Programme of activities design document form
(Version 09.0)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION	
Title of the PoA	MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India
Version number of the PoA-DD	10
Completion date of the PoA-DD	18/04/2021
Coordinating/managing entity	Micro Energy Credits Corporation Private Limited
Host Parties	India
Applied methodologies and standardized baselines	AMS-III.A.R "Substituting fossil fuel-based lighting with LED/CFL lighting systems" (Version 6) AMS-II.G "Energy efficiency measures in thermal applications of non-renewable biomass" (Version 11.1) AMS III.AV "Low greenhouse gas-emitting safe drinking water production systems" (Version 08) Standardized baseline(s) – N.A.
Sectoral scopes	1: Energy industries (renewable - / non-renewable sources), 3: Energy demand

PART I. Programme of activities (PoA)

SECTION A. Description of PoA

A.1. Purpose and general description of PoA

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1. General operating and implementing framework of PoA

The purpose of this small scale Programme of Activities ("SSC-PoA") is the dissemination of clean energy products in India. The Programme will promote three broad categories of Clean Energy Products ("CEP"):

- Efficient Stoves
- Water Purifiers
- Solar Electric Lights

CEPs disseminated under this PoA reduce carbon emissions by reducing the amount of fuel required to cook, boil water for health or provide light for low-income households in India that typically rely upon kerosene, non-renewable woody biomass, and charcoal for fuel.

MicroEnergy Credits is the Coordinating Entity that will implement the "Microfinance for Clean Energy Product Lines" Programme of Activities, subsequently referred to as the PoA.

MicroEnergy Credits is a social enterprise that helps microentrepreneurs and low income households in developing countries to invest in clean energy through their local microfinance institution. Under the PoA, MicroEnergy Credits will develop projects with microfinance institutions[1] and clean product suppliers to market, distribute, and finance clean energy products to these microentrepreneurs and low income and households.

Many microfinance clients suffer from energy poverty, impacting their health, their ability to educate their children, the gender balance of their household and their ability to save and accumulate wealth. Presently available clean and low carbon technologies can both improve their quality of life and reduce carbon emissions. Many microentrepreneurs and households lack access to clean energy technologies due to economic barriers and market inefficiencies including:

- Lack of access to upfront finance
- Lack of awareness of clean energy products and their value proposition
- Lack of supply of products in the local market place
- Lack of aftersales service and maintenance
- Inability to afford the clean energy product

MicroEnergy Credits addresses these barriers by working with microfinance institutions to market affordable, reliable clean energy products right to doorstep of the microentrepreneurs. Microfinance institutions are well positioned to provide clean energy to their clients because they offer:

- Awareness: Microfinance Institutions (MFIs) offer education in addition to finance with frequent touch points
- Finance: Ability to finance upfront costs
- Local knowledge: MFIs are typically local organizations that understand local energy resources and needs
- Longevity: Most microfinance clients remain bank clients for many years or decades

[1] For the purposes of this document, a "microfinance institution" is defined as a local institution that provides financial services to low-income households.

Historically a very small percentage of microfinance institutions have offered microfinance for low-carbon technologies due to economic barriers. MicroEnergy Credits has developed a program that enables Microfinance institutions to overcome these barriers. Obstacles that have prevented Microfinance institutions from starting clean energy product lines include:

1. High cost of hiring additional staff
2. Expense of marketing and awareness building
3. Steep learning curve to understand products and technologies
4. Lack of partnerships with local suppliers and distributors.
5. Reputational risk
6. Scarcity of on-lending funds
7. Difficulty developing financial products for consumptive loans

MicroEnergy Credits uses carbon finance to overcome all of these obstacles, enabling microentrepreneurs to invest in clean energy products. First, MicroEnergy Credits works with the microfinance institution to develop an attractive clean energy product offering to its microfinance client base, addressing each of the barriers such as education, price, finance, and supply and aftersales service. Second, MicroEnergy Credits trains the microfinance institution to implement the clean energy-lending program. This includes business planning, capacity building, and implementation of marketing, education and supply chain processes. Third, MicroEnergy Credits implements 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. Finally, the carbon finance is used to expand and sustain the clean energy program through:

1. Client education and marketing
2. Internal training and capacity building
3. On-lending funds to local SMEs producing the clean energy systems.
4. Aftersales service and maintenance
5. Lowering the interest or principal cost to the client.

MicroEnergy Credits is the coordinating/managing entity (“CME”) for this SSC-PoA. As such it will coordinate the efforts of different Partner Organizations (“PO”) to disseminate clean energy products. POs will act as SSC-CPA Activity Implementers/Operators. In the context of this PoA, POs will not become project participants, as per Annex 38 to EB55 Report, paragraph 8, “the operators of individual CPAs are not required to be project participants”. The inclusion of new CPAs to the PoA will be requested by the CME to the Designated Operational Entity (DOE) during the lifetime of the PoA.

The POs will operate clean energy lending units that disseminate CEPs to local households. They will keep track of the list of CEP installations pertaining to the PoA in the electronic Credit Tracker Platform.

When purchasing a CEP the user will have signed a title transfer with the PO (the “Title Transfer”). The title transfer will assert the legal rights of the carbon credits generated by the CEP to the PO. Contracts between the PO and CME subsequently transfer the carbon credit rights to the CME. Accordingly the POs will use the CER proceeds to expand and sustain the CEP program including providing some or all of the following: education, training, linkages to local product suppliers, aftersales service and maintenance, and reducing the cost of the CEP to the client.

Based on the title transfer, the POs will transfer information for each CEP to the Credit Tracker Platform, which will ensure that no CEP is counted more than once under the SSC-CPAs or the PoA. The Credit Tracker Platform will also serve as the basis for the calculation of the CERs.

The monitoring plan will be validated and verified by a Designated Operational Entity (“DOE”). CEP suppliers will have to be educated by the PO, ensuring that stakeholders involved in the implementation of the SSC-CPA are aware and have agreed that their activity is being subscribed to the SSC-PoA.

Organizational chart showing the stakeholders involved in the PoA:

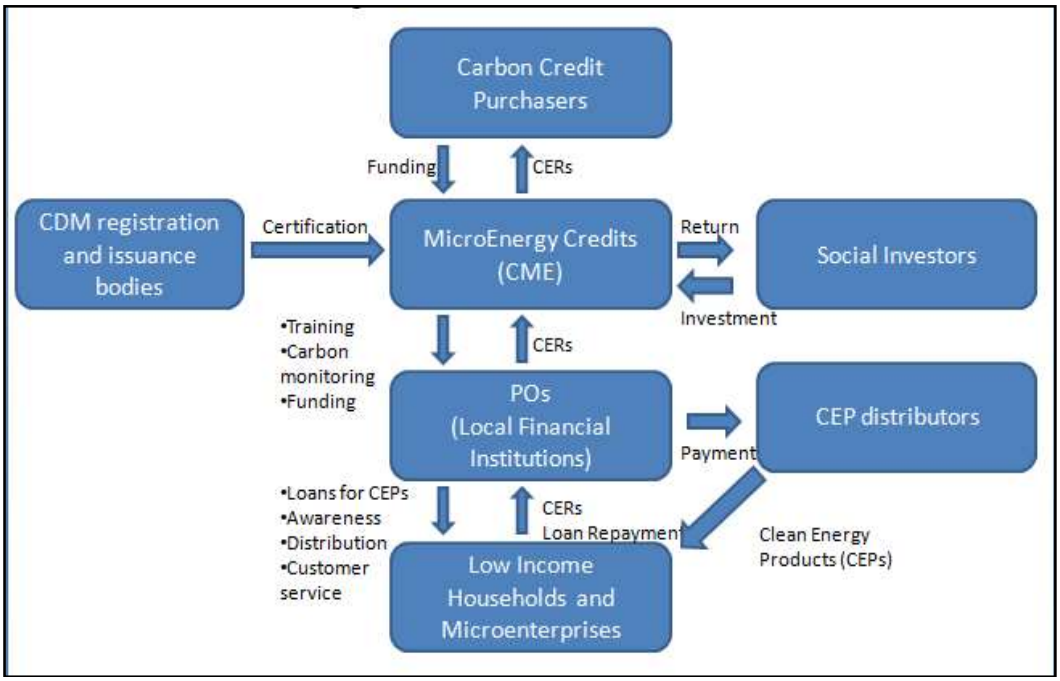

Figure A.1: Relationship between stakeholders in PoA

2. Policy/measure or stated goal of the PoA

The goal of the PoA is to use carbon finance to expand access to clean energy to millions of micro-entrepreneurs and low-income households, enabling:

- Households to achieve critical development improvements (health, education, economic status)
- Households to benefit from savings on energy expenditures
- Micro-entrepreneurs to have the electricity and other resources they need to expand their income-generating activities
- Reduced environmental impacts from carbon emissions and deforestation
- Expansion of the clean energy product supply chain to serve poor, rural populations

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

The PoA is a purely voluntary activity by the coordinating entity MicroEnergy Credits, a private entity. MicroEnergy Credits is under no requirements to complete such programs. There are no laws/policies mandating the adoption and/or dissemination of ICS in any of the countries within the PoA boundary. Therefore, the proposed PoA is a voluntary action by the CME and the participating POs as CPA-developers.

Sustainable Development Benefits:

Impact on the Environment

- Climate Change: The new clean energy products will increase energy efficiency of the households in India. The stoves reduce the amount of fuel required to cook, the solar lighting reduces the need to kerosene lamps in the house, and the water purifier reduces the need for fuel since households no longer need to boil water to ensure it is safe. This will result in

less Greenhouse gas emissions from burning non-renewable biomass and will have a positive effect on climate change.

- Local Environment: Through the introduction of the more efficient stoves, solar lighting, and water purification technologies this PoA will result in the reduction of pollution caused by particulate matter released during the burning of traditional fuels (biomass and charcoal).
- Natural Resource Use: The use of wood to heat homes and cook food causes pressure on the forests of India. The introduction of more efficient stoves and better water purifier will result in a reduction in deforestation as reliance on non-renewable fuel sources is reduced.

Impact on Society

- Poverty Alleviation: MicroEnergy Credits utilizes carbon credits to help provide low-cost affordable micro finance to project participants so they can purchase modern energy systems that can reduce monthly energy expenditures, improve health conditions, and increase household productivity. This will ensure that less money is spent on fuel and more money can be saved for other uses.

- Equity: This programme allows for low-income households to afford these desired clean energy products which increase fuel savings and means less money is spent on fuel each year and there is more money to be spent on other things.

- Health: The new stoves reduce particulate matter emissions and families no longer inhale indoor smoke that causes respiratory illnesses and the risk of burns from falling into fires is reduced. The solar lighting technology will decrease household consumption of kerosene which will reduce smoke inside households. These will have a positive effect on the health of the project participants who will inhale less smoke.

- Improving Ecological Education: The implementation of this project increases awareness amongst project participants about deforestation and climate change. MicroEnergy Credits uses carbon finance to expand and sustain the clean energy program, which includes client education, and marketing and internal training and capacity building amongst other things.

Impact on Economy and Technology

- Efficient Resource Utilization: Setting up a Micro Finance Institution to provide Clean Energy Products requires a lot of resources. Micro Energy Credits is making use of carbon finance to help alleviate the costs of client education and marketing, internal training and capacity building, lending funds to local small enterprises producing the Clean Energy Systems, aftersales service and maintenance, and lower the interest or principal cost to the client. This means that less of the cost of providing this service is passed on to the project participants who can enjoy an efficient micro-finance service with reduced cost for the clean energy products.

- Transfer of Technology and Knowhow: The installation of Clean Energy Products ("CEP") will be done with local people who will learn about how the technology works. In some cases the assembly of the stove will also be done by local people who will learn about the stoves.

A.2. Physical/geographical boundary of PoA

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The geographical boundary for the PoA is defined by the national boundary of India.

In each CPA, project-specific boundaries may be defined by the locations[2] of each user-level clean energy product installation, which will be recorded in MEC's Credit Tracker Platform.

[2] Location is defined by one of the following sets of information:

A.3. Technologies/measures

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The technologies that will be employed by the SSC-CPAs are all small-scale, low cost clean energy products that meet the basic needs of India's low income demographic. In general, these technologies are deployed in homes and small businesses, as well as, to a small degree, local institutions such as schools, clinics, and microfinance institution branches. All of the technologies employed by the CPAs provide development benefits as well as environmental benefits.

Specifically, each SSC-CPA will employ lighting, safe water and heating technologies from one or more of the following categories:

Solar electric/photovoltaic systems

- SSC-CPAs will deploy solar electric/photovoltaic systems that provide a renewable source of lighting by replacing fossil-fuel based lighting as requested by AMS III.AR, ver. 6.
- For example, solar lighting systems disseminated under the PoA will be the d.light S series solar lamps (e.g. S20, S320, S100) and Sunking Home lighting system series (e.g. Sunking HLS 12)).
- Design of solar lighting systems may develop over time, however it will be ensured that they meet all methodological requirements.

Some of the models that will be distributed, including their technical specifications[3] are –

1) d. Light S300
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
Lifetime of module – 15 years
Battery lifetime – 5 years
Electronics lifetime – 5 years
Physical protection against environmental factors - YES

2) Sunking Home 120
Luminous intensity (Lumens): 590
Solar Panel: 12 Watt
Solar Panel Lifetime: 15 years
Lifetime of product (in years) –
Module – 15 years
Battery – 8 years

A. Precise GPS location of the household that purchases/installs clean energy product.
B. GPS location within one mile of the household and credible address for household.
C. Three of the following identifiers: Purchaser name, household address, phone number, bank ID number, national ID number, product unique identifier number, household GPS location, or GPS location within one mile of household.

[3] As per manufacturer's product information sheet

Electronics – 5 years
Wattage – 5.28 W
Battery – Li-Fe-PO4, 12000mAh, 3.3 V
Rated Lamp life – 10,000 hours
Warranty – 2 Years DBT/SRT – 3.5 hours (Default)
Physical protection against environmental factors - YES

There could be various other solar lighting models distributed under this PoA. All products contain a solar panel, lights as shown in the photograph –

Efficient cookstoves:

- SSC-CPAs will deploy improved cook stoves (ICS) reaching a specified efficiency of at least 20% at the time of CPA inclusion, as also requested by AMS II.G., ver. 11.1. The efficiency of the ICS shall be obtained from either the manufacturer specification or as certified by a national standards body or a certifying agent recognized by it.
- For example, one improved cook stove disseminated under the PoA will be the Powergram, a portable stove made of durable components. The initial model has a specified thermal efficiency of 40%. The single burner design ensures high efficiency.
- Design of the Powergram may develop over time, however it will be ensured that they meet all methodological requirements.

Some of the models that will be distributed, including their technical specifications[4] are –Powergram Stove:

Material : Stainless steel

Stove Body Size – 46.99 x 22 x 22 cm
Net weight: 10 kg
Thermal efficiency: 40%

Water purifiers:

- SSC-CPAs will deploy Low greenhouse gas-emitting safe drinking water production systems to achieve water quality defined in a relevant national standard or guideline for drinking water quality, as also request by AMS III.AV ver. 8.
- For example, one water purification system disseminated under the PoA will be the Pureit in-home purification system and Germkill battery kit. The performance of Pureit in removing or killing viruses, bacteria and parasites is comparable to that of boiling water (standard boiling time), and therefore water treated by Pureit can be considered as safe as boiled water. The microbiological quality of Pureit treated water is within limits of drinking water guidelines specified by the most stringent international standards like the United States Environmental Protection Agency (EPA) and the World Health Organization (WHO).
- Community based water purifiers will also be disseminated under the PoA
- Design of the Water purifiers may develop over time, however it will be ensured that they meet all methodological requirements.

HUL Pureit classic 23 L:

This is a large size purifier with a 23-litre capacity. It includes an activated carbon trap that removes harmful pesticides and undesirable odor. It also has an auto shut-off feature that ensures water purity. In the absence of the project activity, the households would have continued to boil water for drinking purposes. The technical specifications[5] of the water purifier are as follows -

[4] As per manufacturer's product information sheet

[5]Manufacturer's certificate on specifications

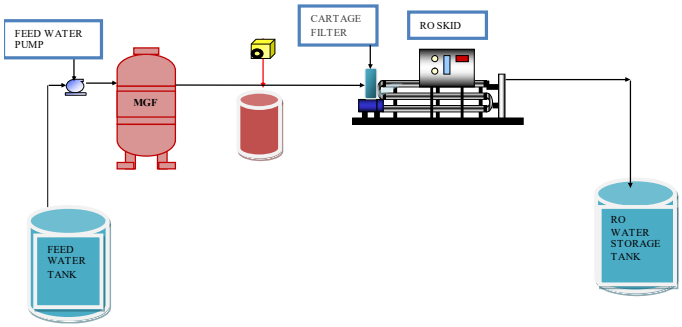
Size – 61 cm X 29 cm X 21 cm

Net weight: 4.1 kg

Life span under standard use conditions: The life span of the germ kill kit used by the purifier has a capacity of 1500 l after which it must be replaced. The life of the kit therefore depends on how much water is purified by the user every day.

ION Exchange – 200 LPH model:

This model will be specifically deployed for distribution and installation in communities and community facilities like school, small businesses, panchayat center etc.



The water generation system is designed to produce treated water based on the following requirements:

SYSTEMS	FLOW
Feed Water Pump	1.0 m3 Hr
Multigrade Sand Filter	1.0 m3 Hr
Antiscalent Dosing	1.5 LPH (max)
Cartage Filter	5 µ
RO Skid	200 LPH

The PoA will be implemented using three approved methodologies:

- For solar lighting and solar electric/PV systems, the SSC-CPAs will use the small-scale methodology AMS-III.AR “Substituting Fossil fuel-based lighting with LED/CFL lighting systems” (Version 6)
- For efficient cookstoves, the SSC-CPAs will use the small-scale methodology AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass” (Version 11.1)
- For water purifiers, the SSC-CPAs will use the small-scale methodology AMS III.AV “Low greenhouse gas-emitting safe drinking water production systems” (Version 08)

All CPAs included in this PoA will use no more than two of the three approved methodologies stated above, and the only the following combination of technologies shall be allowed in a given household:

- Solar lighting systems and efficient cookstoves
- Solar lighting systems and water purifiers

Water purifiers and efficient cookstoves shall not be disseminated to the same households or included in the same CPAs, thus no cross effects exist between the technologies or methodologies included in this PoA.

Low-income households and small businesses in India in aggregate spend billions of dollars a year for carbon emitting fuels for cooking and lighting. The kerosene lamps that are used for lighting provide insufficient light for children to read by at night or for women to conduct income-generating activities into the evening hours. While many households would happily switch to clean energy alternatives, they are already spending up to 30% of their income on dirty fuels, which prevents them from saving enough to afford cleaner technologies. As a result, the world's poor are often trapped in a cycle of energy poverty, spending the most for the worst forms of energy.

Under this PoA, MicroEnergy Credits breaks the cycle of energy poverty for low-income households and microentrepreneurs by helping microfinance institutions provide financing for small-scale clean heating and lighting technologies. With appropriate financing, these clean technologies become more affordable than the dirty fuels the poor are currently forced to rely upon. The SSC-CPAs thus provide energy access and energy choices for low income people enabling them to switch to clean technologies that improve their living conditions and generate savings on energy expenditures, while also reducing greenhouse gas emissions.

The technologies that will be employed by the SSC-CPAs are all small-scale, low cost clean energy products that meet the basic needs of India's poor. In general, these technologies are deployed in homes and small businesses, as well as, to a small degree, local institutions such as schools, clinics, and microfinance institution branches.

All of the technologies employed by the CPAs provide development benefits as well as environmental benefits.

Solar electric/photovoltaic systems:

- Approximately 1.5 billion people worldwide lack access to electricity, and an additional 1 billion lack access to reliable electricity networks[6]
- For the world's poor, lighting is extremely expensive, as fuels such as kerosene typically cost 10-15% of total household income[7]
- Households in India use kerosene, gas, candle, electricity, and other oil for lighting. Among these, kerosene and electricity are most commonly used. ~~.A.~~[8]
- Nearly 80 million Indian households, approximately 400 million people, do not use grid electricity as the main source of lighting. Of these, almost 94 percent live in rural areas. Out of the 180 million rural households in the country, nearly 43 percent still use kerosene as the primary fuel for lighting[9] (Census of India, 2011). Since the census data is available once every 10 years, this census data used here is still the latest available information from Government sources.

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[6] UNDP. "Accelerating Progress Towards the Millennium Development Goals: UNDP's Work in Environment and Sustainable Development," http://content.undp.org/go/cms-service/download/publication/?version=live&id=2900450 (last accessed 06/27/11).

[7] World Bank. "Brightening the Night in Africa," http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/0,,contentMDK:21462411~menuPK:258657~pagePK:2865106~piPK:2865128~theSitePK:258644,00.html (last accessed 07/06/11).

[8] National Sample Survey Organization, 2007. "Energy Sources of Indian Households for Cooking and Lighting, 2004-05". Report No. 511(61/1.0/4).

[9] http://lightingasia.org/india/what_new/kerosene-for-home-lighting-a-key-indicator-to-prioritize-districts-for-clean-energy-initiatives-in-india

- Many end users that will be reached by the SSC-CPAs live rurally and do not have access to centralized electricity grids
- Solar lighting generates the following sustainable development benefits:
    - Environmental: reduce emissions associated with current lighting sources, principally kerosene used for lamps
    - Education: enables children to read and study by at night
    - Economic: enables end users to save on reduced fuel (e.g., kerosene) consumption and microentrepreneurs to conduct income-generating activities at night

Efficient cookstoves:

- Approximately 3 billion people, mainly the world's poor, rely on solid fuels such as traditional biomass and coal to meet their basic needs. Every year, 2 million people – mostly women and children – die as a result of indoor air pollution from household burning of solid fuels such as dung, wood, crop waste and coal in unventilated kitchens.[10]
- Efficient cookstoves generate the following sustainable development benefits:
    - Environmental: reduces carbon emissions associated with burning wood and coal, reduces air pollution from particulate matter released by stoves, and reduces deforestation that results from collection of wood for fuel
    - Health: families no longer inhale indoor smoke that causes respiratory illnesses and the risk of burns from falling into fires is reduced
    - Education: children that previously spent hours collecting firewood each day now have more time to attend school and study
    - Economic: generates households savings from reduced fuel expenditures and enables microentrepreneurs to spend less time collecting fuel and more time engaged in income-generating activities

Water purifiers:

- More than 1 billion people around the world do not have access to clean water.[11] Many of the world's poor boil some or all of their water over inefficient cookstoves if they can afford or collect sufficient fuel to do so.
- Water purifiers reduce the need to boil water for purification and consequently the need for use of traditional heating methods. Water purifiers generate the following sustainable development benefits:
    - Environmental: Reduce carbon emissions, air pollution, and deforestation associated with many traditional cooking methods
    - Health: reduce diseases associated with impure water and reduce the respiratory illnesses and risk of burns associated with traditional cooking methods
    - Education: healthier children are better prepared to attend and stay focused in school
    - Economic: generates households savings from reduced cooking fuel expenditures and enables microentrepreneurs to spend less time collecting fuel and more time engaged in income-generating activities

A.4. Coordinating/managing entity

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Micro Energy Credits Corporation Private Limited is the coordinating/managing entity ("CME") for this SSC-PoA. Micro Energy Credits Corporation Private Limited is a registered company in India. The CME will communicate with the Executive Board and/or the pertinent Designated Operational Entity ("DOE") on all matters, including submission of the PoA and making arrangements for the distribution of certified emission reductions.

[10] UNDP. "Fast Facts: UNDP and Energy Access for the Poor," UNDP, New York, NY, October 2010.

[11] UNDP. "Human Development Report: 2006." UNDP, New York, NY, 2006.

A.5. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	Micro Energy Credits Corporation Private Limited (Private entity, CME of the POA)	No
Switzerland	Climate Cent Foundation	No

A.6. Public funding of PoA

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No public funding or ODA have or will be diverted for the implementation of the POA.

SECTION B. Management system

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MicroEnergy Credit's Credit Tracker Platform will be used to maintain records for each SSC-CPA. 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 each CPA, making it easy to identify, locate and verify any or all of the installations that pertain to a given CPA. The MEC Credit Tracker Platform is a hosted internet service, limiting the risk of loss of data.

(i) Record keeping system for each SSC-CPA under the PoA

The Credit Tracker Platform enables MicroEnergy Credits to maintain consistent data on all CPAs and product installations.

The process for entering data into the Credit Tracker Platform will be consistent across all CPAs. At the time of installation, the PO will create a Booking Record (in paper or electronic format) that captures detailed data on the installation:

- Household name
- Location of household (address and/or GPS location)
- Product type installed
- Product model installed
- Date of installation
- Unique identifier number for CEP
- Respective CPA

Once the installation is complete, the PO will ensure 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. The PO will implement an internal check 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.

The Credit Tracker Platform includes a CPA Dashboard that provides a summary on the status of each CPA, and includes the fields:

- Name and unique identifier of each CPA
- List of CEPs included in each CPA
- Name of PO implementing each CPA
- Number of CEPs installed
- Aggregate emissions reductions per year for each CPA

The CPA Monitoring Record maintains monitoring and auditing data on each installation in a CPA:

- Unique identifier number for CEP
- Date of monitoring
- Usage status at time of monitoring

Procedures for training of monitoring personnel

- Personnel are trained in a group training session where the monitoring presentation is given by staff of the clean energy product unit. Personnel are also provided with a user manual. These training sessions will take place at least once before the sale of the first CEP, and as needed according to the progress of the sales, or at least every month--whichever occurs earlier. The CME will provide the DOE with the materials generated from the meetings and trainings with all parties to demonstrate that they were conducted. The materials could be any of the following, but are not limited to, photos, emails, participation sheets, self-statements and training materials.

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

Each CPA has unique identifier number that is attached to each household and installation within that CPA to ensure no double counting within the PoA. In addition, a PoA logo will be clearly embedded on each CEP distributed. This information will match with the information displayed on each CPA Credit Tracker Platform, with a copy retained by the customer, thus identifying that each CEP with its unique serial ID number has been distributed under a PoA managed by the CME of this PoA.

At the time of registering a new CPA, MicroEnergy Credits will ensure that the project activity is not part of CDM project activity or another PoA:

- MicroEnergy Credits signs contracts with each microfinance institution documenting that the emissions reductions in a specific project activity are included in that project and that project alone
- The partner microfinance institution explains the concept of carbon credits to the end user. The microfinance institution signs a contract with each end user recognizing the end user's title to the emissions reductions and transferring it to the microfinance institution, which then transfers it to MicroEnergy Credits
- MicroEnergy Credits and partner microfinance institutions consult with participating clean energy product suppliers to clarify that credits are not included in other projects and will be included in this PoA
- Each project is publicly announced at launch, both at the microfinance institution level and at the level of MicroEnergy Credits, including a posting on its website

The MEC Credit Tracker Platform will maintain data on all installations, including each CEP unique identifier number, the date of installation and the CPA/PoA with which they are associated. The platform's use of locations for each installation will ensure that each clean energy product is only included in a single CPA under a single PoA.

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

In accordance with para 17 of EB105, Annex04, Tool 20: Assessment of debundling for small-scale project activities, Version-4, If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity. Each individual CEP offered under the PoA is below this limit, as is detailed on sections I.5, and hence debundling check is not required.

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

As discussed in part (ii) above, contracts are signed with microfinance institutions and end users. Activity inclusion in the PoA is communicated to suppliers and other local stakeholders at the launch of the CPA.

The CME will coordinate the activities to be undertaken by each PO involved in the PoA. As part of the inclusion of a CPA under the PoA, a legally-binding contractual agreement will be signed by the PO and the CME. Under the agreement, the roles and responsibilities of the CME and the PO will be clearly spelled out. Further, the PO will ascribe its activity to the PoA as part of entering into this agreement. Any parties the PO contracts in its role as the CPA developer will also be required to enter into a contractual agreement with the PO, similarly ascribing their activities to the PoA. Suitable training will be conducted for POs taking part in new CPAs to make them aware of the rules of the CDM and the PoA and their requirements in terms of distribution and data collection. Guidance will be provided to each PO on the correct procedures to be followed during distribution. The agreement will also define carbon ownership rights.

SECTION C. Demonstration of additionality of PoA

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There are no laws or regulations in the geographical/physical boundary of the PoA requiring the activities of the PoA. The activities under the PoA are a voluntary, coordinated action by the CME of the PoA.

The voluntary coordinated action implemented by the CME would not occur in absence of the PoA. Thus the proposed PoA is a voluntary coordinated action.

The action is not financially viable without the support of revenues from the sale of CERs. Financial support from the CDM is required in order to develop, disseminate, and ensure continued operation of the activity proposed under the PoA.

For each CPA under this PoA, the additionality would be proven at CPA level as per the eligibility criteria number 10 mentioned in the generic CPA-DD sections of this PoA-DD.

SECTION D. Start date and duration of PoA

D.1. Start date of PoA

>>
18/01/2012 (date of publication of the PoA-DD for global stakeholder consultation)

D.2. Duration of PoA

>>
28 years 0 months

SECTION E. Environmental impacts

E.1. Level at which environmental impacts analysis is undertaken

>>

Environmental analysis is undertaken at PoA level. The PoA involves the distribution and installation of household-level clean energy products. These products are small-scale with minimal negative environmental impacts. Furthermore, because of their small size and minimal negative impact, they are not subject to national level Environmental Impact Assessments. Therefore, it is reasonable to undertake a single environmental analysis at the level of the PoA rather than individual assessments for each SSC-CPA.

E.2. Analysis of environmental impacts

>>

Because the clean energy products being distributed in this PoA are small scale for household use, they have minimal negative environmental impacts. These negative impacts are far outweighed by the positive environmental impacts that result from use of these technologies, including:

- Reduction in carbon and other GHG emissions from burning wood and other fuel sources
- Reduction in air pollution caused by particulate matter released in burning traditional fuels
- Reduction in deforestation as reliance on non-renewable fuel sources is reduced

The minimal negative impacts are primarily limited to the disposal of the technologies once their useful life is finished. In many cases where project activities are undertaken, recycling programs are already in place offered by the clean energy product company or other entities. Where this is the case, the microfinance institution implementing the SSC-CPA will inform end users of such pre-existing programs.

Additionally, SSC-CPAs included in this PoA will:

- Inform all households about the collection and disposal mechanism for the technologies in an environmentally-friendly manner
- Implement a recycling program by end of natural lifetime of product (e.g., five years)
- Include implementation of a product end-of-life recycling scheme as an environmental indicator in the monitoring plan of the PoA, such that the verifier can make an assessment of the coordinating entity's progress in this area

E.3. Environmental impact assessment

>>

As per the current applicable laws[12], a full-scale EIA is not required for this PoA as per the list of industries published by the Host Country India for EIA requirement.

SECTION F. Local stakeholder consultation

F.1. Level at which local stakeholder consultation is undertaken

>>

The stakeholder consultation would be carried out at CPA-Level.

F.2. Modalities for local stakeholder consultation

>>

Not Applicable, as stakeholder consultation would be carried out at CPA-Level.

[12] http://moef.gov.in/division/environment-divisions/environmental-impact-assessment-eia/introduction/

F.3. Summary of comments received

>>
Not Applicable.

F.4. Consideration of comments received

>>
Not Applicable.

SECTION G. Approval and authorization

>>
The letter(s) of approval from following Party(ies) that are involved in the PoA, is available –

1. India[13]
2. Switzerland[14]

Additionally,

- Project participant MicroEnergy Credits Corporation Private Limited has been authorized by India.[15]
- Project participant Climate Cent Foundation has been authorized by Switzerland[16]

PoA has only one Host Party, i.e. India, and the Host Party has authorized the CME, i.e. MicroEnergy Credits Corporation Private Limited for its coordination of the PoA. .[17]

PART II. Generic component project activity (CPA)

SECTION H. Description of generic CPA

H.1. Title of generic CPA

>>
MicroEnergy Credits POA- Cookstoves and Solar - CPA XX

H.2. Reference number of generic CPA

>>
9181-PX-YYYY-CPZ

H.3. Purpose and general description of generic CPA

>>
In the rural areas in India, the predominant means of cooking are traditional cook stoves that use biomass as fuel. The smoke and fumes from these inefficient stoves contribute heavily to indoor air pollution. Indoor air pollution claims approximately 1,300,000 lives per year in India[18]. In rural areas of India there are frequent power outages and low voltage so rural households must use kerosene for indoor lighting, which also contributes to indoor air pollution.

[13] https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/B46TH0V2GLIZK1UPWJ3SMNA8QRX7FY/view

[14] https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/B46TH0V2GLIZK1UPWJ3SMNA8QRX7FY/view

[15] https://cdm.unfccc.int/UserManagement/FileStorage/YGV2FSUOXKQM4JCA6E0ID1LZBR8NH9

[16] https://cdm.unfccc.int/UserManagement/FileStorage/OGVINA26DH9451YQUWBX8TPSL03MZE

[17] https://cdm.unfccc.int/UserManagement/FileStorage/YGV2FSUOXKQM4JCA6E0ID1LZBR8NH9

[18] http://www.businessworld.in/article/1-3-Million-Deaths-Every-Year-In-India-Due-To-Indoor-Air-Pollution/09-09-2017-125739/

The proposed small-scale CDM programme activity (SSC-CPA) involves marketing, distributing, and financing approximately xxx solar lanterns, and xxx improved cook stoves, for low-income households and microentrepreneurs in the _____ region of India. These products provide clean, renewable power for cooking, lighting.

Table H.3.1 Estimated Stoves in Operation[19]

Year	Sales
Year 1	XX
Year 2	XX
Year 3	XX
Year 4	XX
Year 5	XX
Year 6	XX
Year 7	XX

AND

Table H.3.2 Estimated Solar Lamps in Operation[20]

Year	Sales
Year 1	XX
Year 2	XX
Year 3	XX
Year 4	XX
Year 5	XX
Year 6	XX
Year 7	XX

The program is a voluntary initiative coordinated by MicroEnergy Credits, the CME of the PoA, and implemented by Partner Organization (s) _____.

Under the CPA, MicroEnergy Credits 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 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 goal of the CPA is to use carbon finance to enable installations of approximately xxx solar lanterns, and either xxx improved cook stoves for low income households in the _____ region of India, resulting in the following sustainable development benefits:

[19] The actual stove sales volume might be different than those mentioned above depending upon the demand of stoves. ERs shall be calculated at actuals complying with relevant methodological requirements.

[20] The actual solar lamp sales volume might be different than those mentioned above depending upon the demand of stoves. ERs shall be calculated at actuals complying with relevant methodological requirements.

- **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.
- **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, both at PO level and at clean energy product suppliers
- **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

The small-scale project type applicable to the generic CPA in accordance with the CDM project standard for programmes of version 2.0, is - Type II and Type III. Type II is for Improved cookstoves and Type III is for Solar lighting system. The improved cookstoves component will follow the Type-II small-scale activity threshold of energy savings of 180 GWh_{th}/annum and the solar lamps component will follow the Type-III small-scale activity threshold of emission reductions less than 60,000 tCO_2/annum.

H.4. Technologies/measures

>>

Improved cookstove:

Below model of efficient cook stoves disseminated under the PoA. In the absence of the project activity, the households with efficient cook stoves would have continued to use inefficient traditional cook stoves, including three-stone fires. These stoves use firewood as the fuel. The efficiencies of these conventional stoves are low and are of the order of 10% [21] . There could be other models/manufacturers of improved cookstove distributed under the PoA.

The technical specifications[22] of the clean energy products are as follows –

- One of the improved cook stove disseminated under the PoA will be the Powergram, a portable stove made of durable components. The initial model has a specified thermal efficiency of 40%. The single burner design ensures high efficiency.
- Design of the Powergram may develop over time, however it will be ensured that they meet all methodological requirements.

Material: Stainless steel

Stove Body Size – 46.99 x 22 x 22 cmNet weight: 10 kg
Thermal efficiency: 40%

[21] Jagadish, K.S. (2004). The development and dissemination of efficient domestic cook stoves and other devices in Karnataka. Current Science, Vol. 87, No.7.

[22] Manufacturer's certificate on specifications

Baseline cooking systems: In the baseline the user group relies on non-renewable fuel based inefficient cooking solutions like three stone fires. This is primitive method of cooking and does not involve any specific equipment type or specifications.

The baseline consists of use of non-renewable fuels burnt in inefficient cookstoves for meeting the cooking needs of the user group. This is further elaborated in section I.5 below.

Solar lighting systems:

A variety of solar lighting systems can be offered under the PoA. 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.

Some of the models that will be distributed, including their technical specifications[23] are –

1) d. Light S300
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
Lifetime of module – 15 years
Battery lifetime – 5 years
Electronics lifetime – 5 years
Physical protection against environmental factors - YES

2) Sunking Home 120
Luminous intensity (Lumens): 590
Solar Panel: 12 Watt
Solar Panel Lifetime: 15 years
Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years
Wattage – 5.28 W
Battery – Li-Fe-PO4, 12000mAh, 3.3 V
Rated Lamp life – 10,000 hours
Warranty – 2 YearsDBT/SRT – 3.5 hours (Default)
Physical protection against environmental factors - YES

There could be various other solar lighting models distributed under this CPA. All products contain a solar panel, lights as shown in the photograph –

[23] As per manufacturer's product information sheet

Baseline lighting systems: In the baseline the user group relies on Kerosene based lighting solutions like Kerosene wick lamps. This is primitive method of lighting and does not involve any specific equipment type or specifications.

The baseline consists of kerosene fuel based lighting devices for meeting the lighting needs of the user group. This is further elaborated in section I.5 below.

SECTION I. Application of methodologies and standardized baselines

I.1. References to methodologies and standardized baselines

>>

The generic-CPA will use the following approved small-scale methodologies[24]:

[24] https://cdm.unfccc.int/methodologies/index.html

- For solar lighting and solar electric/PV systems, the SSC-CPAs will use the small-scale methodology AMS-III.A.R "Substituting fossil fuel-based lighting with LED/CFL lighting systems" (Version 6)[25]

- For efficient cook stoves, the SSC-CPAs will use the small-scale methodology AMS-II.G "Energy efficiency measures in thermal applications of non-renewable biomass" (Version 11.1)[26]

This CPA will also use the following Tools:

TOOL30: Calculation of the fraction of non-renewable biomass[27]
TOOL20: Assessment of de-bundling for small-scale project activities[28]
TOOL 11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period[29]
TOOL21: Demonstration of additionality of small scale project activities version 13.1[30]

I.2. Applicability of methodologies and standardized baselines

>>
AMS-III.A.R "Substituting fossil fuel-based lighting with LED/CFL lighting systems" " (Version 6)

According to the Emission Reduction calculation for Solar Lamps proposed to be deployed, the proposed SSC-CPA's total emission reductions is below the SSC limit of 60,000 tCO2/annum for Type-III project activities.

The applicability of the methodology is met as follows –

AMS III.AR. version 6	
Applicability condition	**Justification of applicability**
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 CPA undertakes distribution of solar lighting systems (LED or CFL) to replace wick-based kerosene lamps, thus this meet this applicability condition
This methodology is applicable only to project lamps whose batteries are charged using one of the following options[31]:	Since the CPA involves the lights that are charged by solar energy using solar PV which is a renewable source of energy, hence this

[25] https://cdm.unfccc.int/UserManagement/FileStorage/O2HGLE9V8CFPA07I6YT3XZNSUK1BDM

[26] https://cdm.unfccc.int/UserManagement/FileStorage/R1YKFOXZNTJQSG53IVCL8BDP2EU904

[27] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v2.0.pdf

[28] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-20-v1.pdf

[29] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

[30] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v13.1.pdf

[31] Project lamps may be charged by any of the listed options, however each individual project lamp shall be charged by only one of the charging options (for example 10,000 project lamps may be charged by photovoltaic (PV) systems and 10,000 may be charged by a grid, but none of the individual project lamps may be charged by both a grid and a PV system).

(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.	applicability criterion is met
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); (b) 10,000 hours for Option 2, paragraph 4(b).	Before inclusion, each CPA will choose to apply either option 1 or option 2. If the CPA chooses to apply option 1, the manufacturer's specification for the lighting devices under the CPA would demonstrate that rated average operational life is above 5,000 hours based on the appropriate testing results. If the CPA chooses to apply option 2, and the manufacturers specification for the lighting devices under the CPA would demonstrate that rated average operational life is above 10,000 hours based on the appropriate testing results.
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.
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 PoA. Rated life would be certified by the lamps manufacturer in accordance with the requirement of this condition. All the technical criteria would also be checked as per CPA eligibility criteria number 14 at the time of inclusion. 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.

Measures are limited to those that result in emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.	As demonstrated in the CPA-DD, the total emission reductions are less than the small scale threshold of 60,000 t CO2 equivalent annually, as demonstrated in the ER sheet.
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
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; c. The project lamp shall be fully recharged from a discharged state after eight hours of charging.	DBT for the project lamps is XXX hours (equal to or greater than 4 hours) based on manufacturer's product specification. This is also covered under the eligibility criterion14 and will be checked at the time of CPA inclusion. 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.
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,	The CPA proposed to distribute the solar lamps through micro finance institutions sales channel or through manufacturer sales channel. (a) Fossil fuel-based lighting is a common practice in India. This has been well documented in the generic CPA-DD based on the peer reviewed literature, demonstrating that fossil fuel is the commonly used fuel for lighting. Also, for all the lamps distributed under the CPA, 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

project lamps shall be marked as CDM project lamps; (d) Ensure compliance with prevailing regulations pertaining to the use and disposal of batteries.	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. This is also covered under eligibility condition number 2 under the CPA. In addition, each of the lamp distributed under the project would be physically marked as CDM project lamp. A legally binding contract between CME and manufacturer/micro finance institution/POs would be established to ensure that all carbon title is transferred to the CME. (d) There are no prevalent regulations in Indian region. However, the CME and CPA implementer would follow any regulations that come up during the crediting period of the CPA.
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 the CPA DD. In addition, these requirements are also covered under the eligibility criterion number 14.

AMS-II.G "Energy efficiency measures in thermal applications of non- renewable biomass" (Version 11.1)

According to the energy savings calculation for improved cookstoves proposed to be deployed, the proposed SSC-CPA's total energy saving is below the SSC limit of 180 GWh (thermal)/annum for Type-II component of the specific CPA.

The applicability of the methodology is met as follows –

AMS II.G. Version 11.1	
Applicability Condition	**Justification of applicability**
This methodology comprises efficiency improvements in thermal applications of non-renewable biomass. Examples of applicable technologies and measures include the introduction of high efficiency biomass fired project devices (cook stoves or ovens or dryers) to replace the existing devices and/or energy efficiency improvements in existing biomass fired cook stoves or ovens or dryers.	The purpose of the CPA is to introduce efficient cookstove technology involving the efficiency improvements in the thermal applications of non-renewable biomass in households. The activity involves replacement of old and inefficient cook stoves with improved cook stoves.
In the case of cookstoves, the methodology is applicable to the introduction of single pot or multi pot portable or in-situ cookstoves with rated efficiency of at least 20 per cent.	All the cookstoves will have a minimum efficiency of 20% as recommended by the meth and eligibility criterion "18"
The aggregate energy savings of a single project activity shall not exceed the equivalent of 60 GWh per year or 180 GWh thermal per year in fuel input.	Each CPA (single project activity) shall result in aggregate energy savings no more than 180 GWh thermal per year in fuel input.
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.	The decline of forest in India has been identified supporting the claim that the biomass usage in the baseline scenario is non-renewable and that non-renewable biomass (NRB) has been used since 31 December 1989. The decline of forest in India has been identified [32] supporting the claim that the biomass usage in the baseline scenario is non-renewable and that non-renewable biomass (NRB) has been used since 31 December 1989. India has lost over 1.6 million hectare of tree cover area between 2001 to 2018. The loss of tree cover has contributed to 172 MT of carbon emissions during this period[33]. Since forest cover has been decreasing steadily since 1990 it can be concluded that non-renewable biomass has been used in India since 31 December 1989.
For cases where the biomass is sourced from renewable sources, the project participants should	Not applicable as biomass is not sourced from renewable sources

[32] http://www.corecentre.co.in/Platform/Docs/DocFiles/population_pressure.pdf (Page 5)

[33] https://www.hindustantimes.com/india-news/india-s-forest-cover-loss-in-17-years-is-four-times-the-size-of-goa/story-IY2OpSPLA7kRutBy8CXhyN.html

use a corresponding Type I methodology.	
If the project device requires a specific fuel for this device (e.g. briquettes, pellets, woodchips), the consumption of the fuel should be monitored during the crediting period.	The project devices do not require a specific fuel type. The devices can operate on any type of Biomass.
The CDM-PDD or CDM-PoA-DD/CPA-DD 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. programme logo).	The distribution of project devices is carried out with the help of various local partners and microfinance institutions. The unique identification of the project devices is mentioned as one of the inclusion criteria for the CPAs and would be followed for all the project devices.
The CDM-PDD or CDM-PoA-DD/CPA-DD shall also explain how the proposed procedures prevent double counting of emission reductions, for example to avoid that project stove manufacturers, wholesale providers or others claim credit for emission reductions from the project devices.	The eligibility criteria 2,3, 4 and 5 covers the requirement. Please refer the same.

Applicability of applied tools:

TOOL30: Calculation of the fraction of non-renewable biomass[34] Version 2.0	
Applicability Condition	**Justification of applicability**
This tool may be used by: (a) DNAs to submit region/country-specific default fNRB values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or (b) project proponents to calculate project or PoA-specific fNRB values.	Since the DNA calculated/approved values for fNRB are not available, CME proposes to apply this tool to calculate project specific (CPA-Specific) fNRB values. Hence this condition is fulfilled
For project or PoA specific fNRB values, project proponents shall assess the area where biomass is sourced and justify the selection of the area in CDM project design documents.	The fNRB values shall be demonstrated at the CPA level. The CPA-DD shall assess the area from where biomass is sourced and the area chosen shall be specific to the boundary of the CPA, and shall be justified at the CPA-DD level.

TOOL20: Assessment of debundling for small-scale project activities[35] Version 4.0	
Applicability Condition	**Justification of applicability**
This methodological tool is applicable to proposed small-scale project activities and small-scale CPAs in order to check whether they are debundled	Since the PoA involves addition of small-scale project (CPAs), hence this tool is applicable.

[34] https://cdm.unfccc.int/Reference/tools/index.html

[35] https://cdm.unfccc.int/Reference/tools/index.html

components of largescale project activities.	Hence this condition is fulfilled

.
Tool 11 is applicable since the PoA is going for crediting period renewal and this is used for demonstrating the validity of the baseline

I.3. Application of multiple methodologies

>>
This generic CPA combination applies two small-scale methodologies:

1) AMS-II.G. - Energy efficiency measures in thermal applications of non-renewable biomass, version 11.1
2) AMS-III.AR. - Substituting fossil fuel-based lighting with LED/CFL lighting systems, version 6.

As per para 12 of the Guidelines for the consideration of interactive effects for the application of multiple CDM methodologies for the POA, version-1, EB-68, Annex 3:

Analysis of the interactive effects and accounting for them by the CME is limited to cases where only small-scale methodology(ies) are applied in a CPA. Further, only the types of situations described in paragraph 9(a), (c) and (d), involving the application of a combination of methodologies, are considered and it is assumed in all other cases that the issue is addressed in the respective methodologies.

As per the situations described in the para 9, such situations only apply when multiple methodologies are applied for same technology in the PoA, or when multiple technologies are using same methodology. Here in this case, only one methodology is used specific technology.

Hence, multiple methodologies are not applied for any particular Technology/Measures. There is no possibility of cross effects as there is no exchange of energy or mass transfer between different measures within the CPA.

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

>>
For solar lights:

	Source	GHG	Included?	Justification/Explanation
Baseline	Combustion of kerosene fuel used for light; power plants serving the electricity grid	CO_2	Yes	Primary source of emissions
		CH_4	No	Minor source
		N_2O	No	Minor source
Project activity	Renewable energy source solar lamps used for light	CO_2	No	Project activity does not involved consumption of fossil fuels or electricity therefore no CO2 emissions are generated
		CH_4	No	Minor source
		N_2O	No	Minor source

For solar lighting systems, the project boundary is defined in line with the requirements stated in para 17 of AMS III.AR v7 and includes the physical, geographical site of the renewable energy system i.e all the project lamps as well as the solar energy based charging systems.

	For improved cookstove:Source	GHG	Included?	Justification/Explanation
Base	Combustion of non-renewable biomass for cooking or heating	CO_2	Yes	Important source of emissions
		CH_4	No	Minor source

For improved cookstove:Source		GHG	Included?	Justification/Explanation
		N_2O	No	Minor source
Project activity	Combustion of non-renewable biomass for cooking or heating	CO_2	Yes	Important source of emissions
		CH_4	No	Not required by methodology, only CO_2 Emission Factor for fossil fuels is considered.
		N_2O	No	Not required by methodology, only CO_2 Emission Factor for fossil fuels is considered.

For improved cookstove, the project boundary is defined in line with the requirements stated in para 15 of AMS II.G. v12 and includes the physical, geographical site of the efficient/improved cooking devices that utilize biomass.

I.5. Establishment and description of baseline scenario

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Validity of the current baseline

The validity of the baseline is assessed according to CDM TOOL 11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period

1) Cook-stoves: compliance and explanation of tool-11

Table – 1 Cookstoves

Step 1: Assess the validity of the current baseline for the next crediting period	
Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies	There are no mandatory national or sectoral policies in India that prohibit the use of three-stone fired stoves for cooking. Rural household sector in India, continues to experience considerable energy loss in particular for cooking and lighting, due to inefficient technologies such as the traditional three-stone fired and similar stoves. There are no relevant mandatory national and/or sectoral policies To be considered for baseline compliance. We, therefore, proceed to Step 1.2
Step 1.2: Assess the impact of circumstances	In this section, we examine the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario. We also assess the availability of new fuels or raw materials in the identification of the current practice for the baseline emissions. Since the registration of the PoA in 2012, the Indian Government had launched a LPG cylinder distribution scheme in rural India, however, the scheme has been only partially successful. About a quarter of the Pradhan Mantri Ujjwala Yojana[36] (PMUY) consumers enrolled till the end of 2018 had not taken even a single refill, and less than half of those enrolled had purchased four or more refills"[37]. There are many barriers to sustained use of LPG that need to be addressed once the connection is given. The barriers are broadly categorised as: -- Affordability of LPG ,

[36] http://www.pmujjwalayojana.com/

[37] https://www.theindiaforum.in/article/pradhan-mantri-ujjwala-yojana-needs-be-more-ambitious-achieve-its-goal-ending-pollution-rural

	-- Absence of robust distribution networks and infrastructure to ensure reliable, last mile access to LPG, -- Behavioural aspects which need to be addressed to ensure sustained use. As per latest available WHO[38] data, 64% of the population in India still relies on solid fuel for cooking. In addition, as per 2018 data published by WHO[39] only 49% of India's population has access to clean cooking technologies. As per recent research study, even with substantial increasing provision of clean cooking fuels in India, more than half of India's population was exposed to household air pollution from solid cooking fuels in 2017[4041]. Household air pollution is caused mainly by the residential burning of solid fuels for cooking and to some extent heating, the major types of which are wood, dung, agricultural residues, coal, and charcoal. Although the use of solid fuels for cooking has been declining in India, 56% of India's population was still exposed to household air pollution from solid fuels in 2017 Household air pollution (HAP), comprising smoke from the burning of unclean cooking fuels (UCFs) and indoor tobacco smoking, has adverse consequences on the health of women and children.1-3 HAP accounted to 4.8 lakh deaths, reduction of 1.2 years of life expectancy, and 5% of India's total disease burden in 2016. Among the under-five children, 6 million disability-adjusted life years (DALYs) (5082 DALYs per 100 000) and 66 890 deaths (55.7 deaths per 100 000) caused by acute lower respiratory infections are attributable to HAP in India.[42] As demonstrated by above data, a large-scale adoption of improved appliances has not yet taken place in India, despite the LPG scheme's introduction. Market penetration rate of clean cooking technologies in India is equal or below 50%[43]. Despite Research & Development efforts, improved wood stoves have not gained any significant foothold in any part of the country. Approximately 64 percent of household cooking energy is sourced from solid fuels[44]. Wood is undoubtedly a major source of fuel for cooking in rural areas in India. It is therefore demonstrated that the new circumstances do not make a continued validity of the current baseline not plausible, hence the current baseline does not need to be updated for the subsequent crediting period. . Thus in line with the methodology AMS-II.G, version 11.1, it is assumed that in the absence of the project activity, the baseline scenario would be the projected use of fossil fuels to meet similar thermal energy needs as those provided by the project devices. We, therefore, proceed to Step 1.3

[38] https://www.who.int/data/gho/data/indicators/indicator-details/GHO/population-using-solid-fuels-(-)

[39] https://www.who.int/data/gho/data/indicators/indicator-details/GHO/proportion-of-population-with-primary-reliance-on-clean-fuels-and-technologies-(-)

[40] https://www.thelancet.com/action/showPdf?pii=S2542-5196%2818%2930261-4

[41] Balakrishnan, S. D. (2019). The impact of air pollution on deaths, disease burden, and life expectancy across the states of India: the Global Burden of Disease Study 2017. The Lancet Planetary Health

[42] Cooking, smoking, and stunting: Effects of household air pollution sources on childhood growth in India Samarul Islam | Md Juel Rana | Sanjay K. Mohanty

[43] https://www.who.int/data/gho/data/indicators/indicator-details/GHO/proportion-of-population-with-primary-reliance-on-clean-fuels-and-technologies-(-)

[44] https://www.who.int/data/gho/data/indicators/indicator-details/GHO/population-using-solid-fuels-(-)

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.	This sub-step is to be applied only if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment and, the projects proponents or third party (or parties) would undertake an investment later due, for example, to the end of the technical lifetime of the equipment(s) before the end of the crediting period or the availability of a new technology. The baseline scenario identified at the time of validation of project activity was the continued use of woody biomass using three stone fired without any investment. There were no plans to undertake any investment towards the end of the technical lifetime of the equipment before the end of the project's crediting period or due to availability of a new technology. This sub-step also requires to assess whether the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, as determined in the CDM-PDD, exceeds the crediting period for which renewal is requested. The identified baseline at time of registration i.e. 3 stone fired stove using woody biomass would have been continued to be operated in the absence of the project activity. The 3 stone fired stove is rudimentary system that essentially requires three bricks to be lined crediting space for combustion of wood with the cooking pot place on the bricks. This has no set lifetime and can be easily replaced with similar 3-stone fired stoves As mentioned in the previous step, there has not been penetration of improved cookstoves or LPG based stoves in India. Indian Government has a mission to promote transition from wood fuel to environmentally benign fuels for cooking, but the policy approach and its implementation still remain impracticable, largely due to poverty and weak policies and poor last mile energy delivery infrastructure. Household energy demand is known to be mostly guided by prices of fuels and appliances, disposable income of households, availability of fuels and appliances, and cultural preferences. When there is scarcity of cooking gas, which happens frequently, the shift is usually towards solid biomass for cooking. Therefore, the continuation of use of current baseline equipment is likely during the crediting period. The most plausible baseline scenario is hence that firewood/woody biomass from non-renewable sources. In addition, without carbon finance, there has not been a large scale investment into the solid fuel based efficient cooking devices in India. So far, the clean cookstove technology has only been made possible by Carbon Finance and without Carbon Finance there are no similar investments being made in large scale adoption of solid fuel based clean cooking. Hence, as per the methodology provisions, it is assumed that in the absence of the PoA, the baseline scenario would be the projected use of fossil fuels for meeting similar thermal energy needs. Therefore, emission reductions are calculated by multiplying the thermal energy from annual biomass savings stemming from non-renewable biomass ($B_{y,savings,i,j}$) with an emission factor for fossil fuels. The baseline emission factor for fossil fuels is 64.4 tCO_2/TJ as per par. 25 of AMS-II.G. ver. 11. For determination of each parameter required for the emission reductions, please refer to Section I.6.1 of the PoA-DD part II. The baseline scenario of the project activity is therefore the continuation of use of the current equipment(s) without any investment and the projects proponents or third party(ies) did not plan to undertake any investment later, before the end of a crediting period, therefore the current baseline

<table>
<tr><td></td><td>does not need to be updated for that crediting period or the crediting of emission reductions is not required to be be limited to the period before the baseline equipment would cease its operation. In addition there are no mandatory requirements to use clean fuel in the country i.e. there is no restriction on continued use of solid fuels like woody biomass that is used widely and freely available.
Hence we move to step 1.4</td></tr>
<tr><td>Step 1.4: Assessment of the validity of the data and parameters</td><td>This sub-step requires to assess whether data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are still valid or whether they should be updated.

Updates are required to be undertaken in the following cases:

• Where IPCC default values are used, the values should be updated if any new default values have been adopted and published by the IPCC, for example, in guidelines for national GHG inventories, IPCC assessment report or special reports by the IPCC;

• Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity.

The parameters that were determined at the start of the crediting period are still valid, however they require to be updated i.e. the data/value of these parameters needs update.

The following data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period have been updated:

$f_{NRB,y}$: Fraction of non-renewable biomass : The value will be calculated on per CPA basis

$EF_{projected\_fossilfuel}$: Emission factor for fossil fuels

B_{old}: Annual quantity of woody biomass that would have been used in the absence of the project activity

Below is a comparison of the values that have been updated:

<table>
<tr><td>Parameter</td><td>1st crediting period</td><td>2nd crediting period</td></tr>
<tr><td>fNRB,y (Fraction)</td><td>0.8726</td><td>Calculated at CPA level</td></tr>
<tr><td>EFprojected_fossilfuel (tCO2/TJ)</td><td>81.6</td><td>64.4</td></tr>
<tr><td>$B_{old,i,j}$ (tons/HH/year)</td><td>Varied by state to state in the range from 0.65 to 2.39</td><td>2.45 applied as national value based on methodology per capita defaults</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Step 2: Update the current baseline and the data and parameters</td></tr>
<tr><td>Step 2.1: Update the current baseline</td><td>As per the analysis during step 1, the baseline is still valid. However, there are parameters that needs to be updated which have been updated as per step 2.2 below.</td></tr>
<tr><td>Step 2.2: Update the data and parameters</td><td>As per this step, if the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, project participants should update all applicable data and parameters. Hence as per this step, CME has updated the below parameters:</td></tr>
</table>

	• $f_{NRB,y}$: Fraction of non-renewable biomass : The value will be calculated on per CPA basis following the tool 30. • $EF_{projected\_fossilfuel}$: Emission factor for fossil fuels • $B_{old,i,j}$: Annual quantity of woody biomass that would have been used in the absence of the project activity

2) Solar Lamps: compliance and explanation of tool-11

Table – 2 Solar Lamps

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies	There are no mandatory national or sectoral policies in India that are prohibiting the use of Kerosene or other fossil fuel based lighting technologies. Rural household sector in India continues to experience considerable energy loss due to inefficient household appliances for lighting, due to inefficient technologies such as Kerosene wick lamps.
Step 1.2: Assess the impact of circumstances	In this section, we examine the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario. We also assess the availability of new fuels or raw materials in the identification of the current practice for the baseline emissions. During the past years since the PoA registration, there was a focus on increased electrification of rural areas by the Government. However, Government considers a village as electrified when only 10% of the Households in the villages get electricity connection.[45] In addition to this, there is widespread energy poverty prevalent in rural areas of India. As per a recent study[46], Overall in rural India, 86.2% people are energy-poor. Among all the 35 states of India, 12 have more than 90% rural population energy-poor. The five states with more than 95% share of population energy-poor in rural areas are: Chhattisgarh, Jharkhand, Odisha, Bihar, and Uttar Pradesh. Bihar has the dubious distinction of an entity with 72.5% rural population as extreme energy-poor, i.e., deprived of modern energy as prime source for both cooking and lighting. Uttar Pradesh follows Bihar with the corresponding figure of 57.5%. Hence, even though there have been efforts of electrification, but adoption has been limited either due to last mile connectivity challenges or grid stability or due to overall lack of financial resources to be able to afford electricity. As per another study [47] , electrification, or providing an electricity connection, does not necessarily mean reliable electricity access for households. Currently, electricity supply is highly unreliable for most rural consumers. The Electricity Supply Monitoring Initiative (ESMI) by Prayas Energy Group has been monitoring hourly power supply quality since 2013 across India—covering more than 50 districts and 350 locations as of April 2017—and is finding significant power-quality issues, especially in rural areas, despite the significant increase in power availability. More specifically, ESMI data shows that rural areas in several states continue to face regular power-cuts that last for several hours, while urban areas receive reliable power supply during the same time. For example, there was no evening (5 PM to 11 PM) electricity supply in the rural villages monitored for more than 58% (Uttar Pradesh) and 39% (Bihar) of the time, on average, during all of 2016.

[45] http://www.ddugjy.gov.in/page/definition_electrified_village

[46] Measuring Energy Poverty: A Households Level Analysis of India Hippu Salk Kristle Nathan Lakshmikanth Hari available at http://ncds.nic.in/sites/default/files/WorkingandOccasionalPapers/WP72NCDS.pdf

[47] https://www.sciencedirect.com/science/article/pii/S0301421519303854

	Below are the excerpts from a recent scientific literature published by John Hopkins in 2019, "Lock-in for lighting: The puzzle of continued kerosene use among electrified households in six Indian states", Electricity is the most commonly used form of energy for artificial lighting in modern society. Despite a rapid growth in the rate of electrification, 9% of electrified Indian households in our six sampled states continued to use kerosene as their primary lighting fuel in 2018. This appears as a puzzle considering the benefits of electric lights. Using a panel survey of rural households in six states in India, we examine why some grid-connected households primarily used kerosene lamps for illumination. We use a logistic regression model to test our hypothesis regarding the relationship between primary lighting choices and electricity quality. The results show that household primary lighting choices are correlated with nighttime duration of electricity service, daytime duration of electricity service, and the number of days without any electricity connection, at the 99% confidence level. Among these three factors, nighttime duration of electricity service has the greatest impact. To further promote the use of electric lights, intensive schemes to improve electricity quality are needed.[48] As demonstrated by above data, a large-scale adoption of improved lighting appliances has not yet taken place in India, despite the electrification scheme's introduction. In addition, there is no substantive effort to promote the use of renewable energy based lighting such as solar lamp. It is therefore demonstrated that the new circumstances do not make a continued validity of the current baseline not plausible, hence the current baseline does not need to be updated for the subsequent crediting period. CME has also added a specific monitoring parameter that would monitor the baseline fuel used for each household. Therefore, the continuation of use of current baseline lighting equipment is likely during the crediting period. Thus in line with the methodology AMS-III.AR, version 6, it is assumed that in the absence of the project activity, the baseline scenario would be the projected use of fossil fuels based baseline lighting devices. We, therefore, proceed to Step 1.3
Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.	This sub-step is to be applied only if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment and, the projects proponents or third party (or parties) would undertake an investment later due, for example, to the end of the technical lifetime of the equipment(s) before the end of the crediting period or the availability of a new technology. The baseline scenario identified at the time of validation of project activity was the continued use of Kerosene based lamps without any investment. There were no plans to undertake any investment towards the end of the technical lifetime of the equipment before the end of the project's crediting period or due to availability of a new technology. This sub-step also requires to sassess whether the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, as determined in the CDM-PDD, exceeds the crediting period for which renewal is requested. The identified baseline at time of registration i.e. Kerosene based lighting devices would have been continued to be operated in the absence of the project activity. These lamps are basic system comprising of wick and a kerosene container. This has no set lifetime and can be easily replaced with reusable containers.

[48] Lock-in for lighting: The puzzle of continued kerosene use among electrified households in six Indian states Xiaoxue Hou, Johannes Urpelainen

	As mentioned in the previous step, there has not been penetration of reliable electricity supply or renewable energy based lighting in India. Therefore, the continuation of use of current baseline equipment is likely during the crediting period. The most plausible baseline scenario is hence the use of Kerosene based lighting devices. In addition, without carbon finance, there has not been a large scale investment into the solar lighting technologies in India. So far, the renewable/efficient lighting based interventions has only been made possible by Carbon Finance and without Carbon Finance there are no similar investments being made in large scale adoption of solar lighting. Hence, as per the methodology provisions, it is assumed that in the absence of the PoA, the baseline scenario would be the projected use of fossil fuels for meeting similar lighting needs. Therefore, emission reductions are calculated by multiplying the Lamp emission factor by grid factor and dynamic baseline factor as per para 27 of AMS-III.AR. ver. 6. For determination of each parameter required for the emission reductions, please refer to Section I.6.1 of the PoA-DD part II. The baseline scenario of the project activity is therefore the continuation of use of the current equipment(s) without any investment and the projects proponents or third party(ies) did not plan to undertake any investment later, before the end of a crediting period, therefore the current baseline does not need to be updated for that crediting period or the crediting of emission reductions is not required to be limited to the period before the baseline equipment would cease its operation. In addition there are no mandatory requirements to use clean fuel in the country i.e. there is no restriction on continued use of kerosene for lighting applications. Hence we move to step 1.4
Step 1.4: Assessment of the validity of the data and parameters	Due to change in the monitoring methodology, there are new ex-ante parameters that have been added to the monitoring plan. - Lamp Emission Factor - Fuel use rate - Utilization rate - Leakage factor
Step 2: Update the current baseline and the data and parameters	
Step 2.1: Update the current baseline	As per the analysis during step 1, the baseline is still valid. However, there are parameters that needs to be updated which have been updated as per step 2.2 below.
Step 2.2: Update the data and parameters	As per this step, if the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, project participants should update all applicable data and parameters. Hence as per this step, CME has updated the below parameters that have got added due to change in the methodology: • Lamp Emission Factor • Fuel use rate • Utilization rate • Leakage factor

BASELINE DESCRIPTION – Stoves

A summary of baseline information for India is provided in this Section.

According to CDM Methodology AMS-II.G, version 11.1, "*It is assumed that in the absence of the project activity, the baseline scenario would be the projected use of fossil fuels to meet similar*

thermal energy needs as those provided by the project devices". The calculation of $f_{NRB,y}$, the fraction of woody biomass saved by this project activity is proposed to be carried out at the CPA level.

This generic CPA-DD applies a default value of 0.1 for parameter N_{old} (efficiency of the system being replaced) because the systems being replaced are three-stone fired stoves.

Owing to the geographical diversity of India and each CPA being situated in different parts of India, CME proposed to calculate the fNRB at the individual CPA level for all the CPAs that would be included under the current version of the PoA-DD.

BASELINE DESCRIPTION – SOLAR LIGHTING

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

In India, rural population lacks access to reliable round the clock electricity supply for meeting the lighting needs. 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. Rural households rely on kerosene for lighting but it is expensive and takes up a huge proportion of family budgets.

It has been observed that Kerosene is the main source of lighting energy for the rural household and a large proportion of rural population uses Kerosene for lighting.

Lack of access to reliable lighting limits the productivity of about large proportions of rural areas of the country, hindering peoples' ability to carry out basic activities at night or in the early morning, including household chores, reading, school work and business activities. Fuel-based lighting also has health and safety implications: chronic illness due to indoor air pollution, and risk of injury due to the flammable nature of the fuels used. Kerosene lamps emit fine particles that re major source of air pollution. These implications also have negative impact on the economy and reduced quality of life.

According to Methodology AMS III.AR, version 6, the default energy baseline is the use of Kerosene based wick lamps. The project lamps would replace the Kerosene based wick lamps and the project uses the default baseline option under the methodology.

I.6. Estimation of emission reductions

I.6.1. Explanation of methodological choices

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The methodological approach for solar lights and improved cookstove is explained as below.

For solar lighting:

The methodology AMS III.AR, version 6 provides for a default annual baseline emissions factor for the project lamps. The following assumptions are made about the equivalent baseline lighting system:

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

Where:

DV	=	Lamp Emission Factor (default is 0.092 t CO_2e per project lamp)
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 kgCO_2/liter)
LF	=	Leakage factor (1.0)
N	=	Number of fuel-based lamps replaced per project lamp (1.0)
NTG	=	Net-to-gross adjustment factor (1.0)

Baseline emissions are calculated below equation:

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

Where:

BE_y	=	Baseline emissions per project lamp in year *y* (t CO_2e)
GF_y	=	Grid Factor in year *y*, • Equal to 1.0 since charging option defined in paragraph 3(a) is used;[49]
DB_y	=	Dynamic Baseline Factor (change in baseline fuel, fuel use rate, and/or utilization during crediting period) in year *y*. Calculated as either: 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))

As per the methodology AMS III.AR, version 6 there are no project emissions for the projects involving solar PV as the charging option. Hence in this case the project emissions are zero.

The per-lamp baseline emissions are calculated in the Step above. To calculate total emission reductions, these must be aggregated across all lamps in use in the period under consideration. This is done using the following equations:

Project Emissions:

As per the methodology, in case of lamps charging options of Solar PV, the project emissions would be considered as zero. Hence $PE_y = 0$

Emission Reductions:

Annual emission reductions are calculated as:

[49] i.e. the charging option from solar PV, which is the case for lamps

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

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
$N_{i,j}$	=	Number of project lamps distributed to end users of type *i* with charging method *j*
$OF_{y,i,j}$	=	Percentage of project lamps distributed to end users that are operating and in service in year *y*, for each lamp type *i* and charging method *j.* Assumed to be equal to 100 per cent for years 1, 2 and 3, and equal to the value determined in paragraph 36 of methodology, for years 4, 5, 6 and 7[50]

Detailed calculation and equations are presented in Section I.6.3

For Improved cookstove:
The methodological approach for improved cookstoves is as follows –

In the absence of the project activity, the baseline scenario is the use of higher amounts of non-renewable biomass in the inefficient baseline stoves.

Emission reductions are calculated as:

$$ER_y = \sum_i \sum_j ER_{y,i,j} - LE_y$$

Where:

i	=	Indices different types of project device is introduced to replace the pre-project devices
J	=	Indices for the situation where there is more than one batch of project device.
ER_y	=	Emission reductions during year *y* in t CO_2e
$ER_{y,i,j}$	=	Emission reductions by project device of type *i and* batch *j* during year *y* in t CO_2e
LE_y	=	Leakage emissions in the year *y*

[50] The years refer to the operational years of project lamps (e.g. for project lamps distributed in year 3 of the crediting period years 1, 2 and 3 relate to the years 3, 4 and 5 of the crediting period and so forth).

$$ER_{y,i,j} = B_{y,savings,i,j} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\ fuel}$$

Where:

$B_{y,savings,i,j}$	=	Quantity of woody biomass that is saved in tonnes per cook stove device of type *i* and batch *j* during year *y*
$f_{NRB,y}$	=	Fraction of woody biomass that can be established as non-renewable biomass
$NCV_{biomass}$	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is 'air-dried').
$EF_{projected\ fossil\ fuel}$	=	Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass/charcoal by similar consumers. Use a value of 64.4 t CO_2/TJ.
$N_{y,i,j}$	=	Number of project devices of type *i* and batch *j* operating during year *y*
μ_y	=	Adjustment to account for any continued use of pre-project devices during the year *y*, when applying equations 7 and 9 (fraction) as per methodology. Use 1.0 in other cases.

$B_{y,savings,i,j}$ due to implementation of efficient thermal devices is estimated as per the Option 3 provided in AMS IIG version 11.1: water boiling test (WBT):

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

Where:

$B_{old,i,j}$: Annual quantity of woody biomass that would have been used in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device type i and batch j

$\eta_{new,i,j}$: Efficiency of the device of each type *i and* batch *j* implemented as part of the project activity

$\eta_{old,i,j}$: Efficiency of the pre-project device

1) Determination of the Share of Non-Renewable Biomass

CPAs will follow the f_{NRB} approach as per TOOL30 ver 2.0 "Calculation of the fraction of non-renewable biomass" at the CPA level .

3) Leakage

$By,savings,i,j$ is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required as per the para 39 of applied methodology AMS II.G Version 11.1.

4) The loss in efficiency of the project devices i in each batch j due to aging shall be accounted during the monitoring period y. Below option would be used during the crediting period:
- Determine the loss in efficiency annually from a representative sample of each batch and use the actual loss rate that is measured.

5) If the life span of devices is less than the crediting period it shall be demonstrated that the devices shall be replaced after the life span has ended. In such cases, if it cannot be demonstrated that the project devices will be replaced with new devices, no emission reductions can be claimed beyond the life span of the project devices.

6) Also, only one device per household would be distributed under the CPA. In case there are more than one device per household, those devices would not be credited.

Detailed calculation and equations are presented in Section I.6.3

I.6.2. Data and parameters fixed ex ante

For solar lighting products:

This section has been left blank intentionally

For **efficient cook stoves:**

Data/Parameter	$f_{NRB,y}$
Data unit	Fraction
Description	Fraction of woody biomass saved by project activity during year y that can be established as non-renewable biomass
Source of data	Value to be determined at the time of inclusion of CPA as per TOOL30 version 2.0 "Calculation of fraction of non-renewable biomass"
Value(s) applied	The f_{NRB} values to be determined at the time of CPA inclusion.
Choice of data or Measurement methods and procedures	All data used in the f_{NRB} calculation is to be calculated at the time of CPA inclusion as per TOOL30 version 2.0 "Calculation of fraction of non-renewable biomass".
Purpose of data	Calculation of baseline emissions
Additional comment	At the time of inclusion of CPA in the PoA, data from the most recent literature report will be used to calculate the $f_{NRB,y}$ values to be used for that CPA.

Data/Parameter	$EF_{projected\_fossilfuel}$
Data unit	tCO_2/TJ
Description	Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers.
Source of data	AMS-II.G Version 11.1 Methodology
Value(s) applied	64.4
Choice of data or Measurement methods and procedures	As given in methodology
Purpose of data	Calculation of baseline emissions
Additional comment	

Data/Parameter	$N_{p,HH}$
Data unit	Number
Description	Average number of persons served per household prior to project implementation
Source of data	Based on the "India in figures 2018" Report published by Government of India, Ministry of Statistics and Programme Implementation: http://mospi.nic.in/sites/default/files/publication_reports/India_in_figures-2018_rev.pdf
Value(s) applied	India: 4.9
Choice of data or Measurement methods and procedures	Established ex ante prior to project implementation
Purpose of data	Calculation of baseline emissions
Additional comment	

Data/Parameter	$B_{old,p}$
Data unit	tonnes/person/year
Description	Annual quantity of woody biomass that would have been used per person 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	Determined ex ante based on methodology default
Value(s) applied	India: Wood: 0.5 tonnes/capita per year
Choice of data or Measurement methods and procedures	Default value has been used
Purpose of data	Calculation of baseline emissions
Additional comment	

Data/Parameter	$B_{old,ij}$
Data unit	tonnes/year
Description	Annual quantity of woody biomass that would have been used in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device type *i* and batch *j*
Source of data	Based on default value of Bold,p and exante value of Np,HH,
Value(s) applied	2.45 or value determine at the time of CPA inclusion
Choice of data or Measurement methods and procedures	$B_{old,HH}$ divided by $N_{d,HH}$
Purpose of data	Calculation of baseline emissions
Additional comment	Bold,i,j equals $Bold,HH$ when only one project device per household is distributed.

Data/Parameter	LAF
Data unit	Fraction
Description	Net to gross adjustment factor
Source of data	AMS.II.G Version 11.1
Value(s) applied	0.95
Choice of data or Measurement methods and procedures	Default value as prescribed by methodology applied
Purpose of data	Calculation of baseline emissions
Additional comment	

I.6.3. Modalities for ex ante calculation of emission reductions

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For **solar lighting products:**

The methodology AMS III.AR ver.6 provides for a default annual baseline emissions factor for the project lamps. The following assumptions are made about the equivalent baseline lighting system:

The CPA uses the default lamp emission factor provided by the methodology. According to this option each lamp can be assumed to have an emission factor of 0.092 tCO_2e per lamp per annum. This is due to the fact the project choses to apply default fuel usage rate and defaults utilization rate as prescribed by the methodology.

$$DV - FUR \times O \times U \times EF \div 1000 \times LF \times n \times NTG$$

Where:

DV	=	Lamp Emission Factor (default is 0.092 t CO_2e per project lamp)
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 $kgCO_2$/liter)
LF	=	Leakage factor (1.0)
N	=	Number of fuel-based lamps replaced per project lamp (1.0)
NTG	=	Net-to-gross adjustment factor (1.0)

Baseline emissions are calculated per equation below:

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

Where:

BE_y	=	Baseline emissions per project lamp in year *y* (t CO_2e)
GF_y	=	Grid Factor in year *y*, • Equal to 1.0 since charging option defined in paragraph 3(a) is used;[51]
DB_y	=	Dynamic Baseline Factor (change in baseline fuel, fuel use rate, and/or utilization during crediting period) in year *y*. Calculated as either: 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 rcent available data for a three or five years average (fraction));

As per the methodology AMS III.AR, there are no project emissions for the projects involving solar PV as the charging option. Hence in this case the project emissions are zero.

The per-lamp baseline emissions are calculated in Baseline Step above. To calculate total emission reductions, these must be aggregated across all lamps in use in the period under consideration.

Annual emission reductions are calculated as:

[51] Based on the demonstration that fossil fuel is the predominant practice for lighting it is assumed all baseline emissions are from the consumption of fossil fuel burning for lighting.

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

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
$N_{i,j}$	=	Number of project lamps distributed to end users of type *i* with charging method *j*
$OF_{y,i,j}$	=	Percentage of project lamps distributed to end users that are operating and in service in year *y*, for each lamp type *i* and charging method *j.* Assumed to be equal to 100 per cent for years 1, 2 and 3, and equal to the value determined in paragraph 36 of methodology, for years 4, 5, 6 and 7[52]

Applying example calculations:

Number of project lamps: 10,000 (based on monitored data)
Lamp Emission Factor: 0.092 (fixed ex ante based on methodology values)
OF: 100% (for first three years)
Leakage: zero
Project emissions: zero

Hence, applying the above equations the emission reductions per 10000 lamps comes out to be 920 tCO_2e per annum.

For efficient cook stoves:

The methodology AMS II.G ver.11.1 provides the following approach:

$$ER_y = \sum_i \sum_j ER_{y,i,j} - LE_y$$

Where:

i	=	Indices for the situation where more than one type of project device is introduced to replace the pre-project devices[53]
J	=	Indices for the situation where there is more than one batch of project device
ER_y	=	Emission reductions during year *y* in t CO_2e
$ER_{y,i,j}$	=	Emission reductions by project device of type *i and* batch *j* during year *y* in t CO_2e
LE_y	=	Leakage emissions in the year *y*

[52] The years refer to the operational years of project lamps (e.g. for project lamps distributed in year 3 of the crediting period years 1, 2 and 3 relate to the years 3, 4 and 5 of the crediting period and so forth).

[53] For example, in some instances, full replacement of the pre-project device would require the implementation of more than one project device (e.g. one stove suitable for cooking and the other stove suitable for cooking/boiling water).

$$ER_{y,i,j} = B_{y,savings,i,j} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\ fuel}$$

Where:

$B_{y,savings,i,j}$	=	Quantity of woody biomass that is saved in tonnes per cook stove device of type *i* and batch *j* during year *y*
$f_{NRB,y}$	=	Fraction of woody biomass that can be established as non-renewable biomass[54]
$NCV_{biomass}$	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is 'air-dried')
$EF_{projected\ fossil\ fuel}$	=	Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers. Value used: 64.4 t CO_2/TJ
$N_{y,i,j}$	=	Number of project devices of type *i* and batch *j* operating during year *y*
μ_y	=	Adjustment to account for any continued use of pre-project devices during the year y, when applying equations 7 and 9 (fraction) as per methodology. Use 1.0 in other cases

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

$B_{old,i,j}$	Annual quantity of woody biomass that would have been used in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device type *i and* batch *j*
$\eta_{old,i,j}$	Efficiency of the old devices being replaced by project devices of type *i* and batch *j*
$\eta_{new,i,j}$	Efficiency of the project device *i* and batch *j*

Example calculations are demonstrated below. Other scenarios to follow similar approach with change in value of $B_{old,p}$ and f_{NRB}

Parameter Symbol	Definition	Value	Units	Source
$B_{old,i,j}$	Baseline wood consumption in each	2.45	Tonnes/year	Default value of fuel wood used as per the

[54] TOOL30 version 2.0 "Calculation of the fraction of non-renewable biomass" will be used to determine the value at the time of CPA inclusion.

	household in the project boundary			methodology: 0.5 tons per person per year Household Size: 4.9[55] person/household
$\eta_{old,ij}$	Baseline stove efficiency	0.1		A default value of 0.10 is used as the replaced system is a three stone fired stove (value cited in AMS-II.G Version 11.1)
$\eta_{new,ij}$	Project stove efficiency	0.45		Performance testing report for Powergram stove given by CVR Labs (P) Limited, dated 04/02/2015
$f_{NRB,y}$	Fraction of non-renewable biomass	0.70	Fraction	Assumed. Actual value to be determined at the time of CPA inclusion
$NCV_{biomass}$	Net calorific value of biomass	0.0156	TJ/Tonnes	IPCC default value cited in AMS-II.G Version 11.1
$EF_{projected\_fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers.	64.4	tCO_2/TJ	As per AMS-II.G Version 11.1
Leakage factor	Default factor for leakage related to the non-renewable woody biomass saved by the project activity	0.95	Fraction	As per AMS-II.G Version 11.1
$B_{y,savings,i,j}$	Quantity of woody biomass that is saved	1.91	Tonnes/year	Calculated
Energy Savings	Energy saved by each efficient cookstove	0.0083	GWh/year	Calculated
ER per household		1.273	tCO_2/cookstove	Calculated.
μ_y	Adjustment for usage of project devices	1	Fraction	Default value
Number of ICS	Proposed number of installations of improved cook stoves under the CPA in the first year	1000	Number	Proposed Value
ER_y	Emission reductions in the year y (y=1)	1,273	tCO_2e	Calculated

For details refer to the ER calculation spreadsheet

2) Determination of the Share of Non-Renewable Biomass

The value for fNRB will be calculated at the time of CPA inclusion.

[55] Based on the "India in figures 2018" Report published by Government of India, Ministry of Statistics and Programme Implementation: http://mospi.nic.in/sites/default/files/publication_reports/India_in_figures-2018_rev.pdf

3) Leakage

To take the conservative approach, a leakage adjustment of 95%, as per AMS II.G ver 11.1, has been applied to ER calculations,

I.7. Monitoring plan

I.7.1. Data and parameters to be monitored

For solar lighting – **Data / Parameter:**	**Ni,j**
Data unit:	Number of lights
Description:	Number of lights distributed to end users, i, type, j
Source of data:	MEC tracker platform
Value(s) applied	Each CPA will provide data on the number and type of lights they expect to be installed for CPA-specific estimates of expected reductions
Measurement methods and procedures:	The data will be recorded in a web-based tracker platform. The data will consist of unique number, number of units sold, to whom and where.
Monitoring frequency:	Annual
QA/QC procedures:	Each light installation will be recorded in the MEC Tracker System. Associated data will reside in the MEC Tracker Database, allowing each installation to be monitored .
Purpose of data:	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	GFy
Data unit:	Fraction
Description:	Grid factor in year y
Source of data:	AMS-III.AR. Version 6
Value(s) applied:	1
Measurement methods and procedures:	Default value (lamp charging option 3(a) as per the methodology)
Monitoring frequency:	Default Value
QA/QC procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	DBy
Data unit:	Fraction
Description:	Dynamic baseline factor in year y
Source of data:	AMS III-AR Version6
Value(s) applied:	1
Measurement methods and procedures:	Default value chosen as per option 1 provided in the methodology.
Monitoring frequency:	Default Value
QA/QC procedures:	
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	$f_{i,j}$
Data unit:	Fraction
Description:	The percentage of project lamps distributed to end users that are operating and in service
Source of data:	-
Value(s) applied	100%
Measurement methods and procedures:	Default value for the first three years of operation of a lamp as per the methodology.

	Post three years, for years 4-7, this value will be determined on the basis of sampling surveys.
Monitoring frequency:	Default value for three years. Determined on based of survey from years 4-7.
QA/QC procedures:	-
Purpose of data:	Calculation of baseline emissions
Additional comment:	

For efficient cookstoves

Data/Parameter	$N_{y,i,j}$
Data unit	-
Description	Number of project devices of type *i* and batch *j* operating during year *y*.
Source of data	MEC tracker platform
Value(s) applied	Each CPA will provide data on the number and type of cookstoves they expect to be installed for CPA-specific estimates of expected reductions. For calculation: 10,000 (assumed)
Measurement methods and procedures	Measured directly or based on a representative sample. Sampling standard shall be used for determining the sample size to achieve 90/10 confidence precision. A discount shall be applied based on the percentage of devices operational as determined by the sample survey e.g. if survey shows that 10% of the devices is non-operating, 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.
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	
Purpose of data	Calculation of emission reductions
Additional comment	-

Data/Parameter	$N_{d,HH}$
Data unit	Number
Description	Number of project devices per household
Source of data	MEC tracker platform
Value(s) applied	1
Measurement methods and procedures	-
Monitoring frequency	Recorded at the time of commissioning/distribution of project devices
QA/QC procedures	
Purpose of data	Calculation of baseline emissions
Additional comment	The results of ex post usage/monitoring survey should not be used to determine the value.

Data/Parameter	$\eta_{new,i,j}$
Data unit	Fraction
Description	Efficiency of the device of each type i and batch j implemented as part of the project activity.
Source of data	Performance testing report for Powergram stove given by CVR Labs (P) Limited dated 04/02/2015
Value(s) applied	0.40 (Manufacturer's specifications) – this is indicative based on one of the example models
Measurement methods and procedures	Manufacturer specifications on efficiency based on water boiling test (WBT) has been used.
Monitoring frequency	(i) Recorded at the time of commissioning/distribution (ii) Adjusted for the loss of efficiency as per paragraph 37(a)
QA/QC procedures	-.
Purpose of data	Calculation of baseline emissions
Additional comment	

Data/Parameter	μ_y
Data unit	Fraction
Description	Adjustment to account for any continued use of pre-project devices during the year *y*
Source of data	MEC Credit tracker platform
Value(s) applied	1
Measurement methods and procedures	This parameter would be monitored using following methods: 1) If the pre-project devices are decommissioned and no longer used, as determined by the monitoring survey its value is 1.0. If both the project devices and pre-project devices are used together, measurement campaigns shall be undertaken using data loggers such as stove utilization monitors (SUMs) which can log the operation of all devices (recording the situation of the device being used or not during any day 'd' of the measurement campaign) in order to determine the average device utilization intensity (to establish the relative share of the usage of the devices). The measurement campaign shall be conducted in at least 10 randomly selected participant households of the project activity or the component project activity (CPA) for at least 90 days during the year *y*. If seasonal variation is observed, the average value determined through the campaign shall be annualised taking into account seasonal variation of device utilization. 1. 2) Alternatively, surveys may be conducted if the use of data loggers to record the continued operation of baseline devices is demonstrated to be not practical, for example when the baseline device is the three stone fire. The surveys should be designed to capture the cooking habits and stove usage of households in the region, including quantification of use of baseline devices, by formulating questions and/or collecting evidences to determine the frequency of usage of both the project devices and baseline devices. For example if there were 3 pre-project devices per 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 0.66 is applied for the relevant monitoring period. Another example would be the case where there was only one pre-project device per household and its use during the project period continues along with the project stove to meet 25% of the cooking needs of the household in which case the adjustment factor will be 0.75. Where a more precise data is available i.e. the thermal capacity of the project and pre-project devices and respective utilisation hours, a weighted average adjustment factor may be used
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	- When the data loggers are used, the days when only project devices or only pre-project devices are used will be attributed accordingly. The days where both devices have been used, if the data loggers are able to detect and record the time each device has been used (e.g. in hours), the share in the total duration of utilization will be used to attribute a fraction of this day to one or to the other device. Alternatively, if the data loggers are not able to determine the duration of the utilization, but only the situation of the device being on or off (i.e. used or not used during that day), the share of 50:50 may be used

Data/Parameter	$\eta_{old,i,j}$
Data unit	Fraction
Description	Efficiency of pre-project device, which is a three-stone fire using firewood
Source of data	AMS II.G version 11.1
Value(s) applied	(i) Default 0.1 (ii) Established prior to start of implementation based on survey
Measurement methods and procedures	Based on the survey prior to implementation
Monitoring frequency	Fixed for each individual household when included in the project activity database
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter:	**Date of commissioning of batch *j***
Data unit:	Date
Description:	To establish the date of commissioning, the Project Participant devices would 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
Value (s) applied:	-
Measurement methods and procedures :	As per the dates captured in tracker database
Monitoring frequency:	Recorded once at the time of commissioning/distribution of the last project device in the batch
QA/QC procedures:	-
Purpose of data	-
Additional comment:	To be reported in the monitoring report

Data / Parameter:	**Date of commissioning of project device i**
Data unit:	Date
Description:	Actual date of commissioning of the project device.
Source of data:	Internal records
Value (s) applied:	-
Measurement methods and procedures :	As per the dates captured in tracker database
Monitoring frequency:	Recorded once at the time of commissioning/distribution
QA/QC procedures:	-
Purpose of data	-
Additional comment:	To be reported in the monitoring report

Data/Parameter	$NCV_{biomass}$
Data unit	TJ/tonne
Description	Net calorific value of non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonnes)
Source of data	IPCC
Value(s) applied	0.0156
Measurement methods and procedures :	The net calorific value of woody biomass is as given in 2006 IPCC Guidelines Reference: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2: http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html
Monitoring frequency	Default value
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	Life Span
Data unit	Number of years
Description	The operating life time of the project device.
Source of data	Manufacturer (certified by a national standards body or an appropriate certifying agent recognized by that body)
Value(s) applied	5 years
Measurement methods and procedures :	Manufacturer specifications
Monitoring frequency	Fixed and recorded at the time of commissioning/distribution
QA/QC procedures	-
Purpose of data	Calculation of emissions reductions
Additional comment	-

I.7.2. Sampling plan

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The sampling plan should define the below sections as per Chapter 6 of "Guideline: Sampling and surveys for CDM project activities and programme of activities version 4.0".
1.Sampling Design
2. Data to be collected
3. Implementation plan

The sampling plan takes into account the key parameters that are needed during the crediting period of the CPA. All required monitoring and documentation would be implemented, reported, consolidated and managed by the CME 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:

1.Sampling Design:

Objectives and Reliability Requirements:

The objective of sampling effort is to capture the value of parameter of interest (in line with applied methodology and Sampling (guideline and standard) with more than satisfactory level of confidence/precision for the emission reduction calculations. The parameters of interest are defined in the monitored parameter tables presented in section I.7.1 under "Data / Parameter".

Target Population:

The target population is rural end-users in India. In rural India, the cooking, lighting and drinking water requirements are similar. Hence the target population can be said to be homogenous in nature. Thus, simple random is used for all the monitoring parameters, and there are no sub-groups/primary sampling units which are only used for other kinds of sampling like multi-stage sampling etc.

Sampling method:
The proposed CPAs under this PoA will follow simple random sampling. While considering simple random of the sampling frame of the CPA, the sampling plan would account for sales vintage. The samples can be randomly chosen from the defined population up to the required sample size as calculated by the CME, using random generator tools. This will be done for each group of CPAs within a defined sampling frame or for each CPA in the case that CPAs are not grouped up for monitoring. Cross-CPA sampling may be utilized provided the requirements in the CDM Guideline: Sampling and surveys for CDM project activities and programmes of activities are met.

Sample size:
The measurement methods and procedures section of the monitored parameter table in section I.7.1, and as allowed by applicable methodology, the sample size will be chosen for a 95/10 confidence/precision in case of CME following biennial monitoring frequency for the parameter of interest, in case of annual monitoring frequency, 90/10 precision (90% confidence interval and 10% margin of error) is to be followed.
Where single sampling plan covering a group of CPAs is undertaken, in which case 95/10 confidence/precision is applied for the sample size calculation.
The sample size is determined based on sampling methodology explained in this section and considers the target population (sampling frame) and variance (in case of mean-based parameter).
The confidence/precision will be met as per monitoring frequency requirement. In case the desired confidence/precision is not met, then the CME would do over-sampling in accordance with para 18 and 19 of “Standard: Sampling and surveys for CDM project activities and programme of activities”

During sampling there may be non-response from the target population. Over-sampling by 20% may be used to avoid non-response, however, sampling may be cease once required confidence/precision is met.

A sample size calculation tool will be been designed to describe step by step the method in place and to estimate the minimum sample needed to satisfy statistical requirements for each monitoring parameter according to its sampling approach. Thus, the sample size calculation will be used for the monitored parameter in section I.7.1, that require sampling. Actual survey results will inform whether fewer or greater surveys will be needed to meet the required confidence/precision.
Although the monitoring team will undertake monitoring of various parameters simultaneously and on the same sample, the CME may decide to stop monitoring of a particular parameter during the process once the required precision for this parameter is achieved. The monitoring team will continue to monitor appliances in the sample with respect to the remaining parameter(s) until the required precision for these parameters is achieved again.

The coefficient of variation is estimated from most recent monitoring data for the PoA. In the case of parameters monitored for the first time the expected variation for that measure in the sample may be based on results from similar studies, pilot studies, or from the project planner’s own knowledge of the data.

Sampling Frame:
Since, description and characteristics of the target population are homogenous in nature, the sampling frame appropriate for the study is the entire population. For each CPA, 2 sampling frames will be considered i.e. 1 for each component activity type i.e. improved cookstoves + solar lamps.

2.Data to be collected:

Field Measurement:

This is defined in the tables in section I.7.1 under “Measurement methods and procedures”.

Quality assurance/Quality Control:
The collected data is ensured with regular training of the enumerators by the Carbon Project Manager. The enumerators are given a checklist to ensure the data collected from field is not missed. The PO staffs meet the target population regularly through weekly/monthly regular meeting and hence the response rates are maximum, The data/measurements are stored in MEC Credit Tracker platform for at least two years after crediting period end. Other QA/QC procedures adopted for individual monitoring parameters are elaborated in Section I.7.1.
The MEC Credit Tracker Platform is used to keep detailed records of all installations under each CPA. A credit tracker manual will be maintained that details out how credit tracker works.

Analysis:
The collected data is used as per applied methodology.

3.Implementation:
The sampling for surveyed data will be implemented consistent with the approach described in this section.
The managing entity will be responsible for monitoring and store the data in an electronic database. Primary data will be stored by the implementing entities/operators. The CME could use POs/external/CME staff for conducting the monitoring/sampling and training before every monitoring period is ensured to keep the quality of results.

The typical monitoring parameters for solar lighting system and improved cookstove are mentioned below:

Solar lighting system:

OFi,j – The percentage of project lamps distributed to end-users thar are operating in service
This parameter will be monitored based if the solar lighting systems distributed under the proposed CPA satisfies the condition as per para 19 of applied methodology (Option-2) to claim credits for up to 7 years.
For Option-2, 90/10 confidence/precision to be met and a minimum sample size of 100 (based on simple random sampling) to be followed. The monitoring conducted from 3rd year of the project (solar lamps) which can then be extrapolated for the remaining life of the project based on applied methodology.
If the CPA chooses Option-1, then no sampling/monitoring effort is required. As per the methodology the usage can be assumed as 100%.

Survey principles:
As per methodology AMS III A.R, version 6, the following the following survey principles shall be followed for activities related to determining number of project lamps in service and operating under the project:

(a) The sampling size is determined by minimum 90 per cent confidence interval and the 10 per cent maximum error margin; the size of the sample shall be no less than 100;
(b) Sampling must be statistically robust and relevant, i.e. the survey has a random distribution and is representative of the target population (size, location);
(c) The method to select respondents for interviews is random;
(d) The survey is conducted by site visits;
(e) Only persons over age 12 are interviewed;
(f) The PDD must contain the design details of the survey.

Improved cookstove:

μ_y- A combined monitoring effort is undertaken based on maximum sample size requirement. A minimum sample size of 30 shall be chosen in accordance with para 14 of CDM "Standard: Sampling and surveys for CDM project activities and programme of activities"

Other parameter of interests such as $N_{y,i,j}$, $Nd_{,HH}$, n_{old} are collected at the time of implementation and stored in MEC Credit Tracker system.
$N_{new,i,j}$ uses linear degradation approach based on manufacturer's thermal efficiency specification which will be presented for each stove type.

Sampling Methodology

To reduce monitoring efforts a single sample is drawn based on which all of the parameters determined via sampling shall be monitored. The CME will determine the number of users/appliances monitored during sampling for each of the parameters separately. The reason is that the variation within the values obtained will be different for each parameter. Since the precision of a sampled parameter depends on the variation of its values, the necessary number of users/appliances to be monitored in order to achieve the 5% or 10% precision will also depend on the variation of values. Therefore, although the monitoring team will undertake monitoring of various parameters simultaneously and on the same sample, the managing entity may decide to stop monitoring of a particular parameter during the campaign once the required precision for this parameter is achieved. The monitoring team will continue to monitor appliances in the sample with respect to the remaining parameter(s) until again the required precision for these parameters is achieved.

Statistical sampling using a random number generated will be used to select samples from sampling frames drawn from Credit Tracker for monitored parameters.

Simple random sampling equations are provided below.

The required confidence/precision may be achieved through different combinations of a cross-CPA sample size and within-CPA household sample sizes; if less CPAs are surveyed, more houses within the CPAs will need to be surveyed to achieve the required precision, and vice versa. The relative costs and practicalities of surveying across several CPAs will be balanced against the relative costs and practicalities of household surveys and a decision taken as to the most efficient balance between across-CPA surveying and within-CPA surveying.

Simple random sampling from CPA Project Databases

Step 1: For each monitoring period contact details from end-users are collected for all, or a subset of, appliances deployed. This is stored in the Credit Tracker Platform and serves as the basis from which sampling frames are developed.

Step 2: In order to reflect the different age of the appliances (i.e. the different deployment dates), the relative share of appliance vintages within the total population of appliances deployed as recorded in the Credit Tracker under the CPAs shall be established.

Step 3: Random sampling of users from within the sampling frame (considering vintage). The number of users to be selected shall be determined statistically to maximize reliability of results.

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 this programme, whichever occurs later.

Simple random sampling:

The below formulas are used for simple random sampling for mean and proportion based parameters. These formulas are taken from Guideline: Sampling and surveys for CDM project activities and programme of activities v4, which provides these formulas provided the following conditions are met –

1. The population is homogeneous
2. The applies confidence level is 90% and precision is 10% (as also prescribed by the applied methodology for monitoring parameter values to be determined through sampling).

Proportion based parameter:

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

Where:

n	= Sample size
N	= Total number of households
p	= Expected proportion
1.645	= Represents 90% confidence required
0.1	= Represents the 10% relative precision (0.1 X 0.5 = 0.05 = 5% points either side of p)

The above formula proposed to be used in the case of proportion based parameters is provided in page 28 of the Guideline: Sampling and surveys for CDM project activities and programme of activities v4.

Mean based parameter:

$$n \geq \frac{1.645^2 NV}{(N-1) \times 0.1^2 + 1.645^2 V}$$ Equation (18)

Where:

V	=	$\left(\frac{SD}{mean}\right)^2$
n	=	Sample size
N	=	Total number of households
$Mean$	=	Our expected mean
SD	=	Our expected standard deviation
1.645	=	Represents the 90% confidence required

The above formula proposed to be used in the case of mean based parameters is provided in page 36 of the Guideline: Sampling and surveys for CDM project activities and programme of activities v4.

Summary and Other General Principles:

1. The PO maintains in the Credit Tracker Platform a record of all clean energy products that are installed. The record includes the name, date of installation, model of CEP and location of

the product. All records are screened by the CME and cross-checked with the PO records to confirm the installation record is authentic and no double counting occurs.

2. The PO identifies the exact location of the CEP using GPS location and/or address of the household or organization.

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

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

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

The CME along with the PO will coordinate all ex-post monitoring activities in the PoA. The CME is ultimately responsible for implementing the monitoring plan, ensuring the quality of data obtained and the use of this data for emissions reduction calculations. The actual field measurements to be conducted during monitoring will most likely be performed by third parties contracted to the CME and/or PO. In the case of using contractors, however, the CME 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.

I.7.3. Other elements of monitoring plan

>>

As explained above, the MEC Credit Tracker Platform is used to keep detailed records of all installations under each CPA. Each installation is monitored annually to check usage status. Monitoring records are maintained in the Credit Tracker Platform.

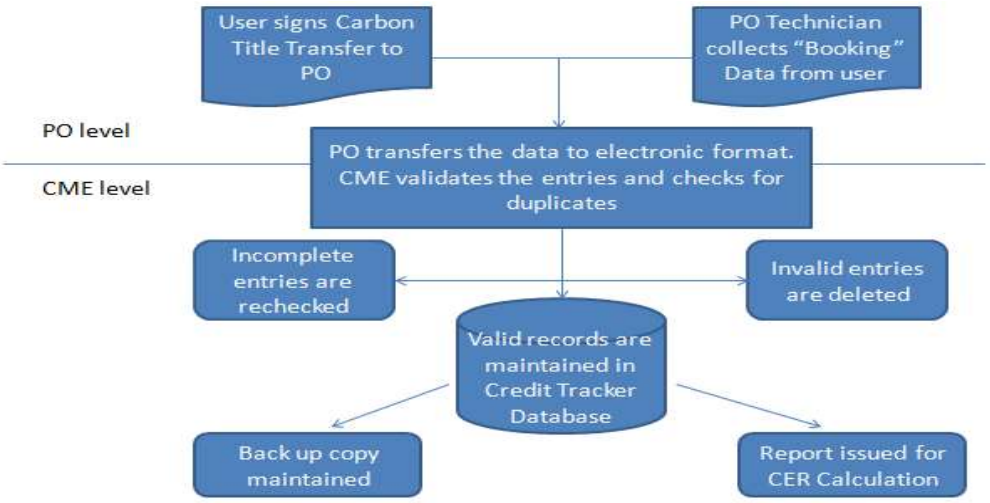
1. The Credit Tracker Platform keeps a record of all clean energy products that are installed.

2. The Credit Tracker Platform crosschecks the new records with the existing Platform in order to confirm that the installation record is authentic and that no double-counting occurs.

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

4. The unique system ID number which is linked to a gps location or verified address eliminates any risk of double-counting between CPAs.

Organizational Diagram of Monitoring Plan



Quality Assurance/Quality control

As the PoA is intended to include multiple regions within India with a high level of cultural diversity as well as different end user groups, there is no "one size fits all" approach for dealing with these issues. However, in order to avoid many of these problems the CME 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 CME 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 CME 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. The CME will ensure that contractors are adequately trained for the tasks they are contracted for. Training will also be provided on how to deal with non-responses, refusals and other problems should these occur.

SECTION J. Crediting period type and duration

>>

Type of crediting period – Renewable

Length of Crediting period - 7 years and 0 months

SECTION K. Eligibility criteria for inclusion of CPAs

>>

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion

1	Boundary and location of the CPA	The CPA is located within India.	Location and boundary is specified in the specific CPA-DD stating that the location is limited to India and supported with GPS coordinates. Document: Statement of CME that the location and boundary is within India and supported with GPS coordinates (XXX°N XXX°E).
2	No Double counting of CEP	A unique numbering or identification system for the CEP installed is applied. This shall ensure no double counting of CEPs within the same CPA, same PoA and ensure that stoves and solar lamps can be identified as belonging to this PoA and not to a PoA managed by any other CME. A legally binding contract between CME and manufacturer/micro finance institution/POs would be required to ensure that all carbon title is transferred to the CME. This shall ensure that POs, stove/lamp manufacturers and distributors do not claim ERs separately.	The unique numbering and PoA logo stamped on each CEP supported by the individual distribution record matching such information is included in the specific CPA-DD and consistent with the PoA-DD. A legally binding contract between CME and manufacturer/micro finance institution/POs would be established to ensure that all carbon title is transferred to the CME. Document: Credit Tracker stove sales receipt showing CME and PO information, end user details including name and address and CEP ID number. In addition to the sales receipt the programme logo shall be displayed on the CEPs and verifiable by the DOE. A legally binding contract between CME and manufacturer/micro finance institution/POs would be required to ensure that all carbon title is transferred to the CME.
3	CER ownership	End users receiving CEP under the specific CPA contractually cede their rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC to the CME of the PoA	The default CEP Booking Record is including the provision that emission reductions generated by the CEP are transferred from the end-user to the PO and ultimately owned by the CME. The receipts will clearly specify that carbon rights are ceded in favour of CME. Documents: Default Booking Record

4	No Double counting of CPA	The CPA is exclusively bound to the PoA. Confirmation that the programme activity has not been and will not be registered either as a single CDM project activity or as a CPA under another PoA	A declaration from the CME on its letterhead would be provided that the specific CPA will not be part of another single CDM project activity or CPA under another PoA. In addition, declaration from CPA operators as part of their contract with the CME, stating that they activities are not registered as part of another single CDM project activity of CPA under another PoA. Evidence: Check on UNFCCC website with date of access and contract between the CME and MFI.
5	Awareness and Agreement of those operating a CPA on PoA subscription	Contractual provisions to ensure that those operating the CPA are aware and have agreed that their activity is being subscribed to the PoA. In the case that the CME is not responsible for implementing the CPA, the organization responsible for CPA implementation, known as the Partner Organisation (PO), has signed a contractual agreement with the CME to participate in the PoA. This agreement: - Defines the ownership of the carbon emission reduction rights - Covers the PO's distribution and monitoring related responsibilities - Confirms that the CEPs to be distributed under the CPA have not and will not be distributed under any other carbon project (CDM project, PoA or voluntary carbon market project) - Cedes the PO's rights to the carbon credits generated from CPAs under the PoA to the CME	Contractual agreement for CPA operators, stating that they are aware and have agreed that their activity is being subscribed to the PoA
6	Non-diversion of ODA in case of Public funding	The CME and the CPA operator (in case of being different from the CME) shall confirm that there is no public funding or in the case of public funding, the Annex 1 party will confirm that funding is not a diversion of Official Development Assistance.	Statement of CME and the CPA operator (in case of being different from the CME) that there is no public funding Or In the case that there is public funding, an Annex 1 party will confirm that funding is not a diversion of ODA.

7	CPA Start Date	CPA start date shall not be before PoA webhosting date, i.e. 18/01/2012. Please note that not all CEP installations may have been deployed at CPA inclusion stage, however the CEP start date can also be checked during verification. In the event that any deployed CEP is found not in line with CPA start date, those CEP will not be counted in the emission reduction calculation	Starting date as stated in the CPA-DD section D is after 18/01/2012. Document: 1. Statement from CME that no CEP under the CPA was sold before the PoA webhosting date, i.e. 18/01/2012. 2. First CEP Booking Record of CPA
8	CPA Crediting Period	CPA starting date of the crediting period is date of inclusion or any date thereafter and crediting period not to exceed the PoA end date Each CPA shall provide verifiable evidence	A statement is included in the CPA-DD that the crediting period starting date is date of inclusion into registered PoA i.e. XXXX and the CPA crediting period will not exceed PoA end date.
9	Approval of CPA by CME	CME approved each CPA to be included into its registered PoA.	A letter by CME giving approval for the CPA to be included into its registered PoA.

10	Additionality of CPAs	Additionality will be demonstrated in accordance with Tool 21 Demonstration of additionality of small scale project activities version 13.1 The additionality would be demonstrated at the individual CPA level. Additionality of the CPA would be demonstrated by using either one of the options as per para 10 of Tool 21, version 13.1 10. Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers : (a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions; (b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions; (c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions; (d) Other barriers: without the project activity, for another specific reason identified by the project participant,	Documentation: 1. Description of CPA activity as documented in CPA-DD 2. Explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers : 1. Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions; 2. Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions; 3. Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions; 4. Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher. 5.

		such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.	
11	Application of Methodologies	The methodologies that can be applied to a CPA include: - AMS-III.AR (version 6) - AMS-II.G (Version 11.1) - AMS-III.AV (version 8) Each CPA can implement these methodologies in isolation. In addition, the following combinations of methodologies are eligible under the PoA: - AMS-III.AR (version 6) and AMS-II.G (Version 11.1) - AMS-III.AR (version 6) and AMS-III.AV (version 8)	As stated in CPA-DD, this CPA will deploy AMS-III.AR (version 6) and AMS-II.G (Version 11.1)
12	End User Group	The CPA is either aimed at households, community organisations (e.g. schools) or small/medium enterprises.	The CPA-DD describes the target end-user group and the appropriate baseline in CPA-DD.
13	LSC	Local stakeholder consultation for CPA to be conducted prior to inclusion at CPA level.	Document: LSC is conducted at the CPA level

14	Technical Requirement of Solar Lamps	All the lamps under the CPA would meet the following conditions as required by the methodology AMS III AR version 6: 1) All the lamps shall be charged by Renewable energy system 2) All solar lamps would also meet the Rated average life requirement as per the methodology. This would be 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. 3) Project lamps shall meet warranty requirements as per para 6 of the methodology AMS III AR, version 6 4) Project lamps shall meet the quality requirements as per para 7 of the methodology AMS III AR, version 6 5) The CPA-DD shall include the minimum requirements for the design specifications of project lamps including all the specifications as per para 9 of the methodology AMS III AR version 6. Please note that not all solar lighting systems may have been deployed at CPA inclusion stage, the 'type and number of solar lighting systems deployed' will however also be checked during verification, and in case any deployed solar lighting systems type will be found not in line with the methodology requirement, those solar lighting systems will not be counted for emission reduction calculation	As per the technical specification of solar lamps, each lamp distributed under the CPA, meets the following conditions: 1) Lamps is charged by renewable energy system 2) Rated average life is certified to be above xxxx hours, life is certified as the time at which the lamp's initial light output will decline by no more than 30 per cent. 3) Lamps meet the warranty requirement as per para 6 of the methodology AMS III AR, version 6 4) Lamps meet the quality requirement as per para 7 of the methodology AMS III AR, version 6 5) All minimum technical requirements are available and added in CPA DD as per para 9 of the methodology AMS III AR version 6. Document: Product data sheets or specification or product information sheets from manufacturer.

15	Technical Requirements of Solar Lamps	The PO must prove that fossil fuel, specifically kerosene, is used in the absence of the project activity as demonstrated by: 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. A representative sample survey (90% confidence interval, ±10% error margin) of target households; or Official statistics from the host country government agencies Or Peer reviewed literature in case government literature is not available.	Document: CPA DD would demonstrate that fossil fuel is commonly used fuel for lighting. This would described 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). Evidence: At least one of the below: 1) Peer reviewed literature 2) Official data statistics 3) Sample survey the prevalence of Kerosene as the lighting fuel in the baseline and establish on the basis of the publicly available documents and statistics.
16	SSC Limit of CPAs (Solar Lamps)	The installed capacity of the CPA will not increase beyond 60kt CO2 emission reductions per year (threshold as per EB 104 Annex 05 and applied methodology AMS III.AR. version 6) throughout the crediting period of the CPA. If a CPA exceeds the applicable limit in any year, the claimable emission reduction shall be capped based on the estimated GHG reductions in the CPA-DD[56]). Please note that not all solar lighting systems may have been deployed at CPA inclusion stage, the SSC limit for CPAs can however also be checked during verification, and in case any deployed solar lighting systems will be found not in line with CPA SSC Limit for CPAs requirement, those solar lighting systems will not be counted for emission reduction calculation	The estimated maximum number of solar lighting systems is to be defined in the CPA-DD according to the SSC threshold limit of 60kt CO2 equivalent emission reductions per year.

[56] As per EB 101, Annex 03

17	Technological requirements for Improved cook stoves	The CPA consists of distribution of domestic ICS, stove type defined in the CPA-DD and hence appliances involving the efficiency improvements in the thermal applications of non-renewable biomass as per AMS II. G, ver. 11.1. Please note that not all ICS may have been deployed at CPA inclusion stage, the 'type and number of ICS deployed' will however also be checked during verification, and in case any deployed ICS type will be found not in line with the methodology requirement, those ICS will not be counted for emission reduction calculation.	Specification of ICS type and compliance with the technological requirements of AMS II G will be described in the CPA-DD. Document: Certification by a national standards body or an appropriate certifying agent recognized by it or manufacturer specifications.
18	Efficiency of the Improved cook stoves	The ICS disseminated under the CPA will be single pot, multi pot or in-situ cookstoves that have a specified efficiency of at least 20%	All ICS disseminated under CPAs to be included in this PoA shall have an efficiency of at least 20% which will be substantiated through technical specification from manufacturer or certificate from a national standards body or a certifying agent recognized by it. Document: Efficiency specification from manufacturer or certificate from a national standards body or a certifying agent recognized by it.
19	Technical Requirements for Improved cook stoves	The PO must monitor the baseline stove that is being replaced to ensure that only the displacement of traditional unimproved stoves is credited.	As stated in section I.7.1, the baseline stove of each end-user will be recorded at the point of sale.
20	Technical requirement for Improved cook stoves	Only new ICS will be disseminated	Specification of stove type and compliance with the technological requirements of AMS II G will be described in the specific CPA-DD. Document: 1. Statement from CME that only new stoves will be disseminated under the CPA
21	Non-renewability of biomass	In accordance with methodology AMS II G: Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods	Document: https://www.sciencedirect.com/science/article/pii/S1364032104000632 (Table 1, page 381) The report shows that historical record of fuel wood usage in India.

22	SSC Limit for CPAs for Improved cook stoves	The CPA will remain under the thermal threshold of 180 GWh/annum thermal energy savings (threshold as per clarification request SSC_233) throughout the crediting period of the CPA. If a CPA exceeds the applicable limit in any year, the claimable emission reduction shall be capped based on the estimated GHG reductions in the CPA-DD[57]). Please note that not all ICS may have been deployed at CPA inclusion stage, the SSC limit for CPAs can however also be checked during verification, and in case any deployed ICS will be found not in line with CPA SSC Limit for CPAs requirement, those ICS will not be counted for emission reduction calculation.	The estimated maximum number of ICSs is to be defined in specific CPA-DD according to the equation provided in PoA-DD Section I.6.3

PART III. Generic component project activity (CPA)

SECTION H. Description of generic CPA

H.1. Title of generic CPA

>>
MicroEnergy Credits POA – Water and Solar - CPA XX

H.2. Reference number of generic CPA

>>
9181-PX-ZZZZ-CPZ

H.3. Purpose and general description of generic CPA

>>
In rural areas of India there are frequent power outages and low voltage so rural households must use kerosene for indoor lighting, which also contributes to indoor air pollution. In addition, people obtain their drinking water supply from wells, which they then boil using inefficient stoves to make it safe for drinking.

The proposed small-scale Component programme activity (SSC-CPA) involves marketing, distributing, and financing approximately xxx solar lanterns, and xxx water purifiers, for low-income households and microentrepreneurs in the _____ region of India. These products provide clean, renewable power for lighting and water purification.

[57] As per EB 101, Annex 03

Table A.1.2 Estimated Water Purifiers in Operation[58]

Year	Sales
Year 1	XX
Year 2	XX
Year 3	XX
Year 4	XX
Year 5	XX
Year 6	XX
Year 7	XX

Table A.1.3 Estimated Solar Lamps in Operation[59]

Year	Sales
Year 1	XX
Year 2	XX
Year 3	XX
Year 4	XX
Year 5	XX
Year 6	XX
Year 7	XX

The program is a voluntary initiative coordinated by MicroEnergy Credits, the CME of the PoA, and implemented by Partner Organization _____.

Under the CPA, MicroEnergy Credits 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 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 goal of the CPA is to use carbon finance to enable installations of approximately xxx solar lanterns, and xxx water purifiers for low income households in the _____ region of India, resulting in the following sustainable development benefits:

- **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.
- **Economic benefits:**
    - Households and microentrepreneurs will achieve energy savings from reduced spending on biomass fuel and kerosene

[58] The actual water purifier sales volume might be different than those mentioned above depending upon the demand of stoves. ERs shall be calculated at actuals complying with relevant methodological requirements.

[59] The actual solar lamp sales volume might be different than those mentioned above depending upon the demand of stoves. ERs shall be calculated at actuals complying with relevant methodological requirements.

  - Microentrepreneurs will be able to spend more time on income-generating activities due to better lighting in the evenings
  - The expansion of the clean energy supply chain to rural regions will generate jobs, both at PO level and at clean energy product suppliers
- **Health benefits:** There will be lesser fire risks from kerosene for families and microentrepreneurs
- **Environmental benefits:** It will reduce emissions of greenhouse gases from usage of kerosene for lighting

The small-scale project type applicable to the generic CPA in accordance with the project standard v2 is Type III. The solar lamp and water purifier will individually follow the Type-III small-scale activity threshold of emission reductions less than 60,000 tCO_2/annum.

H.4. Technologies/measures

>>

Water purification system:

This CPA will deploy Low greenhouse gas-emitting safe drinking water production systems to achieve water quality defined in a relevant national standard or guideline for drinking water quality, as also request by AMS III.AV ver. 8. The water purifiers will be deployed in households as well as in communities/institutions. Few examples of the water purification models which can be deployed in the specific CPAs:

HUL Pureit classic 23 L:

This is a large size purifier with a 23-litre capacity. It includes an activated carbon trap that removes harmful pesticides and undesirable odor. It also has an auto shut-off feature that ensures water purity. In the absence of the project activity, the households would have continued to boil water for drinking purposes. The technical specifications[60] of the water purifier are as follows -

Size – 61 cm X 29 cm X 21 cm

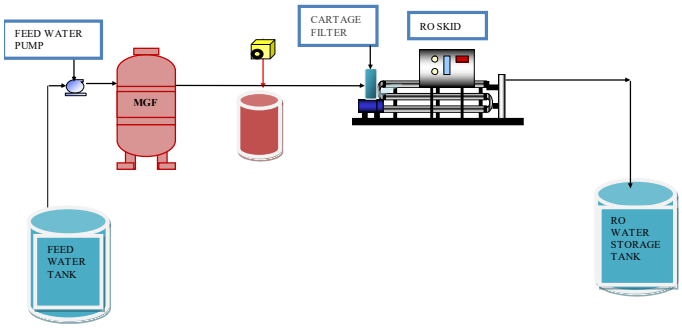
Net weight: 4.1 kg

Life span under standard use conditions: The life span of the germ kill kit used by the purifier has a capacity of 1500 l after which it must be replaced. The life of the kit therefore depends on how much water is purified by the user every day.

ION Exchange – 200 LPH model:

This model will be specifically deployed for distribution and installation in communities and community facilities like school, small businesses, panchayat center etc.

[60]Manufacturer's certificate on specifications



The water generation system is designed to produce treated water based on the following requirements:

SYSTEMS	FLOW
Feed Water Pump	1.0 m3 Hr
Multigrade Sand Filter	1.0 m3 Hr
Antiscalent Dosing	1.5 LPH (max)
Cartage Filter	5 µ
RO Skid	200 LPH

A variety of other water purification systems can be offered under the PoA which would meet all the methodological criteria.

Baseline water purification systems: In the baseline the user group relies on boiling water for making it safe for drinking. This is primitive method of water purification and does not involve any specific equipment type or specifications.

The baseline consists of boiling water by using non-renewable biomass for making water fit for drinking purpose. This is further elaborated in section I.5 below.

Solar lighting systems:

A variety of solar lighting systems can be offered under the PoA. 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.

Some of the models that will be distributed, including their technical specifications[61] are –

1) d. Light S300
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

[61] As per manufacturer's product information sheet

Lifetime of module – 15 years
Battery lifetime – 5 years
Electronics lifetime – 5 years
Physical protection against environmental factors - YES

2) Sunking Home 120

Luminous intensity (Lumens): 590
Solar Panel: 12 Watt
Solar Panel Lifetime: 15 years
Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years
Wattage – 5.28 W
Battery – Li-Fe-PO4, 12000mAh, 3.3 V
Rated Lamp life – 10,000 hours
Warranty – 2 Years DBT/SRT – 3.5 hours (Default)
Physical protection against environmental factors - YES

There could be various other solar lighting models distributed under this PoA. All products contain a solar panel, lights as shown in the photograph –

Baseline lighting systems: In the baseline the user group relies on fuel based lighting solutions like Kerosene wick lamps. This is primitive method of lighting and does not involve any specific equipment type or specifications.

The baseline consists of Kerosene based lamps for meeting the lighting needs of the user group. This is further elaborated in section I.5 below.

SECTION I. Application of selected methodologies and standardized baselines

I.1. Reference to methodologies and standardized baselines

>>
The generic-CPAs will use the following approved small-scale methodologies:

- For solar lighting and solar electric/PV systems, the SSC-CPAs will use the small-scale methodology AMS-III.A.R "Substituting fossil fuel-based lighting with LED/CFL lighting systems" (Version 6)

- For water purifiers, the SSC-CPAs will use the small-scale methodology AMS III.AV "Low greenhouse gas-emitting safe drinking water production systems" (Version 08)

This CPA will also use the following Tools:

TOOL30: Calculation of the fraction of non-renewable biomass[62]
TOOL20: Assessment of de-bundling for small-scale project activities[63]
TOOL 11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period[64]
TOOL03: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion[65]
TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation[66]

[62] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v2.0.pdf

[63] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-20-v1.pdf

[64] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

[65] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf

[66] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf

TOOL21: Demonstration of additionality of small scale project activities version 13.1[67]

Both the methodologies are falling under SSC type, Type III, and the individual number of emission reductions for each component is restricted to 60,000 tons of CO_2e/annum under this CPA.

I.2. Applicability of methodologies and standardized baselines

>>

AMS-III.A.R "Substituting fossil fuel-based lighting with LED/CFL lighting systems" (Version 6) for solar lights (Version 6)

According to the Emission Reduction calculation for Solar Lamps proposed to be deployed, the proposed SSC-CPA has a total emission reductions below the SSC limit of 60,000 tCO_2/annum for Type-III project activities.

The applicability of the methodology is met as follows –

AMS III.AR. version 6	
Applicability condition	**Justification of applicability**
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 CPA undertakes distribution of solar lighting systems (LED or CFL) to replace wick based kerosene lamps, thus this meet this applicability condition
This methodology is applicable only to project lamps whose batteries are charged using one of the following options: (a) Charged by a renewable energy system included as part of the project lamp (e.g. a photovoltaic system or mechanical system such as a hand crank charger); (b) Charged by a standalone distributed generation system (e.g. a diesel generator set) or a mini-grid, i.e. that is not connected to a national or regional grid; (c) Charged by a grid that is connected to regional/national grid.	Since the CPA 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
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) (b) 10,000 hours for Option 2, paragraph 4(b)	Before inclusion, each CPA will choose to apply either option 1 or option 2. If the CPA chooses to apply option 1, the manufacturer's specification for the lighting devices under the CPA would demonstrate that rated average operational life is above 5,000 hours based on the appropriate testing results. If the CPA chooses to apply option 2, and the manufacturers specification for the lighting devices under the CPA would demonstrate that rated average operational life is above 10,000 hours based on the appropriate testing results.

[67] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v13.1.pdf

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.
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 PoA. Rated life would be certified by the lamps manufacturer in accordance with the requirement of this condition. All the technical criteria would also be checked as per CPA eligibility criteria number 14 at the time of inclusion. 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.
Measures are limited to those that result in emissions reductions of less than or equal to 60 kt CO_2 equivalent annually.	As demonstrated in the CPA-DD, the total emission reductions are less than the small scale threshold of 60,000 t CO2 equivalent annually, as demonstrated in the ER sheet.
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
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):	DBT for the project lamps is XXX hours (equal to or greater than 4 hours) based on manufacturer's product specification. This is also covered under the eligibility criteria 14 and will be checked at the time of CPA inclusion. 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.

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; c. The project lamp shall be fully recharged from a discharged state after eight hours of charging.	
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 CPA proposed to distribute the solar lamps through micro finance institutions sales channel or through manufacturer sales channel. (a) Fossil fuel-based lighting is a common practice in India. This has been well documented in the generic CPA-DD based on the peer reviewed literature, demonstrating that fossil fuel is the commonly used fuel for lighting. Also, for all the lamps distributed under the CPA, 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. This is also covered under eligibility condition number 2 under the CPA. In addition, each of the lamp distributed under the project would be physically marked as CDM project lamp. A legally binding contract between CME and manufacturer/micro finance institution/POs would be established to ensure that all carbon title is transferred to the CME. (d) There are no prevalent regulations in Indian region. However, the CME and CPA implementer would follow any regulations that come up during the crediting period of the CPA.
The project design document shall include the minimum requirements for the design specifications of project lamps including the following specifications:	All the requisite details for each model of the solar lamp have been mentioned in the CPA DD. In addition, these requirements are also covered under the eligibility criteria number 14.

(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).	

AMS-III.A.V. “Low greenhouse gas-emitting safe drinking water production systems” (Version 8)

According to the Emission Reduction calculation for Water purifiers proposed to be deployed, the proposed SSC-CPA has a total emission reductions below the SSC limit of 60,000 tCO_2/annum for Type-III project activities.

The methodology is applicable because the proposed SSC-CPA fulfills the following criteria:

AMS III.AV. version 8	
Applicability condition	**Justification of applicability**
This methodology comprises introduction of Low greenhouse gas-emitting safe drinking water production systems to provide safe drinking water (SDW). Water purification technologies that involve point-of use (POU) or point-of-entry (POE) treatment systems for residential or institutional applications such as systems installed at a school or a community centre are included. The examples include, but are not limited to, water filters (e.g. membrane, activated carbon, ceramic filters), solar energy powered ultraviolet (UV) disinfection devices, solar disinfection techniques, photocatalytic disinfection equipment, pasteurization appliances, chemical disinfection methods (e.g.	The program will introduce Point of Use (POU) or point-of-entry (POE) devices for residential and institutional applications, such as gravity based water purifiers, RO/UV based water purifiers and water kiosks.

chlorination), combined treatment approaches (e.g. flocculation plus disinfection). The methodology is also applicable to water kiosks that treat water using one or more of the following technologies: chlorination, combined flocculant/disinfection powders and solar disinfection. In case the water kiosk is using solar disinfection, project proponents need to implement measures to prevent recontamination (e.g. disinfecting containers, sealing containers and hygiene training).	
Soil filtration schemes (boreholes, wells) that include container disinfection (e.g. chlorination) may be applied. Project proponents shall demonstrate ex ante that rehabilitation and/or construction of the wells complies with relevant national and/or international standards and that measures are taken to ensure that water and well are not contaminated.	This PoA would not involve soil filtration systems (boreholes, wells). Hence, this condition is not applicable.
Prior to the implementation of the project activity, a public distribution network supplying SDW to the project boundary does not exist.[68]	Each CPA shall demonstrate this condition at the CPA level in the command region of the water distribution system. This condition would also be checked annually during the monitoring period by each CPA.
It shall be demonstrated based on laboratory testing [69] or official notifications (for example notifications from the national authority on health) that the application of the project technology/equipment achieves compliance either with: (i) the Comprehensive Protection performance target as per "Evaluating household water treatment options: Health based targets and microbiological performance specifications" (WHO, 2011) and "International Scheme to Evaluate Household Water Treatment Technologies" (WHO, 2014); or (ii) an applicable national standard or guideline. Applicable national standard should be based on laboratory efficacy testing that, at a minimum, includes quantitative microbial measures of pre- and post-treatment challenge waters [70] that are representative of potential drinking water sources, and that includes measured reductions based on at least one pathogen class (bacteria, viruses, protozoa).	Each CPA will ensure compliance as per the CPA eligibility criterion 20.
In cases where the life span of the water treatment technologies is shorter than the crediting period of the project activity, there shall be documented measures in place to ensure that	Yes, in case lifespan is shorter than the crediting period, the CPA would undertake following measures to ensure this condition is met:

[68] This methodology is also applicable in case a public distribution network exists, but is not supplying SDW.

[69] The testing should be undertaken under conditions that are representative of the operation conditions of the project site(s) including feed water.

[70] Challenge water" is synonymous with "test water" – this is the experimental water that has been spiked with microbes (a "microbial challenge") in order to demonstrate the potential for the technology to reduce microbes.

end users have access to replacement purification systems of comparable quality.	- Though education of using appropriate water treatment system - By making available the replacement devices - By making available the replacement filtration media
It should be demonstrated that the project appliances use technologies that meet the technology standards as per paragraph 4(b), and that they deliver microbiologically safe drinking water.	Each CPA will ensure compliance as per the CPA eligibility criterion 20.

According to the Emission Reduction calculation for Solar Lamps & Water purifiers proposed to be deployed, the proposed SSC-CPA has a total emission reductions below the SSC limit of 60,000 tCO_2/annum for Type-III project activities for each of these components individually.

Applicability of applied tools:

TOOL30: Calculation of the fraction of non-renewable biomass[71] Version 2.0	
Applicability Condition	**Justification of applicability**
This tool may be used by: (a) DNAs to submit region/country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or (b) project proponents to calculate project or PoA-specific f_{NRB} values.	Since the DNA calculated/approved values for f_{NRB} are not available, CME proposes to apply this tool to calculate project specific (CPA-Specific) f_{NRB} values. Hence this condition is fulfilled
For project or PoA specific fNRB values, project proponents shall assess the area where biomass is sourced and justify the selection of the area in CDM project design documents.	The f_{NRB} values shall be demonstrated at the CPA level. The CPA-DD shall assess the area from where biomass is sourced and the area chosen shall be specific to the boundary of the CPA, and shall be justified at the CPA-DD level.

TOOL20: Assessment of debundling for small-scale project activities[72] Version 4.0	
Applicability Condition	**Justification of applicability**
This methodological tool is applicable to proposed small-scale project activities and small-scale CPAs in order to check whether they are debundled components of largescale project activities.	Since the PoA involves addition of small-scale project (CPAs), hence this tool is applicable. Hence this condition is fulfilled

[71] https://cdm.unfccc.int/Reference/tools/index.html

[72] https://cdm.unfccc.int/Reference/tools/index.html

Tool 11 is applicable since the PoA is going for crediting period renewal and this is used for demonstrating the validity of the baseline

"TOOL03: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"

This tool provides procedures to calculate project and/or leakage CO2 emissions from the combustion of fossil fuels. It can be used in cases where CO2 emissions from fossil fuel combustion are calculated based on the quantity of fuel combusted and its properties. This tool is applicable for use along with AMS-III.AV. as defined in the methodology.

"TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation": This tool is applicable as the emissions are calculated for electricity consumption for the electricity purchased from the grid as per para 5(a) of the Tool 05.

I.3. Application of multiple methodologies

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This generic CPA combination uses two different technologies and hence generic CPA applies two different methodologies:

1) AMS-III.A.V. "Low greenhouse gas-emitting safe drinking water production systems" (Version 8)
2) AMS-III.AR. - Substituting fossil fuel-based lighting with LED/CFL lighting systems, version 6.

As per para 12 of the Guidelines for the consideration of interactive effects for the application of multiple CDM methodologies for the POA, version-1, EB-68, Annex 3:

Analysis of the interactive effects and accounting for them by the CME is limited to cases where only small-scale methodology(ies) are applied in a CPA. Further, only the types of situations described in paragraph 9(a), (c) and (d), involving the application of a combination of methodologies, are considered and it is assumed in all other cases that the issue is addressed in the respective methodologies.

As per the situations described in the para 9, such situations only apply when multiple methodologies are applied for same technology in the PoA, or when multiple technologies are using same methodology. Here in this case, only one methodology is used specific technology.

Hence, multiple methodologies are not applied for any particular Technology/Measures. There is no possibility of cross effects as there is no exchange of energy or mass transfer between different measures within the CPA.

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

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For solar lights:

Source		GHG	Included?	Justification/Explanation
Baseline	Combustion of kerosene fuel used for light; power plants serving the electricity grid	CO_2	Yes	Primary source of emissions
		CH_4	No	Minor source
		N_2O	No	Minor source

Source		GHG	Included?	Justification/Explanation
Project activity	Renewable energy source solar lamps used for light	CO_2	No	Project activity does not involved consumption of fossil fuels or electricity therefore no CO2 emissions are generated
		CH_4	No	Minor source
		N_2O	No	Minor source

For solar lighting systems, the project boundary is defined in line with the requirements stated in para 17 of AMS III.AR v7 and includes the physical, geographical site of the renewable energy system i.e all the project lamps as well as the solar energy based charging systems.

For water purifiers:

Source		GHG	Included?	Justification/Explanation
Baseline	CO_2 emissions from the fossil fuel utilized for boiling water displaced due to project activity.	CO_2	Yes	Important source of emissions
		CH_4	No	Minor source of emissions
		N_2O	No	Minor source of emissions
Project	Operation of the project water purification system	CO_2	No	Minor source of emissions
		CH_4	No	Minor source
		N_2O	No	Minor source

For water purifiers, the project boundary is defined in line with the requirements stated in para 11 of AMS.III.A.V v8 and includes the physical, geographical sites of the low greenhouse gas emitting technologies for water purification installed under the PoA/CPA and the household/institutional buildings where the consumers of safe water provided by the systems are located.

I.5. Establishment and description of baseline scenario

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Validity of the current baseline

The validity of the baseline is assessed according to CDM TOOL 11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period

1) Solar Lamps: compliance and explanation of tool-11

Table – 2 Solar Lamps

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies	There are no mandatory national or sectoral policies in India that are prohibiting the use of Kerosene or other fossil fuel based lighting technologies. Rural household sector in India continues to experience considerable energy loss due to inefficient household appliances for lighting, due to inefficient technologies such as Kerosene wick lamps.
Step 1.2: Assess the impact of circumstances	In this section, we examine the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario. We also assess the availability of new fuels or raw materials in the identification of the current practice for the baseline emissions.

	During the past years since the PoA registration, there was a focus on increased electrification of rural areas by the Government. However, Government considers a village as electrified when only 10% of the Households in the villages get electricity connection.[73] In addition to this, there is widespread energy poverty prevalent in rural areas of India. As per a recent study[74], Overall in rural India, 86.2% people are energy-poor. Among all the 35 states of India, 12 have more than 90% rural population energy-poor. The five states with more than 95% share of population energy-poor in rural areas are: Chhattisgarh, Jharkhand, Odisha, Bihar, and Uttar Pradesh. Bihar has the dubious distinction of an entity with 72.5% rural population as extreme energy-poor, i.e., deprived of modern energy as prime source for both cooking and lighting. Uttar Pradesh follows Bihar with the corresponding figure of 57.5%. Hence, even though there have been efforts of electrification, but adoption has been limited either due to last mile connectivity challenges or grid stability or due to overall lack of financial resources to be able to afford electricity. As per another study [75], electrification, or providing an electricity connection, does not necessarily mean reliable electricity access for households. Currently, electricity supply is highly unreliable for most rural consumers. The Electricity Supply Monitoring Initiative (ESMI) by Prayas Energy Group has been monitoring hourly power supply quality since 2013 across India—covering more than 50 districts and 350 locations as of April 2017—and is finding significant power-quality issues, especially in rural areas, despite the significant increase in power availability. More specifically, ESMI data shows that rural areas in several states continue to face regular power-cuts that last for several hours, while urban areas receive reliable power supply during the same time. For example, there was no evening (5 PM to 11 PM) electricity supply in the rural villages monitored for more than 58% (Uttar Pradesh) and 39% (Bihar) of the time, on average, during all of 2016. Below are the excerpts from a recent scientific literature published by John Hopkins in 2019, “Lock-in for lighting: The puzzle of continued kerosene use among electrified households in six Indian states”, Electricity is the most commonly used form of energy for artificial lighting in modern society. Despite a rapid growth in the rate of electrification, 9% of electrified Indian households in our six sampled states continued to use kerosene as their primary lighting fuel in 2018. This appears as a puzzle considering the benefits of electric lights. Using a panel survey of rural households in six states in India, we examine why some grid-connected households primarily used kerosene lamps for illumination. We use a logistic regression model to test our hypothesis regarding the relationship between primary lighting choices and electricity quality. The results show that household primary lighting choices are correlated with nighttime duration of electricity service, daytime duration of electricity service, and the number of days without any electricity connection, at the 99% confidence level. Among these three factors, nighttime duration of electricity service has the greatest impact. To further promote the use of electric lights, intensive schemes to improve electricity quality are needed.[76]

[73] http://www.ddugjy.gov.in/page/definition_electrified_village

[74] Measuring Energy Poverty: A Households Level Analysis of India Hippu Salk Kristle Nathan Lakshmikanth Hari available at http://ncds.nic.in/sites/default/files/WorkingandOccasionalPapers/WP72NCDS.pdf

[75] https://www.sciencedirect.com/science/article/pii/S0301421519303854

[76] Lock-in for lighting: The puzzle of continued kerosene use among electrified households in six Indian states Xiaoxue Hou, Johannes Urpelainen

	As demonstrated by above data, a large-scale adoption of improved lighting appliances has not yet taken place in India, despite the electrification scheme's introduction. In addition, there is no substantive effort to promote the use of renewable energy based lighting such as solar lamp. It is therefore demonstrated that the new circumstances do not make a continued validity of the current baseline not plausible, hence the current baseline does not need to be updated for the subsequent crediting period. CME has also added a specific monitoring parameter that would monitor the baseline fuel used for each household. Therefore, the continuation of use of current baseline lighting equipment is likely during the crediting period. Thus in line with the methodology AMS-III.AR, version 6, it is assumed that in the absence of the project activity, the baseline scenario would be the projected use of fossil fuels based baseline lighting devices. We, therefore, proceed to Step 1.3
Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.	This sub-step is to be applied only if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment and, the projects proponents or third party (or parties) would undertake an investment later due, for example, to the end of the technical lifetime of the equipment(s) before the end of the crediting period or the availability of a new technology. The baseline scenario identified at the time of validation of project activity was the continued use of Kerosene based lamps without any investment. There were no plans to undertake any investment towards the end of the technical lifetime of the equipment before the end of the project's crediting period or due to availability of a new technology. This sub-step also requires to sassess whether the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, as determined in the CDM-PDD, exceeds the crediting period for which renewal is requested. The identified baseline at time of registration i.e. Kerosene based lighting devices would have been continued to be operated in the absence of the project activity. These lamps are basic system comprising of wick and a kerosene container. This has no set lifetime and can be easily replaced with reusable containers. As mentioned in the previous step, there has not been penetration of reliable electricity supply or renewable energy based lighting in India. Therefore, the continuation of use of current baseline equipment is likely during the crediting period. The most plausible baseline scenario is hence the use of Kerosene based lighting devices. In addition, without carbon finance, there has not been a large scale investment into the solar lighting technologies in India. So far, the renewable/efficient lighting based interventions has only been made possible by Carbon Finance and without Carbon Finance there are no similar investments being made in large scale adoption of solar lighting. Hence, as per the methodology provisions, it is assumed that in the absence of the PoA, the baseline scenario would be the projected use of fossil fuels for meeting similar lighting needs. Therefore, emission reductions are calculated by multiplying the Lamp emission factor by grid factor and dynamic baseline factor as per para 27 of AMS-III.AR. ver. 6. For determination of each parameter required for the emission reductions, please refer to Section I.6.1 of the PoA-DD part II. The baseline scenario of the project activity is therefore the continuation of use of the current equipment(s) without any investment and the projects proponents or third party(ies) did not plan to undertake any investment later, before the end of a crediting period, therefore the current baseline

	does not need to be updated for that crediting period or the crediting of emission reductions is not required to be limited to the period before the baseline equipment would cease its operation. In addition there are no mandatory requirements to use clean fuel in the country i.e. there is no restriction on continued use of kerosene for lighting applications. Hence we move to step 1.4
Step 1.4: Assessment of the validity of the data and parameters	Due to change in the monitoring methodology, there are new ex-ante parameters that have been added to the monitoring plan. - Lamp Emission Factor - Fuel use rate - Utilization rate - Leakage factor
Step 2: Update the current baseline and the data and parameters	
Step 2.1: Update the current baseline	As per the analysis during step 1, the baseline is still valid. However, there are parameters that needs to be updated which have been updated as per step 2.2 below.
Step 2.2: Update the data and parameters	As per this step, if the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, project participants should update all applicable data and parameters. Hence as per this step, CME has updated the below parameters that have got added due to change in the methodology: • Lamp Emission Factor • Fuel use rate • Utilization rate • Leakage factor

2) Water purifiers: compliance and explanation of tool-11

Table – 2 Water Filters

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies	There are no mandatory national or sectoral policies in India that are prohibiting the use of woody biomass for water boiling. In absence of reliable water supply Rural households in India rely on water boiling practices for meeting safe drinking water needs. There are no relevant mandatory national and/or sectoral policies To be considered for baseline compliance. We, therefore, proceed to Step 1.2
Step 1.2: Assess the impact of circumstances	In this section, we examine the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario. We also assess the availability of new fuels or raw materials in the identification of the current practice for the baseline emissions. During crediting period, there are no specific country wide policies, programs that are introduced which would target to make water supply available to all or the one that is safe for drinking. In the household sector, there is considerable energy consumption for boiling of water to make it fit for drinking. In majority of rural areas, tap water is not available. Wherever available, including in Urban areas, tap water is not fit for drinking and tap water standards are voluntary in nature and has hardly been implemented across

	various states in India.[77] Every year 37.7 million people in India are affected by waterborne diseases due to contamination of water by bacteria (E coli, Shigella, Vibrio cholerae), viruses (Hepatitis A, polio virus, rota virus) and parasites (E. histolytica, Giardia, hook worm).[78] As per a recent study, samples drawn from 17 Indian state capitals were not as per the specification 'Indian Standard (IS)-10500:2012' for drinking water. In other metro cities; Delhi, Kolkata and Chennai, failed in almost 10 out of 11 quality parameters tested by the Bureau of Indian Standards (BIS) which is under the aegis of the Consumer Affairs Ministry.[79] As per research study published in 2020[80], the researchers collected 3296 stored water samples from rural households in India. As per the findings, water samples were frequently contaminated with E. coli (69%), and E. coli levels were the highest during the wet season. Most households contributing two or more drinking water samples had detectable E. coli in some (47%) or all (44%) samples. As per the study, until households can be reached with on-premises continuous safe water supplies, suboptimal drinking water consumption is likely to continue. As per another study published in 2019[81], covering the North Eastern states of India, the surveyed household reveals that about 43 % of respondents suffered from water-borne diseases. So, the large numbers of people (more than 60%) in this region prefer boiling the water before drinking. As demonstrated by above data, clean drinking water is still not available in India and large part of population is dependent on boiling the water from unsafe water supply networks. Therefore, the continuation of use of current water boiling practices is expected during the next crediting period. It is therefore also demonstrated that the new circumstances do not make a continued validity of the current baseline not plausible, hence the current baseline does not need to be updated for the subsequent crediting period. . Thus in line with the methodology AMS-III.AV, version 8, it is assumed that in the absence of the project activity, the baseline scenario would be the projected use of fossil fuels to meet drinking water needs as those provided by the project devices. We, therefore, proceed to Step 1.3
Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.	This sub-step is to be applied only if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment and, the projects proponents or third party (or parties) would undertake an investment later due, for example, to the end of the technical lifetime of the equipment(s) before the end of the crediting period or the availability of a new technology. The baseline scenario identified at the time of validation of project activity was the use of woody biomass for boiling water, without any investments. There were no plans to undertake any investment towards the end of the

[77] https://www.business-standard.com/article/pti-stories/tap-water-in-delhi-not-potable-and-safe-to-drink-paswan-119092401364_1.html#:~:text=Tap%20water%20in%20Delhi%20is,Vilas%20Paswan%20said%20on%20Tuesday.

[78] https://tappwater.co/en/tap-water-in-india-2/

[79] https://www.ndtv.com/india-news/tap-water-drinkable-only-in-mumbai-delhi-13-state-capitals-fail-test-2133670

[80] Household Water Storage Management, Hygiene Practices, and Associated Drinking Water Quality in Rural India Sarah L. McGuinness,* Joanne O'Toole, S. Fiona Barker, Andrew B. Forbes, Thomas B. Boving, Asha Giriyan, Kavita Patil, Fraddry D'Souza, Ramkrishna Vhaval, Allen C. Cheng, and Karin Leder

[81] Assessment of Domestic Water Use Pattern and Drinking Water Quality of Sikkim, North Eastern Himalaya, India: A Crosssectional Study Pravat Kumar Shit, Gouri Sankar Bhunia , Manojit Bhattacharya, Bidhan Chandra Patra

	technical lifetime of the equipment before the end of the project's crediting period or due to availability of a new technology. This sub-step also requires to assess whether the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, as determined in the CDM-PDD, exceeds the crediting period for which renewal is requested. As discussed in step 1.2 above, a large proportion of population still supplied with unsafe water and uses boiling method for making it drinkable. The identified baseline at time of registration i.e. boiling water using woody biomass would have been continued to be operated in the absence of the project activity. Water boiling does not need any specific equipment/investment and is feasible to be carried out in any of the households. This has no set lifetime and can be easily replaced with similar water boiling instruments. As argued in step 1.2 above, tap water in India is not of drinkable quality and this makes water treatment necessary to make it fit for consumption. Boiling is the prominent and easy way deployed by low income households. Therefore, the continuation of use of current baseline equipment is likely during the crediting period. The most plausible baseline scenario is hence that firewood/woody biomass from non-renewable sources used for boiling water. The baseline scenario of the project activity is therefore the continuation of use of the current equipment(s) without any investment and the projects proponents or third party(ies) did not plan to undertake any investment later, before the end of a crediting period, therefore the current baseline does not need to be updated for that crediting period or the crediting of emission reductions is not required to be limited to the period before the baseline equipment would cease its operation. In addition there are no mandatory requirements to use clean fuel for water boiling or any other water boiling techniques in the country i.e. there is no restriction on continued use of solid fuels like woody biomass that is used widely and freely available. Hence we move to step 1.4
Step 1.4: Assessment of the validity of the data and parameters	This sub-step requires to assess whether data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are still valid or whether they should be updated. Updates are required to be undertaken in the following cases: • Where IPCC default values are used, the values should be updated if any new default values have been adopted and published by the IPCC, for example, in guidelines for national GHG inventories, IPCC assessment report or special reports by the IPCC; • Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity. The parameters that were determined at the start of the crediting period are still valid, however they require to be updated i.e. the data/value of these parameters needs update. The following data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period have been updated:

<table>
<tr><td></td><td>$f_{NRB,y}$ Fraction of non-renewable biomass : The value will be calculated on per CPA basis

$EF_{projected\_fossilfuel}$: Emission factor for fossil fuels
Below is a comparison of the values that have been updated:

<table>
<tr><th>Parameter</th><th>1st crediting period</th><th>2nd crediting period</th></tr>
<tr><td>fi (Fraction)</td><td>0.8726</td><td>Calculated at CPA level</td></tr>
<tr><td>$EF_{projected\_fossilfuel}$ (tCO2/TJ)</td><td>81.6</td><td>64.4</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Step 2: Update the current baseline and the data and parameters</td></tr>
<tr><td>Step 2.1: Update the current baseline</td><td>As per the analysis during step 1, the baseline is still valid. However, there are parameters that needs to be updated which have been updated as per step 2.2 below.</td></tr>
<tr><td>Step 2.2: Update the data and parameters</td><td>As per this step, if the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, project participants should update all applicable data and parameters. Hence as per this step, CME has updated the below parameters:
• fi : Fraction of non-renewable biomass : The value will be calculated on per CPA basis
• $EF_{projected\_fossilfuel}$: Emission factor for fossil fuels</td></tr>
</table>

BASELINE DESCRIPTION – SOLAR LIGHTING

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

BASELINE DESCRIPTION – WATER PURIFIERS

Boiling is the most common treatment method for drinking water in India[82]. Households across rural India, use woody biomass or fossil fuel to boil water to make it fit for consumption. As per the applied methodology, a weighted average emission factor is used to calculate baseline emissions.

I.6. Estimation of emission reductions

I.6.1 Explanation of methodological choices

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The methodological choice is in line with the applied methodologies - **AMS-III.AV** (Version 8) and **AMS-III.AR.** (Version 6) as explained below:

For solar lighting:

The methodology AMS III.AR version 6 provides for a default annual baseline emissions factor for the project lamps. The following assumptions are made about the equivalent baseline lighting system:

$$DV - FUR \times O \times U \times EF \div 1000 \times LF \times n \times NTG$$

[82] http://iserd.net/ijerd41/41226.pdf

Where:

DV	=	Lamp Emission Factor (default is 0.092 t CO_2e per project lamp)
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 kgCO_2/liter)
LF	=	Leakage factor (1.0)
n	=	Number of fuel-based lamps replaced per project lamp (1.0)
NTG	=	Net-to-gross adjustment factor (1.0)

1. Baseline emissions are calculated per equation below:

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

Where:

BE_y	=	Baseline emissions per project lamp in year *y* (t CO_2e)
GF_y	=	Grid Factor in year *y*, • Equal to 1.0 since charging option defined in paragraph 3(a) is used;[83]
DB_y	=	Dynamic Baseline Factor (change in baseline fuel, fuel use rate, and/or utilization during crediting period) in year *y*. Calculated as either: 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 rcent available data for a three or five years average (fraction))

Project Emissions:
As per the methodology AMS III.AR, there are no project emissions for the projects involving solar PV as the charging option. Hence in this case the project emissions are zero.

Emission Reductions:
The per-lamp baseline emissions are calculated in Baseline Step above. To calculate total emission reductions, these must be aggregated across all lamps in use in the period under consideration. This is done using the following equations:

Annual emission reductions are calculated as:

[83] i.e. the charging option from solar PV, which is the case for lamps

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

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
$N_{i,j}$	=	Number of project lamps distributed to end users of type *i* with charging method *j*
$OF_{y,i,j}$	=	Percentage of project lamps distributed to end users that are operating and in service in year *y*, for each lamp type *i* and charging method *j*. Assumed to be equal to 100 per cent for years 1, 2 and 3, and equal to the value determined in paragraph 36 of methodology, for years 4, 5, 6 and 7[84]

For **water purifiers:**

Baseline emissions

$$\mathrm{BE}_y = QPW_y * \mathrm{m} * \mathrm{X}_{boil} * \mathrm{SEC} * \sum (BLfuel,i * f_i * EF_{projected\_fossilfuel,i} * 10^{-9})$$

Where:

BE_y	Baseline emissions during the year y in (t CO_2e)
QPW_y	Total quantity of purified water by the project in year y (L)
m :	Fraction of functional appliances that are meeting the SDW standards (%)
X_{boil} :	Fraction of the population served by the project activity for which the common practice of water purification is or would have been water boiling.
SEC:	Specific energy consumption required to boil one litre of water (kJ/L)
$BL_{fuel,i}$	Proportions of baseline fuel type i (NRB and/or fossil fuels) used in the absence of the project activity (%)
f_i	Fraction of non-renewable fuel type i used in the absence of the project activity in year y. For biomass it is the fraction of woody biomass that can be established as non-renewable biomass (f_{NRB}). If the baseline fuel is fossil fuel, the value to be applied is 1.
$EF_{projected\_fossilfuel,i}$	Emission factor of the fuel type i substituted

Each CPA would calculate value of QPW on the basis of below option:

1) Directly monitor the quantity

$$SEC = \left[WH * (T_f - T_i) + 0.01 * WHE \right] / n_{wb}$$

Variable	Definition	Unit	Type
WH	Specific heat of water (kJ/L °C)	kJ/L °C	AMS III.A.V default value of 4.18 kJ/L °C
T_f	Final temperature (°C)	°C	AMS III.A.V default value of 100 °C

[84] The years refer to the operational years of project lamps (e.g. for project lamps distributed in year 3 of the crediting period years 1, 2 and 3 relate to the years 3, 4 and 5 of the crediting period and so forth).

T_i	Initial temperature of water (°C)	°C	AMS III.A.V default
WHE	Latent heat of water evaporation (kJ/L).	KJ/L	AMS III.A.V default 2260 kJ/L.
n_{wb}	Efficiency of the water boiling systems being replaced, estimated ex ante	Fraction	Established for different baseline situations based on referenced literature values or AMS III.A.V default
SEC	Specific energy consumption required to boil one litre of water (kJ/L), to be calculated according to paragraphs below	kJ/L	Calculated

Detailed calculation and equations are presented in Section I.6.3

Project emissions

The operation of the project water purification system may involve consumption of fossil fuels and/or electricity. CO_2 emissions from on-site consumption of fossil fuels and electricity due to the project activity shall be accounted for as project emissions. The calculation would be done as per the following options:

1. Emissions from fossil fuel combustion ($PE_{FF,y}$)
   $PE_{FF,y}$ shall be calculated using the latest version of the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion".
2. Emissions from electricity consumption ($PE_{EC,y}$)
   $PE_{EC,y}$ shall be calculated using the latest version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

Leakage

In line with para 21 of AMS. III.AV, leakage relating to non-renewable wood biomass is assessed as per relevant procedure of AMS I.E and AMS I.E allows for a net to gross adjustment factor of 0.95 to account for leakages related to the non-renewable woody biomass saved by the project activity. Hence, this default adjustment factor would be applied in the calculations.

Emissions reductions

Emissions reductions will be calculated as:

$$ER_y = BE_y - PE_y - L_y$$

I.6.2 Data and parameters fixed ex ante

For **solar lighting products:**

This section is intentionally left blank

For water purifiers:

Data/Parameter	**fi**
Data unit	Fraction
Description	Factor to determine amount of non-renewable fuels
Source of data	Value to be determined at the time of inclusion of CPA as per TOOL30 version 2.0 "Calculation of fraction of non-renewable biomass"
Value(s) applied	The f_{NRB} values to be determined at the time of CPA inclusion. Fraction of fuel type i used in the absence of the project activity in year y. For biomass, it is the fraction of woody biomass that can be established as non-renewable biomass (f_{NRB}) as per "TOOL30: Calculation of the fraction of non-renewable biomass"
Choice of data or Measurement methods and procedures	Since the baseline fuel in Non Renewable Biomass, hence only fNRB value would be used as fi
Purpose of data	Calculation of baseline emissions
Additional comment	At the time of inclusion of CPA in the PoA, data from the most recent literature report will be used to calculate the $f_{NRB,y}$ values to be used for that CPA.

Data / Parameter:	**n_{wb}**
Data unit:	%
Description:	Efficiency of water boiling system being replaced
Source of data:	End-user survey or methodology default value
Value(s) applied:	Option (b) is chosen as provided in the methodology: 0.10 default value is used as the replaced system or the system that would have been used is a three-stone fire;
Choice of data or Measurement methods and procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	-

Data/Parameter	$EF_{projected\_fossilfuel,i}$
Data unit	tCO_2/TJ
Description	Emission factor of the fuel(s) type i substituted
Source of data	AMS.III.A.V. methodological value
Value(s) applied	64.4
Choice of data or Measurement methods and procedures	If the fuel displaced is NRB, this parameter can be sourced from approved methodology AMS-I.E. (i.e. Table 2 in version 10.0 of AMS-I.E.)
Purpose of data	Calculation of baseline emissions
Additional comment	

Data/Parameter	WH
Data unit	kJ/L °C
Description	Specific heat of water
Source of data	AMS III.AV
Value(s) applied	4.186
Choice of data or Measurement methods and procedures	As per methodology AMS III.AV
Purpose of data	Calculation of baseline emissions
Additional comment	

Data/Parameter	Tf
Data unit	°C
Description	Final temperature of water
Source of data	As stated in AMS III.AV, this is the boiling point of water at standard conditions
Value(s) applied	100
Choice of data or Measurement methods and procedures	As per methodology AMS III.AV
Purpose of data	Calculation of baseline emissions
Additional comment	

Data/Parameter	Ti
Data unit	°C
Description	Initial temperature of water
Source of data	AMS III.AV
Value(s) applied	20
Choice of data or Measurement methods and procedures	As per methodology AMS III.AV
Purpose of data	Calculation of baseline emissions
Additional comment	

Data/Parameter	WHE
Data unit	kJ/L
Description	Latent heat of water evaporation
Source of data	As stated in AMS III.AV, this is the boiling point of water at standard conditions
Value(s) applied	2260
Choice of data or Measurement methods and procedures	The latent heat required to boil one litre of water for five minutes is assumed to be equivalent to latent heat for the evaporation of 1% of the water volume
Purpose of data	Calculation of baseline emissions
Additional comment	

Data/Parameter	L_{NRB}
Data unit	%
Description	Net-to-gross adjustment factor for NRB Leakage
Source of data	AMS II.G Version 11.1
Value(s) applied	95%
Choice of data or Measurement methods and procedures	Default value as prescribed by methodology applied
Purpose of data	Calculation of baseline emissions
Additional comment	

Data / Parameter:	LS
Data unit:	Years
Description:	Life span of water treatment technologies
Source of data:	Manufacturer's specifications
Value(s) applied:	-
Choice of data or Measurement methods and procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	There shall be measures in place to ensure that end users have access to replacement purification systems of comparable quality. These measures shall be documented in the PDD or PoA-DD

Data / Parameter:	BLfuel,i
Data unit:	%
Description:	Proportions of baseline fuel type i (NRB and fossil fuel).
Source of data:	Estimated ex ante through a survey or official data or peer reviewed literature or local expert opinion
Value(s) applied:	-
Choice of data or Measurement methods and procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	X_{boil}
Data unit:	%

Description:	Fraction of the population serviced by the project activity for which the common practice of water purification is or would have been water boiling
Source of data:	Survey conducted prior to inclusion of each real case CPA
Value(s) applied:	The value would be determined ex-ante at the time of each CPA inclusion on the basis of survey conducted in the project area.
Choice of data or Measurement methods and procedures:	This value of X_{boil} would be determined prior to inclusion of each CPA by survey method in the command area of each CPA.
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	**q,i**
Data unit:	Litres/hour
Description:	Capacity of the equipment type i
Source of data:	Manufacturer's specifications
Value(s) applied:	-
Choice of data or Measurement methods and procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	

I.6.3 Modalities for ex ante calculation of emission reductions

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For **solar lighting products:**

The methodology AMS III.AR ver.6 provides for a default annual baseline emissions factor for the project lamps. The following assumptions are made about the equivalent baseline lighting system:

The CPA uses the default lamp emission factor provided by the methodology. According to this option each lamp can be assumed to have an emission factor of 0.092 tCO_2e per lamp per annum. This is due to the fact the project choses to apply default fuel usage rate and defaults utilization rate as prescribed by the methodology.

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

Where:

DV	=	Lamp Emission Factor (default is 0.092 t CO_2e per project lamp)
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 $kgCO_2$/liter)
LF	=	Leakage factor (1.0)
N	=	Number of fuel-based lamps replaced per project lamp (1.0)
NTG	=	Net-to-gross adjustment factor (1.0)

Baseline emissions are calculated per equation below:

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

Where:

BE_y	=	Baseline emissions per project lamp in year *y* (t CO_2e)
GF_y	=	Grid Factor in year *y*, • Equal to 1.0 since charging option defined in paragraph 3(a) is used;[85]
DB_y	=	Dynamic Baseline Factor (change in baseline fuel, fuel use rate, and/or utilization during crediting period) in year *y*. Calculated as either: 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 rcent available data for a three or five years average (fraction))

As per the methodology AMS III.AR, there are no project emissions for the projects involving solar PV as the charging option. Hence in this case the project emissions are zero.

The per-lamp baseline emissions are calculated in Baseline Step above. To calculate total emission reductions, these must be aggregated across all lamps in use in the period under consideration.

Annual emission reductions are calculated as:

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

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
$N_{i,j}$	=	Number of project lamps distributed to end users of type *i* with charging method *j*
$OF_{y,i,j}$	=	Percentage of project lamps distributed to end users that are operating and in service in year *y*, for each lamp type *i* and charging method *j*. Assumed to be equal to 100 per cent for years 1, 2 and 3, and equal to the value determined in paragraph 36 of methodology, for years 4, 5, 6 and 7[86]

Applying example calculations:

[85] Based on the demonstration that fossil fuel is the predominant practice for lighting it is assumed all baseline emissions are from the consumption of fossil fuel burning for lighting.

[86] The years refer to the operational years of project lamps (e.g. for project lamps distributed in year 3 of the crediting period years 1, 2 and 3 relate to the years 3, 4 and 5 of the crediting period and so forth).

Number of project lamps: 10,000 (based on monitored data)
Lamp Emission Factor: 0.092 (fixed ex ante based on methodology values)
OF: 100% (for first three years)
Leakage: zero
Project emissions: zero

Hence, applying the above equations the emission reductions per 10,000 lamps comes out to be 920 tCO_2e per annum.

For **water purifiers:**

Baseline emissions

$$BE_y = QPW_y * m * X_{boil} * SEC * \sum \left(BLfuel,i * f_i * EF_{projected\_fossilfuel,i} * 10^9 \right)$$

Variable	Unit	Type
BE_y	t CO_2e	Calculated
QPW_y Quantity of water	Litres	Monitored
m : Fraction of functional appliances that are meeting the SDW standards (%)	%	Monitored
X_{boil} : Fraction of the population served by the project activity for which the common practice of water purification is or would have been water boiling.	Fraction	Default value of 1
SEC: Specific energy consumption required to boil one litre of water (kJ/L)	kJ/litre	calculated
BLfuel,i: Proportions of baseline fuel type i (NRB and/or fossil fuels) used in the absence of the project activity (%)	%	Calculated
f_i : Fraction of fuel type i used in the absence of the project activity in year y. For biomass it is the fraction of woody biomass that can be established as non-renewable biomass (fNRB). If the baseline fuel is fossil fuel, the value to be applied is 1.	Fraction	To be determined at CPA level
$EF_{projected\_fossilfuel,I}$ Emission factor of the fuel type i substituted	t $CO_{2\,e}$	IPCC default values

Each CPA would calculate value of QPW on the basis of option 1, in para 16(a) of the methodology AMS III.AV version 8, which is:

1) Directly monitor the quantity

$$SEC = \left[WH * (T_f - T_i) + 0.01 * WHE \right] / n_{wb}$$

Variable	Definition	Unit	Type
WH	Specific heat of water (kJ/L °C)	kJ/L °C	AMS III.A.V default value of 4.18 kJ/L °C
T_f	Final temperature (°C)	°C	AMS III.A.V default value of 100 °C
T_i	Initial temperature of water (°C)	°C	AMS III.A.V default
WHE	Latent heat of water evaporation (kJ/L).	KJ/L	AMS III.A.V default 2260 kJ/L.

n_{wb}	Efficiency of the water boiling systems being replaced, estimated ex ante	Fraction	Established for different baseline situations based on referenced literature values or AMS III.A.V default
SEC		kJ/L °C	Calculated

Project emissions

The operation of the project water purification system may involve consumption of fossil fuels and/or electricity. CO_2 emissions from on-site consumption of fossil fuels and electricity due to the project activity shall be accounted for as project emissions. The calculation would be done as per the following options:

1. Emissions from fossil fuel combustion ($PE_{FF,y}$)
   $PE_{FF,y}$ shall be calculated using the latest version of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".
2. Emissions from electricity consumption ($PE_{EC,y}$)
   $PE_{EC,y}$ shall be calculated using the latest version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

Leakage

In line with para 21 and 26 of AMS. III.AV, leakage relating to non-renewable wood biomass is assessed as per relevant procedure of AMS I.E and AMS I.E allows for a net to gross adjustment factor of 0.95 to account for leakages related to the non-renewable woody biomass saved by the project activity. Hence, this default adjustment factor would be applied in the calculations.

Emissions reductions

Emissions reductions will be calculated as:

$$ER_y = BE_y - PE_y - L_y$$

I.7. Monitoring plan

I.7.1 Data and parameters to be monitored

For solar lighting –

Data / Parameter:	**Ni,j**
Data unit:	Number of lights
Description:	Number of lights distributed to end users, i, type, j
Source of data:	MEC tracker platform
Value(s) applied	Each CPA will provide data on the number and type of lights they expect to be installed for CPA-specific estimates of expected reductions
Measurement methods and procedures:	The data will be recorded in a web based tracker platform. The data will consist of unique number, number of units sold, to whom and where.
Monitoring frequency:	Annual
QA/QC procedures:	Each light installation will be recorded in the MEC Tracker System. Associated data will reside in the MEC Tracker Database, allowing each installation to be monitored .
Purpose of data:	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	GFy

Data unit:	Fraction
Description:	Grid factor in year y
Source of data:	AMS-III.AR. Version 6
Value(s) applied:	1
Measurement methods and procedures:	Default value (lamp charging option 3(a) as per the methodology)
Monitoring frequency:	Default Value
QA/QC procedures:	-
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	DBy
Data unit:	Fraction
Description:	Dynamic baseline factor in year y
Source of data:	AMS III-AR Version 6
Value(s) applied:	1
Measurement methods and procedures:	Default value chosen as per option 1 provided in the methodology.
Monitoring frequency:	Default Value
QA/QC procedures:	
Purpose of data	Calculation of baseline emissions
Additional comment:	

Data / Parameter:	$f_{i,j}$
Data unit:	Fraction
Description:	The percentage of project lamps distributed to end users that are operating and in service
Source of data:	-
Value(s) applied	100%
Measurement methods and procedures:	Default value for the first three years of operation of a lamp as per the methodology. Post three years, for years 4-7, this value will be determined on the basis of sampling surveys.
Monitoring frequency:	Default value for three years. Determined on based of survey from years 4-7.
QA/QC procedures:	-
Purpose of data:	Calculation of baseline emissions
Additional comment:	

For water purifiers:

Data / Parameter:	**m**
Data unit:	Fraction
Description:	Fraction of functional appliances that are providing the SDW
Source of data:	Survey and microbiological testing
Value(s) applied	1.0
Measurement methods and procedures:	This parameter shall be determined through checking all appliances or a statistically representative sample of the appliances to ensure the following conditions that: a) they only use technologies that are meeting the SDW technology standards as per paragraph 4(b) of the methodology; b) they are still operating or are replaced by an equivalent in-service appliance. The use of appliances shall be monitored through self-report measures (survey data from respondents) as well as physical signs that are observable (e.g. wetness of the unit, water in storage receptacle, functionality of parts) as per “Objective measures of functionality and use of project appliances” described in the Appendix.

	c) they are delivering microbiologically safe drinking water. Appliances shall deliver treated water verified to be <1 cfu / 100 ml E. coli, using methods for measurement with a lower detection limit (LDL) of 1 cfu E. coli per 100 ml sample. Emission reductions cannot be claimed if over 10% of appliances in the project activity fail to meet the final water quality requirements mentioned above
Monitoring frequency:	Annual
QA/QC procedures:	The sampling plan shall also include provisions to collect information for records of replacement of appliances, filters and maintenance
Purpose of data	Calculation of baseline emissions
Additional comment:	A statistically valid sample of the appliances can be used to determine the parameter value, as per the relevant requirements for sampling in the "Standard for sampling and surveys for CDM project activities and programme of activities". - 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters

Data / Parameter:	**Check for SDW public distribution network**
Data unit:	-
Description:	Annual check if there is a public distribution network supplying SDW is installed
Source of data:	End user survey and laboratory testing
Value(s) applied	-
Measurement methods and procedures:	Monitoring shall include annual check if there is public distribution network supplying SDW
Monitoring frequency:	Annual
QA/QC procedures:	
Purpose of data	Calculation of baseline emissions
Additional Comment:	If SDW is made available through a public distribution network during the crediting period, the emission reductions pertaining to the households/buildings supplied by the public system cannot be claimed from that point onwards. This condition should be checked annually during the crediting period

Data / Parameter:	**Quality of safe drinking water**
Data unit:	-
Description:	The quality of the safe drinking water
Source of data:	Project activity site
Value(s) applied	-
Measurement methods and procedures:	The safe drinking water quality is monitored on sample basis at least once every two years (biennial)
Monitoring frequency:	At least once every two years
QA/QC procedures:	
Purpose of data:	Calculation of baseline emissions
Additional comment:	Emission reductions cannot be claimed if project activity fails to meet SDW standards as per paragraph 4(b) of the methodology

Data / Parameter:	Py
Data unit:	Number
Description:	Population serviced by the project activity
Source of data:	Estimated through surveys
Value(s) applied:	-
Choice of data or Measurement methods and procedures:	A survey shall be conducted annually to check the number of persons who consume the purified water supplied by functional project appliances

Purpose of data	To calculate baseline emissions
Additional comment:	

Data / Parameter:	**QPWy**
Data unit:	Litres
Description:	Quantity of purified water in year y
Source of data:	Monitored
Value(s) applied	-
Measurement methods and procedures:	The quantity of purified water in year y shall be determined by directly monitoring the quantity using the following option given in the methodology AMS III AV v8 - FOR DISTRIBUTED APPLIANCES: Monitoring of a statistically valid sample of the distributed appliances during a period that is representative of the monitoring period. FOR WATER KIOSKS: Monitoring on continuous basis using a standard vessel.
Monitoring frequency:	Annual
QA/QC procedures:	For monitoring using a standard vessel, the volume of water shall be cross-checked against water sales receipts.
Purpose of data	Calculation of baseline emissions
Additional comment:	The sample size shall be determined as per the latest version of the Standard: Sampling and surveys for CDM projects and programme of activities. For projects implemented in water kiosks where the quantity of purified water is measured using a standard vessel, measures are implemented to ensure that there is no contamination of water during the measurement processes.

I.7.2. Sampling plan

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The sampling plan should define the below sections as per Chapter 6 of "Guideline: Sampling and surveys for CDM project activities and programme of activities version 4.0".

1.Sampling Design
2. Data to be collected
3. Implementation plan

The sampling plan takes into account the key parameters that are needed during the crediting period of the CPA. All required monitoring and documentation would be implemented, reported, consolidated and managed by the CME 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:

1.Sampling Design:

Objectives and Reliability Requirements:

The objective of sampling effort is to capture the value of parameter of interest (in line with applied methodology and Sampling (guideline and standard) with more than satisfactory level of

confidence/precision for the emission reduction calculations. The parameters of interest are defined in the monitored parameter tables presented in section I.7.1 under “Data / Parameter”.

Target Population:
The target population is rural end-users in India. In rural India, the cooking, lighting and drinking water requirements are similar. Hence the target population can be said to be homogenous in nature. Thus, simple random is used for all the monitoring parameters, and there are no sub-groups/primary sampling units which are only used for other kinds of sampling like multi-stage sampling etc.

Sampling method:
The proposed CPAs under this PoA will follow simple random sampling. While considering simple random of the sampling frame of the CPA, the sampling plan would account for sales vintage. The samples can be randomly chosen from the defined population up to the required sample size as calculated by the CME, using random generator tools. This will be done for each group of CPAs within a defined sampling frame or for each CPA in the case that CPAs are not grouped up for monitoring. Cross-CPA sampling may be utilized provided the requirements in the CDM Guideline: Sampling and surveys for CDM project activities and programmes of activities are met.

Sample size:

The measurement methods and procedures section of the monitored parameter table in section I.7.1, and as allowed by applicable methodology, the sample size will be chosen for a 95/10 confidence/precision in case of CME following biennial monitoring frequency for the parameter of interest, in case of annual monitoring frequency, 90/10 precision (90% confidence interval and 10% margin of error) is to be followed.
Where single sampling plan covering a group of CPAs is undertaken, in which case 95/10 confidence/precision is applied for the sample size calculation.
The sample size is determined based on sampling methodology explained in this section and considers the target population (sampling frame) and variance (in case of mean-based parameter).
The confidence/precision will be met as per monitoring frequency requirement. In case the desired confidence/precision is not met, then the CME would do over-sampling in accordance with para 18 and 19 of “Standard: Sampling and surveys for CDM project activities and programme of activities”
During sampling there may be non-response from the target population. Over-sampling by 20% may be used to avoid non-response, however, sampling may be cease once required confidence/precision is met.

A sample size calculation tool will be been designed to describe step by step the method in place and to estimate the minimum sample needed to satisfy statistical requirements for each monitoring parameter according to its sampling approach. Thus, the sample size calculation will be used for each monitored parameter in section I.7.1. Actual survey results will inform whether fewer or greater surveys will be needed to meet the required confidence/precision. Although the monitoring team will undertake monitoring of various parameters simultaneously and on the same sample, the CME may decide to stop monitoring of a particular parameter during the process once the required precision for this parameter is achieved. The monitoring team will continue to monitor appliances in the sample with respect to the remaining parameter(s) until the required precision for these parameters is achieved again.

The coefficient of variation is estimated from most recent monitoring data for the PoA. In the case of parameters monitored for the first time the expected variation for that measure in the sample may be based on results from similar studies, pilot studies, or from the project planner’s own knowledge of the data.

Sampling Frame:

Since, description and characteristics of the target population are homogenous in nature, the sampling frame appropriate for the study is the entire population. For each CPA, 2 sampling frames will be considered i.e. 1 for each component activity type i.e. water purification systems + solar lamps.

2.Data to be collected:

Field Measurement:
This is defined in the tables in section I.7.1 under “Measurement methods and procedures”.

Quality assurance/Quality Control:
The collected data is ensured with regular training of the enumerators by the Carbon Project Manager. The enumerators are given a checklist to ensure the data collected from field is not missed. The PO staffs meet the target population regularly through weekly/monthly regular meeting and hence the response rates are maximum, The data/measurements are stored in MEC Credit Tracker platform for at least two years after monitoring. Other QA/QC procedures adopted for individual monitoring parameters are elaborated in Section I.7.1.
The MEC Credit Tracker Platform is used to keep detailed records of all installations under each CPA. A credit tracker manual will be maintained that details out how credit tracker works.

Analysis:
The collected data is used as per applied methodology.

3.Implementation:
The sampling for surveyed data will be implemented consistent with the approach described in this section.
The managing entity will be responsible for monitoring and store the data in an electronic database. Primary data will be stored by the implementing entities/operators. The CME could use POs/external/CME staff for conducting the monitoring/sampling and training before every monitoring period is ensured to keep the quality of results.

The typical monitoring parameters for solar lighting system and water purification system are mentioned below:

Solar lighting system:

OFi,j – The percentage of project lamps distributed to end-users thar are operating in service
This parameter will be monitored based if the solar lighting systems distributed under the proposed CPA satisfies the condition as per para 19 of applied methodology (Option-2) to claim credits for up to 7 years.
For Option-2, 90/10 confidence/precision to be met and a minimum sample size of 100 (based on simple random sampling) to be followed. The monitoring conducted from 3rd year of the project (solar lamps) which can then be extrapolated for the remaining life of the project based on applied methodology.
If the CPA chooses Option-1, then no sampling/monitoring effort is required. As per the methodology the usage can be assumed as 100%.

Survey principles:
As per methodology AMS III A.R, version 6, the following the following survey principles shall be followed for activities related to determining number of project lamps in service and operating under the project:

(a) The sampling size is determined by minimum 90 per cent confidence interval and the 10 per cent maximum error margin; the size of the sample shall be no less than 100;

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

Water Purification System –

m - Fraction of functional appliances that are providing the SDW

Check for SDW public distribution network

Quality of safe drinking water

Py - Population serviced by the project activity

QPWy - Quantity of purified water in year y

A combined monitoring effort is undertaken based on maximum sample size requirement. A minimum sample size of 30 shall be chosen in accordance with para 14 of CDM "Standard: Sampling and surveys for CDM project activities and programme of activities v3"

Sampling Methodology

To reduce monitoring efforts a single sample is drawn based on which all of the parameters determined via sampling shall be monitored. The CME will determine the number of users/appliances monitored during sampling for each of the parameters separately. The reason is that the variation within the values obtained will be different for each parameter. Since the precision of a sampled parameter depends on the variation of its values, the necessary number of users/appliances to be monitored in order to achieve the 5% or 10% precision will also depend on the variation of values. Therefore, although the monitoring team will undertake monitoring of various parameters simultaneously and on the same sample, the managing entity may decide to stop monitoring of a particular parameter during the campaign once the required precision for this parameter is achieved. The monitoring team will continue to monitor appliances in the sample with respect to the remaining parameter(s) until again the required precision for these parameters is achieved.

Statistical sampling using a random number generated will be used to select samples from sampling frames drawn from Credit Tracker for monitored parameters.

Simple random sampling equations are provided below.

The required confidence/precision may be achieved through different combinations of a cross-CPA sample size and within-CPA household sample sizes; if less CPAs are surveyed, more houses within the CPAs will need to be surveyed to achieve the required precision, and vice versa. The relative costs and practicalities of surveying across several CPAs will be balanced against the relative costs and practicalities of household surveys and a decision taken as to the most efficient balance between across-CPA surveying and within-CPA surveying.

Simple random sampling from CPA Project Databases

Step 1: For each monitoring period contact details from end-users are collected for all, or a subset of, appliances deployed. This is stored in the Credit Tracker Platform and serves as the basis from which sampling frames are developed.

Step 2: In order to reflect the different age of the appliances (i.e. the different deployment dates), the relative share of appliance vintages within the total population of appliances deployed as recorded in the Credit Tracker under the CPAs shall be established.

Step 3: Random sampling of users from within the sampling frame (considering vintage). The number of users to be selected shall be determined statistically to maximize reliability of results.

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 this programme, whichever occurs later.

Simple random sampling:

The below formulas are used for simple random sampling for mean and proportion based parameters. These formulas are taken from Guideline: Sampling and surveys for CDM project activities and programme of activities v4, which provides these formulas provided the following conditions are met –

1. The population is homogeneous
2. The applies confidence level is 90% and precision is 10% (as also prescribed by the applied methodology for monitoring parameter values to be determined through sampling).

Proportion based parameter:

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

Where:

n	= Sample size
N	= Total number of households
p	= Expected proportion
1.645	= Represents 90% confidence required
0.1	= Represents the 10% relative precision (0.1 X 0.5 = 0.05 = 5% points either side of p)

The above formula proposed to be used in the case of proportion based parameters is provided in page 28 of the Guideline: Sampling and surveys for CDM project activities and programme of activities v4.

Mean based parameter:

Equation (18)

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

Where:

V	=	$\left(\frac{SD}{mean}\right)^2$
n	=	Sample size
N	=	Total number of households
$Mean$	=	Our expected mean
SD	=	Our expected standard deviation
1.645	=	Represents the 90% confidence required

The above formula proposed to be used in the case of mean based parameters is provided in page 36 of the Guideline: Sampling and surveys for CDM project activities and programme of activities v4.

Summary and Other General Principles:

1. The PO maintains in the Credit Tracker Platform a record of all clean energy products that are installed. The record includes the name, date of installation, model of CEP and location of the product. All records are screened by the CME and cross-checked with the PO records to confirm the installation record is authentic and no double counting occurs.

2. The PO identifies the exact location of the CEP using GPS location and/or address of the household or organization.

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

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

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

The CME along with the PO will coordinate all ex-post monitoring activities in the PoA. The CME is ultimately responsible for implementing the monitoring plan, ensuring the quality of data obtained and the use of this data for emissions reduction calculations. The actual field measurements to be conducted during monitoring will most likely be performed by third parties contracted to the CME and/or PO. In the case of using contractors, however, the CME 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.

I.7.3 Other elements of monitoring plan

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As explained above, the MEC Credit Tracker Platform is used to keep detailed records of all installations under each CPA. Each installation is monitored annually to check usage status. Monitoring records are maintained in the Credit Tracker Platform.

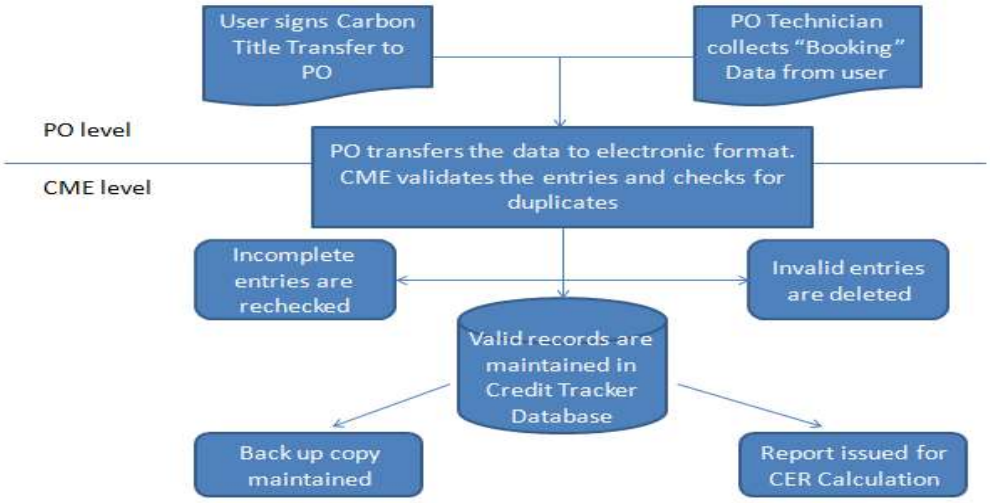
1. The Credit Tracker Platform keeps a record of all clean energy products that are installed.

2. The Credit Tracker Platform crosschecks the new records with the existing Platform in order to confirm that the installation record is authentic and that no double-counting occurs.

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

4. The unique system ID number which is linked to a gps location or verified address eliminates any risk of double-counting between CPAs.

Organizational Diagram of Monitoring Plan



Quality Assurance/Quality control

As the PoA is intended to include multiple regions within India with a high level of cultural diversity as well as different end user groups, there is no "one size fits all" approach for dealing with these issues. However, in order to avoid many of these problems the CME 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 CME 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 CME 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. The CME will ensure that contractors are adequately trained for the tasks they are contracted for. Training will also be provided on how to deal with non-responses, refusals and other problems should these occur.

SECTION J. Crediting period type and duration

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Type of crediting period – Renewable

Length of Crediting period - 7 years and 0 months

SECTION K. Eligibility criteria for inclusion of CPAs

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No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	Boundary and location of the CPA	The CPA is located within India.	Location and boundary is specified in the specific CPA-DD stating that the location is limited to India and supported with GPS coordinates. Document: Statement of CME that the location and boundary is within India and supported with GPS coordinates (XXX°N XXX°E).

2	No Double counting of CEP	A unique numbering or identification system for the CEP installed is applied. This shall ensure no double counting of CEPs within the same CPA and same PoA and ensure that CEP can be identified as belonging to this PoA and not to a PoA managed by any other CME. A legally binding contract between CME and manufacturer/micro finance institution/POs would be required to ensure that all carbon title is transferred to the CME. This shall ensure that POs, stove/lamp manufacturers and distributors do not claim ERs separately.	The unique numbering and PoA logo stamped on each CEP supported by the individual distribution record matching such information is included in the specific CPA-DD and consistent with the PoA-DD A legally binding contract between CME and manufacturer/micro finance institution/POs would be established to ensure that all carbon title is transferred to the CME. Document: Credit Tracker stove sales receipt showing CME and PO information, end user details including name and address and CEP ID number. In addition to the sales receipt the programme logo shall be displayed on the CEPs and verifiable by DOE. A legally binding contract between CME and manufacturer/micro finance institution/POs would be required to ensure that all carbon title is transferred to the CME.
3	CER ownership	End users receiving CEP under the specific CPA contractually cede their rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC to the CME of the PoA	The default CEP Booking Record is including the provision that emission reductions generated by the CEP are transferred from the end-user to the PO and ultimately owned by the CME. The receipts will clearly specify that carbon rights are ceded in favour of CME. Documents: 1. Default Booking Record
4	No Double counting of CPA	The CPA is exclusively bound to the PoA. Confirmation that the programme activity has not been and will not be registered either as a single CDM project activity or as a CPA under another PoA	A declaration from the CME on its letterhead would be provided that the specific CPA will not be part of another single CDM project activity or CPA under another PoA. In addition, declaration from CPA operators as part of their contract with the CME, stating that they activities are not registered as part of another single CDM project activity of CPA under another PoA. Evidence: Check on UNFCCC website with date of access and contract between the CME and MFI.

5	Awareness and Agreement of those operating a CPA on PoA subscription	Contractual provisions to ensure that those operating the CPA are aware and have agreed that their activity is being subscribed to the PoA. In the case that the CME is not responsible for implementing the CPA, the organization responsible for CPA implementation, known as the Partner Organisation (PO), has signed a contractual agreement with the CME to participate in the PoA. This agreement: - Defines the ownership of the carbon emission reduction rights - Covers the PO's distribution and monitoring related responsibilities - Confirms that the CEPs to be distributed under the CPA have not and will not be distributed under any other carbon project (CDM project, PoA or voluntary carbon market project) - Cedes the PO's rights to the carbon credits generated from CPAs under the PoA to the CME	Contractual agreement for CPA operators, stating that they are aware and have agreed that their activity is being subscribed to the PoA
6	Non-diversion of ODA in case of Public funding	The CME and the CPA operator (in case of being different from the CME) shall confirm that there is no public funding or in the case of public funding, the Annex 1 party will confirm that funding is not a diversion of Official Development Assistance.	Statement of CME and the CPA operator (in case of being different from the CME) that there is no public funding Or In the case that there is public funding, an Annex 1 party will confirm that funding is not a diversion of ODA.
7	CPA Start Date	CPA start date shall not be before PoA webhosting date, i.e. 18/01/2012. Please note that not all CEP installations may have been deployed at CPA inclusion stage, however the CEP start date can also be checked during verification. In the event that any deployed CEP is found not in line with CPA start date, those CEP will not be counted in the emission reduction calculation	Starting date as stated in the CPA-DD section D is after 18/01/2012. Document: 1. Statement from CME that no CEP under the CPA was sold before the PoA webhosting date, i.e. 18/01/2012. 2. First CEP Booking Record of CPA

8	CPA Crediting Period	CPA starting date of the crediting period is date of inclusion or any date thereafter and crediting period not to exceed the PoA end date Each CPA shall provide verifiable evidence	A statement is included in the CPA-DD that the crediting period starting date is date of inclusion into registered PoA i.e. XXXX and the CPA crediting period will not exceed PoA end date.
9	Approval of CPA by CME	CME approved each CPA to be included into its registered PoA.	A letter by CME giving approval for the CPA to be included into its registered PoA.

10	Additionality of CPAs	Additionality will be demonstrated in accordance with Tool 21 Demonstration of additionality of small scale project activities version 13.1 The additionality would be demonstrated at the individual CPA level. Additionality of the CPA would be demonstrated by using either one of the options as per para 10 of Tool 21, version 13.1 10. Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers : (a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions; (b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions; (c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions; (d) Other barriers: without the project activity, for another specific reason identified by the project participant,	Documentation: 1. Description of CPA activity as documented in CPA-DD 2. Explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers : 1) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions; 2) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions; 3) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions; 4) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

		such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.	
11	Application of Methodologies	The methodologies that can be applied to a CPA include: - AMS-III.AR (version 6) - AMS-II.G (Version 11.1) - AMS-III.AV (version 8) Each CPA can implement these methodologies in isolation. In addition, the following combinations of methodologies are eligible under the PoA: - AMS-III.AR (version 6) and AMS-II.G (Version 11.1) - AMS-III.AR (version 6) and AMS-III.AV (version 8)	As stated in section D.1. above, this CPA shall deploy AMS-III.AR (version 6) and AMS-III.A.V. (version 8)
12	End User Group	The CPA is either aimed at households, community organisations (e.g. schools) or small/medium enterprises.	The CPA-DD describes the target end-user group and the appropriate baseline in the CPA-DD
13	LSC	Local stakeholder consultation is conducted at the CPA level	Document: LSC is conducted at the CPA level

14	Technical Requirement for solar lamp	All the lamps under the CPA would meet the following conditions as required by the methodology AMS III AR version 6: 1) All the lamps shall be charged by Renewable energy system 2) All solar lamps would also meet the Rated average life requirement as per the methodology. This would be 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. 3) Project lamps shall meet warranty requirements as per para 6 of the methodology AMS III AR, version 6 4) Project lamps shall meet the quality requirements as per para 7 of the methodology AMS III AR, version 6 5) The CPA-DD shall include the minimum requirements for the design specifications of project lamps including all the specifications as per para 9 of the methodology AMS III AR version 6. Please note that not all solar lighting systems may have been deployed at CPA inclusion stage, the 'type and number of solar lighting systems deployed' will however also be checked during verification, and in case any deployed solar lighting systems type will be found not in line with the methodology requirement, those solar lighting systems will not be counted for emission reduction calculation	As per the technical specification of solar lamps, each lamp distributed under the CPA, meets the following conditions: 1) Lamps is charged by renewable energy system 2) Rated average life is certified to be above xxxx hours, life is certified as the time at which the lamp's initial light output will decline by no more than 30 per cent. 3) Lamps meet the warranty requirement as per para 6 of the methodology AMS III AR, version 6 4) Lamps meet the quality requirement as per para 7 of the methodology AMS III AR, version 6 5) All minimum technical requirements are available and added in CPA DD as per para 9 of the methodology AMS III AR version 6. Document: Product data sheets or specification or product information sheets from manufacturer.

15	Technical Requirements for solar lamp	The PO must prove that fossil fuel, specifically kerosene, is used in the absence of the project activity as demonstrated by: 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. A representative sample survey (90% confidence interval, ±10% error margin) of target households; or Official statistics from the host country government agencies Or Peer reviewed literature in case government literature is not available.	CPA DD. would demonstrate that fossil fuel is commonly used fuel for lighting. This would described 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). Evidence: At least one of the below: 1) Peer reviewed literature 2) Official data statistics 3) Sample survey the prevalence of Kerosene as the lighting fuel in the baseline and establish on the basis of the publicly available documents and statistics.
16	SSC Limit of CPAs for solar lamp	The installed capacity of the CPA will not increase beyond 60kt CO2 emission reductions per year (threshold as per EB 104 Annex 05 and applied methodology AMS III.AR. version 6) throughout the crediting period of the CPA. If a CPA exceeds the applicable limit in any year, the claimable emission reduction shall be capped based on the estimated GHG reductions in the CPA-DD[87]). Please note that not all solar lighting systems may have been deployed at CPA inclusion stage, the SSC limit for CPAs can however also be checked during verification, and in case any deployed solar lighting systems will be found not in line with CPA SSC Limit for CPAs requirement, those solar lighting systems will not be counted for emission reduction calculation	The estimated maximum number of solar lighting systems is to be defined in the CPA-DD according to the SSC threshold limit of 60kt CO2 equivalent emission reductions per year. Since this CPA has both technology (solar and water purifier) under Type III, hence individual emission reduction for each component will not increase beyond 60kCO_2e/annum.

[87] As per EB 101, Annex 03

17	Technology Requirement for water purifier	The CPA consists of distribution of water purifiers, product type defined in the CPA-DD, and hence appliances that are Low greenhouse gas-emitting safe drinking water production systems to achieve water quality defined in a relevant national standard or guideline for drinking water quality and involve point-of use (POU) or point-of-entry (POE) treatment systems for residential or institutional applications, as per AMS III. AV, ver. 8. Please note that not all water purifiers may have been deployed at CPA inclusion stage, the 'type and number of water purifiers deployed' will however also be checked during verification, and in case any deployed water purifiers type will be found not in line with the methodology requirement, those water purifiers will not be counted for emission reduction calculation.	Specification of water purifier type and compliance with the technological requirements of AMS III A.V will be described in the specific CPA-DD. The water purifier deployed is the name of water purifier and hence is an appliance that are Low greenhouse gas-emitting safe drinking water production systems to achieve water quality defined in a relevant national standard or guideline for drinking water quality and involve point-of use (POU) or point-of-entry (POE)2 treatment systems for residential or institutional applications, as per AMS III. AV, ver. 8. Document: Product data sheets or specification or product information sheets from manufacturer.
18	Technical Requirements for water purifier	The PO must ensure the baseline system that is replaced utilizes the traditional unimproved systems	Document: This will be checked during distribution of water purifiers and by survey.
19	Methodological criteria for AMS III AV	As per SSC methodology AMS III.AV v08 paragraph 4(a), prior to the implementation of each CPA project activity, it must be determined that Prior to the implementation of the project activity, a public distribution network supplying SDW to the project boundary does not exist.[88]	Document: A monitoring parameter to check this condition has been added to the CPA-DD - *Check for public distribution system providing SDW*

[88] This methodology is also applicable in case a public distribution network exists, but is not supplying SDW.

20	Technology performance criteria for water purifier	As per SSC methodology AMS.III.A.V. v8 paragraph 4(b), prior to the implementation of project activity, It shall be demonstrated based on laboratory testing [89] or official notifications (for example notifications from the national authority on health) that the application of the project technology/equipment achieves compliance either with: (i) the Comprehensive Protection performance target as per "Evaluating household water treatment options: Health based targets and microbiological performance specifications" (WHO, 2011) and "International Scheme to Evaluate Household Water Treatment Technologies" (WHO, 2014); or (ii) an applicable national standard or guideline. Applicable national standard should be based on laboratory efficacy testing that, at a minimum, includes quantitative microbial measures of pre- and post-treatment challenge waters[90] that are representative of potential drinking water sources, and that includes measured reductions based on at least one pathogen class (bacteria, viruses, protozoa).	Performance specification from manufacturer or certificate from a national standards body or a certifying agent recognized by it shows the water purifier type achieves compliances as per certifying agency

[89] The testing should be undertaken under conditions that are representative of the operation conditions of the project site(s) including feedwater.

[90] "Challenge water" is synonymous with "test water" – this is the experimental water that has been spiked with microbes (a "microbial challenge") in order to demonstrate the potential for the technology to reduce microbes.

21	Methodological criteria of AMS III.AV	As per SSC methodology AMS III.AV v08 paragraph 4(c), prior to the implementation of project activity, it must be determined that: "In cases where the life span[91] of the water treatment technologies is shorter than the crediting period of the project activity, there shall be documented measures in place to ensure that end users have access to replacement purification systems of comparable quality."	For water purifiers, the project will make available to end users replacement parts including new filter, and/or access to a new model technology of comparable quality. These filters will be available through the MFI offices or their retailers. Specifically, the PO field staff typically meets with the users of the improved water filters on a weekly or monthly basis, either in group meetings, or when they come to a bank branch. At group meetings the PO will make regular announcements about the availability of replacement filters, including where to buy them, and discounts available due to the carbon funds. At bank branches as well, knowledgeable staff and written announcements will enable households to get information about these water filter replacements.
22	SSC Limit of CPAs for water purifier	The emissions reduction of the CPA will not increase beyond 60 ktCO2e/y over the entire crediting period, as per the AMS III.AV If a CPA exceeds the applicable limit in any year, the claimable emission reduction shall be capped based on the estimated GHG reductions in the CPA-DD[92]). Please note that not all water purifiers may have been deployed at CPA inclusion stage, the SSC limit for CPAs can however also be checked during verification, and in case any deployed water purifiers will be found not in line with CPA SSC Limit for CPAs requirement, those water purifiers will not be counted for emission reduction calculation	The estimated maximum number of water purifiers to be defined in the CPA-DD according to the equation provided in Section I.6.3 (Part III of generic CPA). This CPA has both technologies (solar and water purifier) under Type III, CME shall ensure that the individual emission reduction for each component will not increase beyond 60ktCO_2e/y. This will be checked during validation before the inclusion.

[91] The rated average life of each system type shall be known ex ante using manufacturer specifications and documented in the PDD/PoA-DD.

[92] As per EB 101, Annex 03

Appendix 1. Contact information of coordinating/managing entity and project participants

Coordinating/managing entity and/or project participants	☒ Coordinating/managing entity ☐ Project participant
Organization name	Micro Energy Credits Corporation Private Limited
Country	India
Address	22A, Waterwoods, Main Varthur Road, Whitefield, Bangalore, Karnataka- 560066
Telephone	-
Fax	-
E-mail	april@microenergycredits.com
Website	www.microenergycredits.com
Contact person	April Allderdice

Coordinating/managing entity and/or project participants	☐ Coordinating/managing entity ☒ Project participant
Organization name	Climate Cent Foundation
Country	Switzerland
Address	Freiestrasse 167, 8032, Zurich
Telephone	-
Fax	-
E-mail	marco.berg@climatecent.ch
Website	https://www.klimarappen.ch/
Contact person	Marco Berg

Appendix 2. Affirmation regarding public funding

There is no public funding involved in the particular project activities included in this PoA.

Any public funding used for related program activities will be disclosed at the CPA level, but carbon funding will always be used to fill gaps in microfinance clean energy lending programs that do not receive public funding.

Appendix 3. Applicability of methodologies and standardized baselines

N/A

Appendix 4. Further background information on ex ante calculation of emission reductions

N/A

Appendix 5. Further background information on monitoring plan

N/A

Appendix 6. Summary report of comments received from local stakeholders

Appendix 7. Summary of post-registration changes

There are five corrections introduced in the PoA-DD during the first crediting period of PoA (including generic CPA(s)):

1. It is mentioned in the original registered PoA-DD that the CME will provide the DOE with a monitoring report for verification purposes for each CPA at the time of each verification. The CME would like to correct this and provide a single monitoring report for all CPA's that will request issuance together.
2. Ex-ante parameter for cookstoves – "Fraction of woody biomass saved by project activity in year y that can be established as non-renewable biomass" ($f_{NRB,y}$) value has been corrected. Originally, the value fixed in the PoA-DD was 0.8726, for the entire country of India using the Forest Survey of India (FSI), 2011 report. This has been corrected and replaced with $f_{NRB,y}$ values at state level, which are also derived from the same FSI, 2011 report. Since improved cookstoves under this PoA are implemented in different states within the geographic boundary of India, using state level values reflect a more accurate representation of the non-renewable fraction of woody biomass from the areas where they are procured to use for cooking. To ensure that the emission reductions are conservative, the lower value between the state level $f_{NRB,y}$ value and country (India) level $f_{NRB,y}$ value will be used.
3. For ex-ante parameter for cookstoves – "Quantity of woody biomass per appliance used in absence of the project activity" ($Q_{biomass}$) value has been corrected. Originally, the value mentioned in the PoA-DD was 2.16 tonnes/family/year, for the state of Karnataka using the Forest Survey of India (FSI), 2011 report. This has been corrected and replaced with $Q_{biomass}$ values for different states in India, which are also derived from the same FSI, 2011 report. Since improved cookstoves under this PoA are implemented in different states within the geographic boundary of India, using state level values reflect a more accurate representation of the quantity of woody biomass used in the absence of the project activity. The state-level data on number of persons per household, used to calculate $Q_{biomass}$, will be taken from the latest India census data/state level official data available at the time of inclusion.
4. Ex-ante parameter for water purifiers – "Fraction of woody biomass saved by project activity in year y that can be established as non-renewable biomass" ($f_{NRB,y}$) value has been corrected. Originally, the value fixed in the PoA-DD was 0.8726, for the entire country of India using the Forest Survey of India (FSI), 2011 report. This has been corrected and replaced with $f_{NRB,y}$ values at state level, which are also derived from the same FSI, 2011 report. Since water purifiers under this PoA are implemented in different states within the geographic boundary of India, using state level values reflect a more accurate representation of the non-

renewable fraction of woody biomass from the areas where they are procured to use for boiling water in the baseline. To ensure that the emission reductions are conservative, the lower value between the state level $f_{NRB,y}$ value and country (India) level $f_{NRB,y}$ value will be used.

5. The following information is added to the solar lighting system monitoring parameter "Lumen output of each solar lamp *n* deployed as part of project activity" - The lumen value for solar lighting systems in this PoA will be capped at 116.9 Lumen for individual households. If the Lumen value of solar lighting systems in an individual household is greater than 116.9 Lumen, value of 116.9 Lumen will be used to calculate emission reductions. If the Lumen value of solar lighting systems in an individual household is less than 116.9 Lumen, actual (lesser) lumen value will be used to calculate emission reductions. The cap of 116.9 Lumen will be applied to all years of crediting to ensure that the emission reductions are conservative.

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Document information

Version	*Date*	*Description*
09.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for programmes of activities" (CDM-EB93-A07-STAN); • Make editorial improvements.
08.1	28 June 2017	Revision to: • Remove a duplicated instruction; • Make editorial improvement.
08.0	7 June 2017	Revision to: • Improve consistency with the "CDM project standard for programmes of activities" and with the PDD and CPA-DD forms; • Make editorial improvement.
07.0	25 May 2017	Revision to: • Ensure consistency with the "CDM project standard for programmes of activities" (CDM-EB93-A07-STAN) (version 01.0); • Incorporate the "Programme design document form for small-scale CDM programmes of activities" (CDM-SSC-PoA-DD-FORM); • Make editorial improvement.
06.0	15 April 2016	Revision to ensure consistency with the "Standard: Applicability of sectoral scopes" (CDM-EB88-A04-STAN) (version 01.0).
05.0	9 March 2015	Revision to: • Include provisions related to choice of start date of PoA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Add exception for generic CPA where technology is under positive lists; • Make editorial improvement.
04.1	5 August 2014	Editorial revision to correct the document information table.

Version	*Date*	*Description*
04.0	25 June 2014	Revision to: • Include the Attachment: Instructions for filling out the project design document form for CDM programme of activities (these instructions supersede the Guideline: Completing the programme design document form for CDM programme of activities (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the PoA in B.4 and Appendix 1; • Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and Appendix 6; • Change the reference number from F-CDM-PoA-DD to CDM-PoA-DD-FORM; • Make editorial improvement.
03.0	3 December 2012	EB 70 Revision to reflect changes to the *Guideline: Completing the programme design document form for CDM programmes of activities* (EB 70, Annex 6).
02.0	13 March 2012	EB 66 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities" (EB 66, annex 12).
01.0	27 July 2007	EB 33, Annex 41 Initial publication.

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