updated each monitoring period:

The methods for measuring, recording, storing, aggregating, collating and reporting data and parameters

1. PP keeps a record of all the CEPs it installs in the MEC Credit Tracker Platform. The record includes the name, date of installation, model of CEP and ID number of the user and mobile number of the user. All records are screened by the PP and crosschecked with the on-ground records to confirm the installation record is authentic and no double counting occurs.
2. The values of the two emission reduction parameters required for ex-post ER calculation (efficiency of CEPs (nnew,i,j), number of CEPs still operating are found from sampling of CEP installations
3. The records kept in the MEC Credit Tracker Platform relate to paper copies of title transfer agreements received from individual households.

The organizational structure, responsibilities and competencies of the personnel that will be carrying out monitoring activities

PP establishes a marketing and lending program for CEPs. This program engages its own staff, as well as local distributors, technicians, and other service providers to effectively market the Clean Energy Products (CEPs) to clients (households). PP followed the monitoring plan and procedures to identify each CEP sold during the project so that the appropriate amount of emissions reductions can be claimed.

Within MEC, the person responsible for carrying out the carbon tasks is the Carbon Operations Manager. This individual is trained using the MEC user manual, which specifies how to complete the inclusion process. This individual has sufficient experience with CDM projects and terminology to successfully carry out the duties. The PP has ensured that Carbon Operations Manager received relevant training and has all necessary competencies to accurately assess and oversee the inclusion process, including the following:

- Knowledgeable on issues relating to Additionality
- Adept at ensuring protocol are followed to prevent double counting

Sampling Approach

The sampling approaches described above follow the CDM Standards for sampling.

The Project proponent will coordinate all ex-post monitoring activities in the project activity. The PP is ultimately responsible for implementing the monitoring plan, ensuring the quality of data obtained and the use of this data for emissions reduction calculations. However, the actual field measurements to be conducted during monitoring (e.g. testing of ICS selected during sampling) will most likely be performed by third parties contracted to the PP. In the case of using contractors, however, the PP will still be responsible for setting the procedures and providing oversight and training to the contractors. The choice between conducting the actual monitoring activities itself or employing another organization (for example, local marketing firm, university etc) will depend on locational, operational factors and financial factors. In any case, a local partner will be important for providing local insight in questionnaire design, interview technique and for gaining physical access to project beneficiaries to obtain accurate results during monitoring. Monitoring shall be carried out by the operating entity of the project activity according

to the procedures and monitoring framework established below and will be submitted to the managing entity. The PP will store the data in an electronic database.

Primary data will be stored by the implementing entities/operators: The MEC Credit Tracker Platform is used to keep detailed records of all installations under the project. Each installation is monitored annually to check usage status. The Project shall monitor a representative sample of households that have received both stoves and water technologies. All monitoring records are maintained in the Credit Tracker Platform.

1. The PP maintains in the Credit Tracker Platform a record of all clean energy products that are installed

2. The emissions parameters required for ex-post management are also maintained in the Credit Tracker Platform. These include the number of solar lighting systems still in operation, and then performance of the solar lighting systems. These parameters are determined through a sampling study as described above.

3. The PP uses the Credit Tracker Platform to cross-check the new records with the existing Platform in order to confirm that the installation record is authentic and that no double-counting occurs.

4. The electronic files holding installation records are backed up on the Internet, reducing risk of any loss of data.

5. All monitored data required for verification and issuance will be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later. The unique system ID number which is linked to a gps location and/or verified address eliminates any risk of double-counting between project activities

Quality Assurance/Quality control

PP will undertake the following strategies, tailoring the specific approach to the local circumstances:

1. Ensuring end user awareness. At the time of sale, the CEP customer is made aware that they are required to participate in monitoring activities. This will be via training sales personnel to explain the importance of monitoring to each customer, and during regularly scheduled microfinance group meetings for end-users.

2. Questionnaire design. The design of the questionnaire will ensure that the questions are non-intrusive and easy to understand for both the interviewee and interviewer.

3. Drawing on local knowledge. The local contractors to be hired by the PP in each region will play an important role in tailoring the approach to suit local circumstances. For example, in some instances, it may be essential for a local person to conduct the interview in order to obtain accurate results.

4. Quality of contractors. Any third parties hired by the PP to carry out sampling will be required to demonstrate a high level of cultural awareness, local language skills and appropriate experience with data entry and data management. PP will ensure that contractors are adequately trained for the tasks they are contracted for (eg. carrying out of WBTs in line with a methodology supported by an appropriate international body such as PCIA). Training will

also be provided on how to deal with non-responses, refusals and other problems should these occur.