



**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	Energy Efficient Stoves Program (EESP)
Version number of the PoA-DD	7.0
Completion date of the PoA-DD	27/07/2020
Coordinating/managing entity	World Vision Australia
Host Parties	Federal Democratic Republic of Ethiopia
Applied methodologies and standardized baselines	AMS-II.G: "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (Version 11.1) (ASB0044-2019): Improved Institutional Cookstoves in Ethiopia, Version 01.0
Sectoral scopes	03

PART I. Programme of activities (PoA)

SECTION A. Description of PoA

A.1. Purpose and general description of PoA

>> *General operating and implementing framework of PoA*

This small scale PoA involves the distribution of energy efficient cooking stoves to households in The Federal Democratic Republic of Ethiopia. The majority of households in rural areas of The Federal Democratic Republic of Ethiopia cook over open fires¹, and this leads to a very significant consumption of wood, as well as a major health risk. To combat this problem, this PoA will distribute low cost, high efficiency stove designs that use considerably less wood than conventional open fires. Users are households who previously used inefficient, traditional open fireplaces. Deforestation and degradation have become a major concern in rural areas of Africa, as wood demand for household energy largely exceeds the available renewable woody biomass. By reducing the fuel wood consumption, the project activity hence reduces greenhouse gas emissions stemming from the use of non-renewable biomass.

Different types of stoves may be distributed as part of the PoA depending on local cooking requirements in the program area. Efficient stoves will be tested to determine their specified efficiency relative to the baseline scenario (for example a three stone open fire). The CPA implementer will be responsible for transporting and distributing stoves to households, and also providing training on how to use and maintain the stoves effectively.

World Vision Australia will act as the Coordinating/Managing Entity (CME) for the PoA. The CME will be responsible for:

- Development of the PoA Design Document (CDM-PoA-DD) and Component Project Activity (CPA) Design Documents (CDM-CPA-DD) for CPAs that are developed under the Programme of Activities.
- Carry out a quality check on CPAs to be included in the Programme of Activities.
- Collect and compile monitoring records from all the CPA entities.
- Coordinate monitoring activities and data management during the lifetime of the PoA.
- Prepare and submit monitoring reports and facilitate the verification of the same.
- Act as the focal point with the CDM Executive Board for matters related to the PoA.

Stove producers will be contracted to manufacture standardized stoves for each CPA. The CPA implementer will be responsible for monitoring the distribution and installation of stoves in each CPA to ensure that each stove meets pre-determined quality standards and has a unique identification number.

Users will enter into an agreement with the CME in order for them to participate in the project. The contractual agreements will summarize roles and responsibilities regarding the implementation of the individual project activities as a Component Project Activity (CPA). The agreements will ensure that the CME will have control of all records and information related to the implementation of individual CPAs and will be in a position to ensure that each CPA is being implemented according to the provisions as outlined in the PoA-DD. When a user purchases a stove, it will become the property of the user. However, as CDM funding is subsidizing the purchase of the stove to the user, the user will agree in the user agreement:

- to cede all CERs to the implementing organization

¹ Lawrence Berkeley National Laboratory 2010, 'Berkeley Lab Makes Cookstoves for Ethiopia', LBNL, U.S. Dept of Energy, < <https://newscenter.lbl.gov/2010/06/29/berkeley-lab-makes-cookstoves-for-ethiopia/>>

- to cooperate with the CME in data collection and monitoring of the cook stoves
- to replace cooking on existing inefficient stoves with the new stoves
- to inform the CME if the new stove is no longer in use by the household or if it is handed over to another user.

Monitoring data, including information collected during the distribution and installation of the cook stoves will be captured in an electronic database by the CME. Paper records will also be kept to back up the electronic system where applicable. From this data, the emissions reductions of each CPA in the PoA will be determined. This system will be available for review by the Designated Operational Entity (DOE) during the validation of the PoA and verification of each CPA.

Policy/measure - stated goal of the PoA

The goal of the SSC-PoA is to distribute and install fuel efficient cook stoves to rural households cooking with firewood. The stoves will reduce the amount of non-renewable biomass used by households, therefore decreasing Greenhouse Gas (GHG) emissions. Significant environmental, social and economic benefits will also be yielded by the replacement of the traditional cooking system with fuel efficient stoves as outlined in “Contribution to sustainable development” below.

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

This SSC-PoA being implemented is a voluntary action by the CME. There is no law or policy in the area of implementation which requires households to use fuel efficient stoves or other means of reducing fuel wood consumption.

Contribution to sustainable development

Benefits of this project will include both emission reduction and reduced pressure on the environment due to the decreased need for firewood as well as a number of significant socio-economic and health related improvements:

Environmental:

- Significant reduction in GHG emissions through a reduction in the use of non-renewable biomass, preventing carbon dioxide being released into the atmosphere per stove per year.
- Reduced pressure on the environment. In Ethiopia for example, approximately 141,000 hectares of forest are cleared each year (FAO)². Reducing the need to collect firewood will reduce deforestation, decrease pressure on biodiversity, increase water quality, protect land from erosion, and ultimately protect communities from degradation of their agricultural land.

Social:

- Reduced time collecting fuel wood means women can spend more time at home, in business, or in employment. In many cases children are kept home from school to collect wood. This project will therefore decrease the time children have to miss school.
- Reduced risk of respiratory diseases due to smoke inhalation. Many families cook over an open fire indoors, and air quality is therefore very poor. Energy efficient stoves reduce the use of fuel wood, therefore reducing the volume of smoke produced. They also burn wood with a primary as well as secondary combustion, significantly reducing toxic gases and reducing particulate matter.
- Reduced risk of house fires. Many homes, particularly in rural areas of Africa for example are burned down each year due to the use of open fires in thatched roof homes. As energy

² FAO. 2009. Change in extent of forest and other wooded land 1990-2005. <http://www.fao.org/forestry/32033/en/>

Access of July 20th 2012

efficient stoves contain the burning process within the stove, they significantly reduce the risk of homes catching alight.

Economic:

- Reduced fuel costs for households who purchase wood, due to a reduction in total amount of wood fuel used for cooking, which increases available household budget.
- In most cases stoves are manufactured or assembled locally, creating local employment and building the local economy.
- The reduction in GHG emissions will lead to the creation of CERs. The CERs generated by the project will be sold to help meet the costs of delivering the project, with any remaining funds generated being returned to communities participating in the project.

The PoA will deliver long-term environmental, social and economic benefits as described above, and these would not be delivered without carbon finance.

A.2. Physical/geographical boundary of PoA

>> The boundary of the PoA is defined as the geographical area within which all implemented small scale CDM programme activities (SSC-CPAs) included in the PoA occur, which is the Federal Democratic Republic of Ethiopia (Figure 1). Its geographical coordinates³ are 9°8'42" N 40°29'22.8" E.



³ <https://www.geodatos.net/en/coordinates/ethiopia>

Figure 1. Map of the Federal Democratic Republic of Ethiopia (<https://maps.google.com.au/>).

A.3. Technologies/measures

>> Each SSC-CPA will provide fuel-efficient stoves to households using fuel wood in the geographic area of the PoA. These stoves are to replace inefficient traditional open fireplaces that would otherwise be used in the absence of the project activity. The stove design utilised in each CPA may vary as traditions demand, however will have a specified efficiency of at least 20%, as required under AMS-II.G Version 11.1. Multiple cook stove technologies may be utilised in any given CPA given the unique cooking needs and requirements of households within the geographic area of the PoA.

Two example technologies that may be disseminated under the PoA are described below.

Example 1: Tikikil Rocket Stove



Figure 2: Tikikil Stove

The rocket cook stove proposed for distribution in CPA 1 is an Ethiopian produced stove called the “Tikikil” stove that is designed by GIZ and achieves a thermal efficiency of 28%³. The design is based on a traditional rocket stove, which achieves efficient combustion of fuel at a high temperature by ensuring that there is a good air draft into the fire, controlled use of fuel, complete combustion of volatiles, and efficient use of the resultant heat (see Figures 2 & 3). The stove's main components are:

- Fuel magazine: Into which the unburned fuel is placed and from where it feeds into the combustion chamber
- Combustion chamber: At the end of the fuel magazine where the wood is burned
- Chimney: A vertical chimney above the combustion chamber to provide the updraft needed to maintain the fire
- Heat exchanger: To transfer the heat to where it is needed, i.e. the cooking pot.

The stove has an inner clay liner for the combustion chamber cladded with sheet metal on the outside. The clay liner is produced by local potters while the metal cladding is done by metal artisans. The wood shelf is made up of 5mm radius round metal bar.

³ GIZ confirmation of Tikikil stove test results as provided in a letter to World Vision Ethiopia.

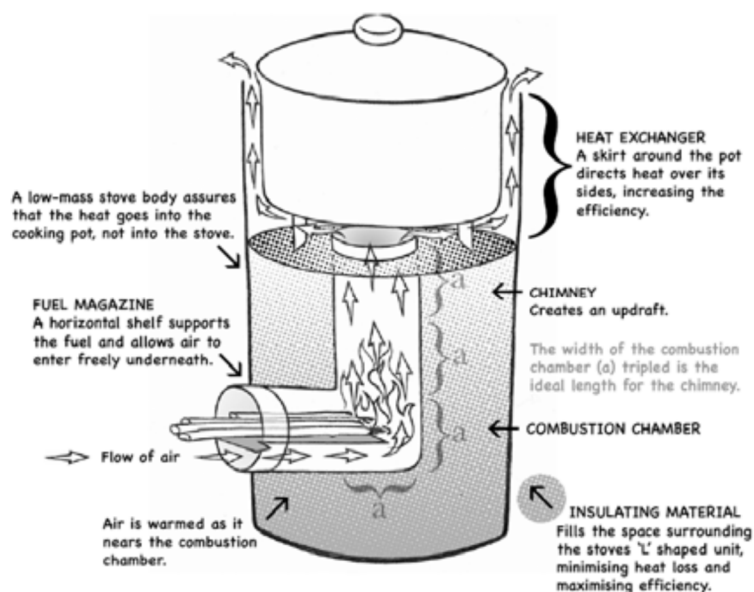


Figure 3: An Example of Rocket Stove Technology – maximising energy creation and minimising fuel consumption

Produced in country, the stove has been tailored and optimized for local Ethiopian cooking requirements. The stove incorporates a non-removable skirt of 32cm in diameter, which can accommodate approximately 98% of all Ethiopian pot sizes. The stove also provides a removable inner skirt that is used when smaller pots are required for cooking, such as the traditional coffee pot (8cm in diameter), to minimize heat loss and ensure that optimal efficiency is maintained.

Example 2: Mirt Stove

The Mirt stove (see Figure 3) was designed by the Ethiopian Rural Energy Development and Promotion Centre (EREDPC) in conjunction with GIZ (achieves a thermal efficiency of 22%⁴) in response to the need for an improved stove that could cook the staple Ethiopian food of Injera.

The stove is made of cement and pumice (a volcanic ash) that binds well with cement and is a good insulator. A mould is used to create the cement components of the stove, which are then transported to the household where the pumice is used to install the stove within the kitchen.



Figure 4: Mirt Stove

The stove has been designed by the EREDPC and GIZ to specifically meet the cooking needs of Injera, along with the secondary needs of roasting grain. It is suitable for both domestic and industrial use, and although not portable, significantly reduces the amount of smoke within the kitchen as opposed to the three stone open fire.

⁴ GIZ confirmation of Mirt stove test results as provided in a letter to World Vision Ethiopia.

The CME through the Post Registration Change (PRC-9769-001) had requested to change the ex-ante value of $SC_{new,Mirt,y}$: from 508 kg/g to actual monitored value of 328.53 kg/g which was approved on 22 November 2018⁵.

A.4. Coordinating/managing entity

>> World Vision Australia is the CME of the PoA

A.5. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Federal Democratic Republic of Ethiopia (host)	World Vision Ethiopia (private)	No
Commonwealth of Australia	World Vision Australia (private)	No
Kingdom of Sweden	Swedish Energy Agency (government agency)	No
Federal Republic of Germany	First Climate Markets AG (private)	No

A.6. Public funding of PoA

>> It is expected in general no public funding will be used in the proposed PoA. All subsidies for the PoA are stemming from revenues generated from the sale of credits under the CDM.

If Public Funding is accessed for any SSC-CPAs under this PoA, affirmation will be provided in the SSC-CPA-DD from the CPA implementer that this funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligation of those parties.

SECTION B. Management system

>> The CME of the PoA will oversee the inclusion of CPAs, ensuring that their technical and administrative processes meet the requirements under the PoA. This includes:

- Carry out a quality check on CPAs to be included in the Programme of Activities.
- Collect and compile monitoring records from all the CPA entities.
- Coordinate monitoring activities and data management during the lifetime of the PoA.
- Prepare and submit monitoring reports and facilitate the verification of the same.
- Act as the focal point with the CDM Executive Board for matters related to the PoA.

The CME has prepared a CPA Inclusion Management System that satisfies all criteria as outlined in EB 74 Annex 5, paragraph 19. A copy of this document has been submitted to the DOE for validation purposes.

In general each CPA will involve the following steps. Note that this list is not prescriptive and SSC-CPAs may choose to undertake a different series of operational steps as long as it is approved by the coordinating entity and complies with the requirements of the PoA and the selected methodology.

⁵ <https://cdm.unfccc.int/PRCContainer/DB/prcp291845402/view>

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

A User Agreement will be signed by those purchasing/receiving a stove, in order for them to participate in the project. When a user purchases a stove, it will become the property of the user. However, as CDM funding is subsidizing the purchase of the stove to the user, the user will agree in the purchase contract:

- to cede all CERs to the implementing organization
- to cooperate with the implementing organization for monitoring purposes
- to replace cooking on inefficient stoves with the new stove
- to inform the implementing organization if the new stove is no longer in use by the household or if it is handed over to another user

The user agreement also holds information on:

- the date of purchase
- the price of the new stove and the mode of payment (cash, installments, etc.) where applicable
- the Region, Zone and District of the user
- the local address where the user is residing
- the name of the user/buyer and contact details (village name and house number where possible)
- the identification number (Stove-ID) of the stove which has been purchased by the user

The buyer will confirm in the User Agreement that up to the date of purchase, wood has been used as the primary fuel source for cooking. Households that were only using fossil fuels (Kerosene, LPG) or electricity for cooking are not eligible to receive an improved stove at the reduced price.

All records and user agreements will be stored in both electronic and hard copy format at the local level by the implementing organization. The data will be provided to the CME and stored in an electronic database. The electronic database will be used to store information in relation to each user, who has purchased a stove, where the household is located within CPA, price and model of the stove, date of purchase, etcetera, as described above.

If a replacement stove is required by a purchaser, due to damage or theft, the household will be provided with a new stove (same model as the original stove) with an updated identification number to ensure no double counting of emission reductions. A new user agreement will be signed, and added to the original user agreement. The electronic database will also be updated with the new purchase date as well as any changes in the purchaser's details.

If a change of ownership occurs with a fuel efficient stove and the new owner is within the project area, then the old owner is replaced by the new one. All change of ownership and new ownership details will be recorded in the electronic database as well as a copy of the user agreement kept at the implementing organizations office.

(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,

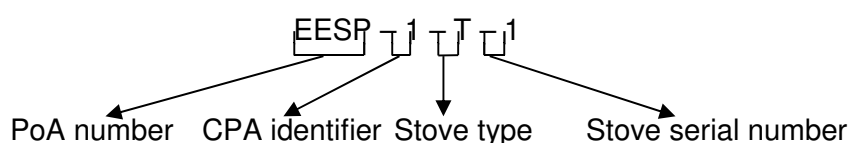
Double counting will be avoided through the use of a unique serial number permanently embedded on or near each stove (depending on stove make/model) under every CPA included in the PoA, which will be cross referenced to personal information of each participant. Every organisation seeking to undertake a CPA within the PoA will sign a standard contractual agreement with World Vision Australia to participate in the PoA. This agreement will ensure that:

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

- The CPA being included in the PoA has not already been registered as a CPA of another PoA or as an individual CDM project.
- The CPA being included uses a unique reference number for each stove across the PoA.

The unique serial number will be manufactured and either located directly on the stove, or placed securely next to the stove within the household, depending on the stove distributed. The unique ID will contain the PoA number (or alternatively the letters EESP), the CPA identifier (y), a stove type code (z), followed by a stove serial number (#).

An example is below:



Note: there may be a separate code for the manufacturer/distributor or for specific areas within a CPA, however as this is not needed to uniquely identify the stove, it is not needed here. The – between each part of the example is for readability only and may not be part of the unique ID.

Furthermore, in order to avoid double counting of emission reductions, for example to avoid that project stove manufacturer or wholesale providers do not claim credit from emission reductions from the project cook stove, the CPA implementer will obtain a written confirmation from those parties (i.e. stove manufacturer or wholesale provider) that they would not claim credits from emission reductions from the project cook stoves.

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

According to the “Guidelines on assessment of de-bundling for SSC project activities”, Version 04.0 if each of the independent subsystem/measures included in the CPA of a PoA is no larger than 1% of the small scale threshold defined by the methodology applied, then the CPA of the PoA is exempt from performing a de-bundling check.

The small scale threshold for AMS-II.G Version 11.1 is 180 GWh thermal per annum. For example the Tikikil and Mirt stoves described above are responsible for less than 0.0031% and 0.0033% respectively of the 180 GWh thermal small scale threshold. Therefore as an example of a typical CPA under this proposed PoA - it would be exempt from a de-bundling check. A check of the stove units installed as part of the PoA will be checked at CPA level to ensure that the technology meets debundling requirements.

(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;

World Vision Australia will ensure that organisations (other than the CME) responsible for implementing and operating a CPA as part of the PoA, sign contracts outlining that the operator of the CPA is aware of and has agreed that their activity is being subscribed to the PoA.

SECTION C. Demonstration of additionality of PoA

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

This PoA is being implemented as a voluntary action. There is no law or policy in the geographical boundary of the PoA which requires households to use fuel efficient stoves or other means of

reducing fuel wood consumption. Households who participate in the project will be doing so voluntarily.

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

In the absence of the proposed PoA, the distribution of domestic fuel efficient stoves to households would not be undertaken. The implementation of the PoA relies on the revenues gained from the sale of CERs generated by the PoA.

(iii) *Assessment and Demonstration of Additionality of the Proposed PoA*

The additionality of the proposed PoA is demonstrated using the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”, Version 3 (EB 74, Annex 5):

- Additionality shall be demonstrated by establishing that in the absence of CDM PoA, none of the implemented CPAs would occur.
- PoAs that consist of one or more small-scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of the “Guidelines on the demonstration of additionality of small-scale project activities”.
- The CME shall demonstrate that compliance with the additionality-related eligibility criteria set in the PoA-DD will ensure that all the relevant additionality-related guidelines, tools or any requirements embedded in the methodologies are met.

The criteria in “Guidelines on the Demonstration of Additionality of Small-Scale Project Activities” Version 09.0 (EB 68 Annex 27) of the methodological standards for small-scale CDM project activities, used to demonstrate additionality, state that:

1. 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, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

However paragraph 2 states:

2. Documentation of barriers, as per paragraph 1 above, is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15MW). The positive list comprises of:
 - c) Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises

(SMEs) and where the size⁶ of each unit is no larger than 5% of the small-scale CDM thresholds.

The stove units installed as part of the PoA will be checked at CPA level to ensure that the technology is used only at the household or community level and that the size of each isolated unit is no larger than 5% of the small-scale CDM threshold. Only units which meet this threshold will be included in the CPA, and hence documentation of barriers for additionality will not be required.

SECTION D. Start date and duration of PoA

D.1. Start date of PoA

>> The starting date of the PoA is 5th September 2012, the date that the CDM-PoA-DD and 1st CDM-CPA-DD were published on the UNFCCC-CDM website for global stakeholder consultation.

D.2. Duration of PoA

>> 28 years

SECTION E. Environmental impacts

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

>> Environmental analysis will be undertaken at PoA level. This is due to the fact that the, environmental impacts of the PoA will not vary across each CPA and the manufacturing and installation of stoves does not incur any negative environmental impacts. Therefore it is reasonable to undertake a single environmental impact analysis at the PoA level rather than for each CPA. Nationwide EIA compliance will be checked for any expanded geographical coverage of the PoA before inclusion.

E.2. Analysis of environmental impacts

>> No negative environmental impacts have been identified from the proposed PoA.

E.3. Environmental impact assessment

>> According to the Designated National Authority for the Clean Development Mechanism in Ethiopia (Environment Protection Authority, Ethiopia), an Environmental Impact Assessment is not required for this PoA.

SECTION F. Local stakeholder consultation

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

>> A single stakeholder consultation process will be undertaken for each CPA to be included under the PoA.

⁶ That is the size of each unit under 750kW installed capacity or under 3000 MWh of energy savings per year or 3000 tonnes of emission reductions per year.

F.2. Modalities for local stakeholder consultation

>> A single stakeholder consultation process will be undertaken for each CPA to be included under the PoA. The results of each process will be documented in the CPA-DD for each CPA implemented.

Comments by local stakeholders shall be invited and compiled at the CPA level. Information disseminated and shared during the community consultation should include:

- A non-technical overview of the project that is easy for stakeholders to understand.
- Overview of the Program goals, understanding of the CDM process, project timelines, monitoring requirements, transfer of CER rights.
- Overview of the improved fuel efficient stoves, including how they are used and benefits over the traditional cooking systems.
- Overview of the positive aspects of the project, including specific social, environmental, economic and health benefits.
- Questions and answer, including discussion on any negative perceptions of the project by community stakeholders.

Consultation should be conducted in the local language.

F.3. Summary of comments received

>> To be completed at the CPA level.

F.4. Consideration of comments received

>> Feedback from stakeholder consultation has been incorporated into the PoA and CPA with a Local Stakeholder Consultation report that outlines specific measures undertaken to incorporate feedback. This type of consultation will be undertaken for each new CPA, helping ensure consultation takes into account the specific needs of the local community, ensuring buy-in to the PoA from stove users themselves.

SECTION G. Approval and authorization

>> The Letter of Approval and Authorisation from the DNA of the Federal Democratic Republic of Ethiopia was received on the 6th of November, 2012.

PART II. Generic component project activity (CPA)**SECTION H. Description of generic CPA****H.1. Title of generic CPA**

>> Energy Efficient Stoves Program CPA

H.2. Reference number of generic CPA

>> Energy Efficient Stoves Program 9769-xx

H.3. Purpose and general description of generic CPA

>> Each CPA will involve the distribution and installation of a number of stoves to households in the project boundary with annual energy savings of up to 180 GWh thermal. The total number of stoves distributed and installed will be determined at the CPA level. Each CPA will involve the manufacturing, distribution, installation and monitoring of stoves over the CPA crediting period. Households will be required to utilise the efficient cook stove, and ensure that the traditional inefficient stoves are no longer used.

Stove producers will be contracted to manufacture standardized stoves for each CPA. The CPA implementer will be responsible for monitoring the distribution and installation of stoves in each CPA to ensure that each stove meets pre-determined quality standards and has a unique identification number.

The CME will have control of all records and information related to the implementation of individual CPAs and will be in a position to ensure that each CPA is being implemented according to the provisions as outlined in the PoA-DD. When a user purchases or receives a stove, it will become the property of the user. However, as CDM funding is subsidizing the stove, the user will agree in the user agreement:

- to cede all CERs to the implementing organization
- to cooperate with the CME in data collection and monitoring of the cook stoves
- to replace cooking on existing inefficient stoves with the new stoves
- to inform the CME if the new stove is no longer in use by the household or if it is handed over to another user.

Monitoring data, including information collected during the distribution and installation of the cook stoves will be captured in an electronic database by the CME. Paper records will also be kept to back up the electronic system where applicable. From this data, the emissions reductions of each CPA in the PoA will be determined. This system will be available for review by the Designated Operational Entity (DOE) during the validation of the PoA and verification of each CPA.

H.4. Technologies/measures

>> Each SSC-CPA will provide fuel efficient stoves to households using fuel wood in the geographic area of the PoA. These stoves are to replace inefficient traditional open fireplaces that would otherwise be used in the absence of the project activity. The stove design utilised in each CPA may vary as traditions demand, however will have a specified efficiency of at least 20%, as required under AMS-II.G Version 11.1. Multiple cook stove technologies may be utilised in any given CPA given the unique cooking needs and requirements of households within the geographic area of the PoA.

Two example technologies that may be disseminated under the PoA are described below.

Example 1: Tikikil Rocket Stove



Figure 2: Tikikil Stove

The rocket cook stove proposed for distribution in CPA 1 is an Ethiopian produced stove called the “Tikikil” stove that is designed by GIZ and achieves a thermal efficiency of 28%⁷. The design is based on a traditional rocket stove, which achieves efficient combustion of fuel at a high temperature by ensuring that there is a good air draft into the fire, controlled use of fuel, complete combustion of volatiles, and efficient use of the resultant heat (see Figures 2 & 3). The stove's main components are:

⁷ GIZ confirmation of Tikikil stove test results as provided in a letter to World Vision Ethiopia.

- Fuel magazine: Into which the unburned fuel is placed and from where it feeds into the combustion chamber
- Combustion chamber: At the end of the fuel magazine where the wood is burned
- Chimney: A vertical chimney above the combustion chamber to provide the updraft needed to maintain the fire
- Heat exchanger: To transfer the heat to where it is needed, i.e. the cooking pot.

The stove has an inner clay liner for the combustion chamber cladded with sheet metal on the outside. The clay liner is produced by local potters while the metal cladding is done by metal artisans. The wood shelf is made up of 5mm radius round metal bar.

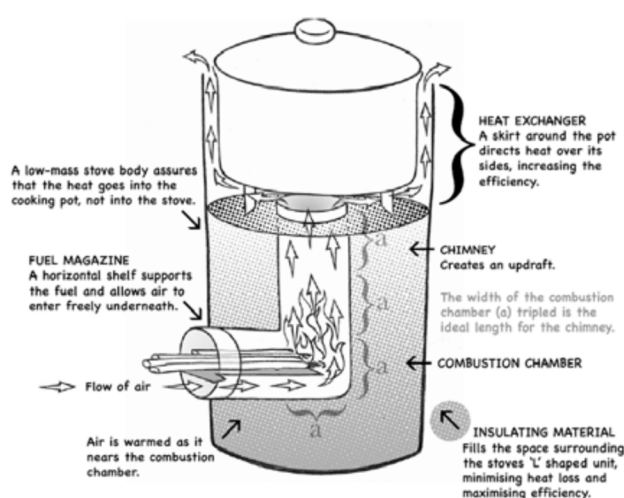


Figure 3: An Example of Rocket Stove Technology – maximising energy creation and minimising fuel consumption

Produced in country, the stove has been tailored and optimized for local Ethiopian cooking requirements. The stove incorporates a non-removable skirt of 32cm in diameter, which can accommodate approximately 98% of all Ethiopian pot sizes. The stove also provides a removable inner skirt that is used when smaller pots are required for cooking, such as the traditional coffee pot (8cm in diameter), to minimize heat loss and ensure that optimal efficiency is maintained.

Example 2: Mirt Stove

The Mirt stove (see Figure 3) was designed by the Ethiopian Rural Energy Development and Promotion Centre (EREDPC) in conjunction with GIZ (achieves a thermal efficiency of 22%⁸) in response to the need for an improved stove that could cook the staple Ethiopian food of Injera.



Figure 4: Mirt Stove

⁸ GIZ confirmation of Mirt stove test results as provided in a letter to World Vision Ethiopia.

The stove is made of cement and pumice (a volcanic ash) that binds well with cement and is a good insulator. A mould is used to create the cement components of the stove, which are then transported to the household where the pumice is used to install the stove within the kitchen.

The stove has been designed by the EREDPC and GIZ to specifically meet the cooking needs of Injera, along with the secondary needs of roasting grain. It is suitable for both domestic and industrial use, and although not portable, significantly reduces the amount of smoke within the kitchen as opposed to the three stone open fire.

The CME through the Post Registration Change (PRC-9769-001) had requested to change the ex-ante value of $SC_{new,Mirt,y}$ from 508 kg/g to actual monitored value of 328.53 kg/g which was approved on 22 November 2018⁹.

SECTION I. Application of methodologies and standardized baselines

I.1. References to methodologies and standardized baselines

>> Each SSC-CPA in this PoA will employ the approved small scale baseline and monitoring methodology AMS-II.G Version 11.1, *“Energy Efficiency Measures in Thermal Applications on Non-Renewable Biomass”* and “Standardized Baseline (ASB0044-2019): Improved Institutional Cookstoves in Ethiopia”, Version 01.0

In line with the application of AMS-II.G Version 11.1 methodology, the PoA has taken into consideration the following documents:

- “General Guidelines for SSC CDM Methodologies”, Version 23.0
- “Demonstration of additionality of smallscale project activities”, Version 10.0
- “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”, Version 3.0
- “Guidelines on the Demonstration of Additionality of Small-Scale Project Activities”, Version 09.0
- “Guidelines on assessment of de-bundling for SSC project activities”, Version 03.0
- “General Guidance on Leakage in Biomass Project Activities” Version 04.0
- “Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities”, Version 4.0
- “Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities”, Version 4.0

I.2. Applicability of methodologies and standardized baselines

>>

Methodology AMS-II.G. Version 11.1	Justification
This methodology comprises efficiency improvements in thermal applications of non-renewable biomass. Examples of applicable	The CPAs will consist of the dissemination of high efficiency biomass fired cook stoves. It will save non-renewable biomass, which would

⁹ <https://cdm.unfccc.int/PRCContainer/DB/prcp291845402/view>

technologies and measures include the introduction of high efficiency biomass fired project devices (cookstoves or ovens or dryers) to replace the existing devices and/or energy efficiency improvements in existing biomass fired cookstoves or ovens or dryers.	otherwise have been consumed by less efficient three stone open fire.
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.	The CPA shall include only those stoves that have a rated thermal efficiency of at least 20%. The Mirt stove and Tikikil stove that the CPAs will distribute has a thermal efficiency of 22% and 28% respectively. A letter from GIZ Ethiopia that confirms the efficiency of Mirt and Tikikil stove has been submitted to the DOE for validation.
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.	The aggregate energy savings of a single CPA shall not exceed the equivalent of 60 GWh per year or 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.	Non-renewable biomass has been used since 31 December 1989 in Ethiopia. According to FAO, total forestry area in Ethiopia has declined between 1990 and 2005, with an estimated loss of 141,000 ha/year representing an annual deforestation rate of 1.0 % (1990-2000) and 1.1 % (2000-2005) ¹⁰ .
For cases where the biomass is sourced from renewable sources, the project participants should use a corresponding Type I methodology.	This criterion is not applicable, as the CPAs will be using non-renewable biomass.
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.	This criterion is not applicable for the CPAs, as the project cook stoves do not require any specific fuel such as briquettes, pellets or woodchips.
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).	<p>The CPA will explain the proposed method of distribution of project devices in the CPA-DD. To avoid double counting of emission reduction, the CPA shall explain the unique identification of the product and end user locations.</p> <p>Section B of the PoA-DD provides an example of unique identification of the project cook stoves that will be included under the CPAs.</p>

¹⁰ FAO. 2009. Change in extent of forest and other wooded land 1990-2005. <http://www.fao.org/forestry/32033/en/>

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 CPA shall explain the proposed procedures to 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 in the CPA-DD. Section B of the PoA-DD provides an example of such procedure.
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Standardized Baseline ASB0044-2019: Improved Institutional Cookstoves in Ethiopia, Version 01.0	Justification
<p>The scope of the standardized baseline covers the values of baseline woody biomass consumption per capita, the efficiency of pre-project institutional cookstoves, and the fraction of woody biomass that can be established as non-renewable biomass (fNRB) in Ethiopia. The standardized baseline is only applicable to cookstoves of the following type of institutions:</p> <p>Category 1: Prisons, hospitals/clinics, refugee camps, military barracks;</p> <p>Category 2: Restaurants and other food services in rural areas;</p> <p>Category 3: Boarding schools, universities;</p> <p>Category 4: Day schools; and</p> <p>Category 5: Injera bakers using Mirt stoves</p>	<p>The CPAs don't fall under any category from 1 to 5, as the CPAs will consist of dissemination of high efficiency biomass fired cook stoves in the Ethiopian households. The CPAs will save non-renewable biomass (NRB), which would otherwise have been consumed by less efficient three stone open fire in Ethiopia. The CPAs will only utilise the value for fraction of woody biomass that can be established as non-renewable biomass (fNRB) in Ethiopia from ASB0044-2019 (version 01.0).</p>
The project activity is implemented in Ethiopia	The CPAs will be implemented in Ethiopia.
The approved CDM methodology applied to the project activity is small-scale methodology AMS-II.G. "Energy efficiency measures in thermal applications of non-renewable biomass" and/or small-scale methodology AMS-I.E. "Switch from non-renewable biomass for thermal applications by the user";	The CPAs will apply small-scale methodology AMS-II.G. "Energy efficiency measures in thermal applications of non-renewable biomass".
The standardized values are not applicable to	This criterion is not applicable as the CPAs will

institutions using LPG and/or kerosene in the baseline as a cooking fuel; and	not be the institutions using LPG and/or kerosene in the baseline as a cooking fuel.
The standardized values are not applicable to standalone renewable energy based water treatment technologies under AMS-I.E.	This criterion is not applicable as the CPAs will not be an energy based water treatment technologies under AMS-I.E.
To use the default value under Category 5, the average weight of an injera is monitored once at the beginning of the crediting period and once every year, where required on a sample basis. It is demonstrated that weight of each injera is equal to or more than 0.368 kg (i.e. the number of injera per kg of injera baked should be equal to or less than 2.72). In addition, annual average number of injera baked per injera baker should also be monitored.	This criterion is not applicable, as the CPAs don't fall under Category 5.

I.3. Application of multiple methodologies

>> Not Applicable

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

>> The major source of GHG emissions arise from the combustion of non-renewable biomass (fuel wood) while cooking with project cook stoves (Figure I.5). This PoA will reduce the consumption of energy by implementing energy efficient cook stoves, thus reducing the greenhouse gas emissions associated with cooking food on inefficient, traditional open fires. The project stoves that will be implemented under this PoA are located within individual households that are within the geographical boundary of the PoA.

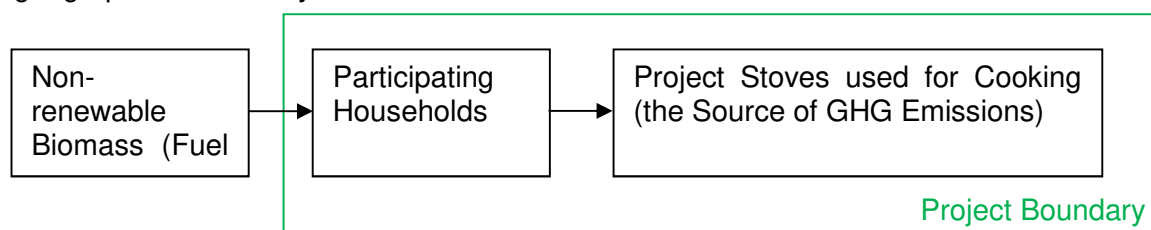


Figure I.5. Flow diagram outlining the facilities, systems and equipment applicable under the PoA.

Source		GHG	Included?	Justification/Explanation
Baseline	Combustion of non-renewable woody biomass for cooking (traditional open fires)	CO ₂	Yes	Main emissions source.
		CH ₄	No	Minor emission source. Not required by methodology.

Source		GHG	Included?	Justification/Explanation
	Combustion of non-renewable woody biomass for cooking (fuel efficient stove)	N ₂ O	No	Minor emission source. Not required by methodology.
		CO ₂	Yes	Main emissions source.
		CH ₄	No	Minor emission source. Not required by methodology.
		N ₂ O	No	Minor emission source. Not required by methodology.

I.5. Establishment and description of baseline scenario

>> The PoA complies with the paragraph 23 of AMS-II.G Version 11.1 that defines baseline scenarios as follows:

“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”.

Following the methodology tool “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” (Version 03.0.1), stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period:

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 and/or sectoral policies that affect the baseline scenario during the renewal of the crediting period. There is no law or policy in the areas of project implementation, which requires households to use fuel-efficient stoves or other means of reducing fuel wood consumption.

Step 1.2: Assess the impact of circumstances

There is no impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions. The conditions used to determine the baseline emissions in the previous crediting period are still valid as in absence of project cook stoves the households would continue to use three stone open fire that would lead to a significant consumption of firewood. Please refer to section H.4 of this PoA-DD for a description of the technologies and activities that would be employed.

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

Continued use of current baseline equipment (i.e. three stone open fire) is the most likely scenario for the crediting period for which renewal is requested. Since the baseline equipment/technology (i.e. three stone open fire) is replaced by project cook stoves, analysis of the end of the technical lifetime of the baseline equipment is not applicable in this case. However, the project cook stove will have specific operational lifetime and when the project stoves ends its operational lifetime, those stoves will be replaced by new project stoves throughout the crediting period.

Step 1.4: Assessment of the validity of the data and parameters

The following parameters that were determined at the start of the first crediting period and not monitored during the first crediting period and not valid anymore have been updated in line with AMS-II.G, Version 11.1 that provides new guidance on key parameters, default values and emission reduction calculation formulas:

- Fraction of woody biomass that can be established as non-renewable biomass (fNRB)
- IPCC default for fuel wood
- Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers (EF_{projected_fossilfuel})
- 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 (Bold,p)

Application of Steps 1.1, 1.2, 1.3 and 1.4 confirms that the current baseline is valid for the second crediting period; however, data and parameters need to be updated. Therefore, step 2 is applicable.

Step 2: Update the current baseline and the data and parameters**Step 2.1: Update the current baseline**

As per the outcome of Step 1, this step is not applicable as the current baseline is still valid.

Step 2.2: Update the data and parameters

As outlined in Step 1.4 above, parameters that were determined at the start of the first crediting period and not monitored during the first crediting period and not valid anymore have been updated in line with AMS-II.G, Version 11.1. More details on updated data and parameters can be found in section I.6.2 and I.6.3 of this PoA-DD.

I.6. Estimation of emission reductions**I.6.1. Explanation of methodological choices**

>> CPAs under the Energy Efficient Stoves Program (EESP) PoA will use the baseline and monitoring methodology AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass” Version 11.1. The following sections outline how the emissions reductions calculations will be performed.

Emissions Reductions

Emissions reductions for the project activity are calculated as follows:

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

(Equation 1)

Where:

i	Indices for the situation where more than one type of project device is introduced to replace the pre-project devices ¹¹
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

As per equation 2 of AMS-II.G Version 11.1, the emissions reductions created by each type of project device implemented by the project activity are calculated as follows:

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

(Equation 2)

Where:

¹¹ 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).

$B_{y,savings,i,j}$	Quantity of woody biomass that is saved in tonnes per cookstove 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 (fNRB)
$NCV_{biomass}$	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
$N_{y,i,j}$	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). Use 1.0 in other cases

$N_{y,i,j}$ is monitored directly, for $NCV_{biomass}$ and $EF_{projected_fossil\ fuel}$, the default values provided under the methodology are used, and LE_y is set to zero, since leakage is considered by multiplying $B_{y,savings,i,j}$ with net to gross adjustment factor of 0.95. μ_y will be monitored.

Value for $f_{NRB,y}$, has been taken from the Standardised Baseline (ASB0044-2019): Improved Institutional Cookstoves in Ethiopia, Version 01.0.

Determination of $B_{y,savings,i,j}$

As per paragraph 32 and 33 of AMS-II.G Version 11.1, $B_{y,savings,i,j}$ is calculated using the following equations:

$$B_{y,savings,i,j} = B_{old,i,j} \times \left(1 - \frac{\eta_{old,i,j}}{\eta_{new,i,j}} \right) \quad (\text{Equation 7})$$

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

$\eta_{old,i,j}$ 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 □

$$B_{y,savings,i,j} = B_{old,i,j} \times \left(1 - \frac{SC_{new,i,j}}{SC_{old}}\right) \quad (\text{Equation 9})$$

Where:

SC_{old}

Specific fuel consumption or fuel consumption rate of the pre-project devices

$SC_{new,i,j}$

Specific fuel consumption or the fuel consumption rate of the devices of type i and batch j deployed as part of the project

Determination of $B_{old,i,j}$ and $B_{old,HH}$

$B_{old,i,j}$ and $B_{old,HH}$ are calculated as per equation 10 and 11 of AMS-II.G Version 11.1 as below.

$$B_{old,i,j} = B_{old,HH} \div N_{d,HH} \quad (\text{Equation 10})$$

$$B_{old,HH} = B_{old,p} \times N_{p,HH} \quad (\text{Equation 11})$$

Where,

$B_{old,HH}$

Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices (tonnes/household/year)

$N_{d,HH}$

Number of project devices per household (number)

$B_{k,old,p}$

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 (tonnes/person/year)

$N_{p,HH}$

Average number of persons per household (number)

Leakage Emissions

For all CPAs to be included in this PoA, $B_{old,i,j}$ will be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, and therefore surveys are not required.

I.6.2. Data and parameters fixed ex ante

Data/Parameter	$f_{NRB,y}$
Data unit	%
Description	Fraction of woody biomass that can be established as non-renewable biomass (f_{NRB})
Source of data	Standardised Baseline (ASB0044-2019): Improved Institutional Cookstoves in Ethiopia, Version 01.0, page 7
Value(s) applied	76%
Choice of data or measurement methods and procedures	Standardised Baseline (ASB0044-2019): Improved Institutional Cookstoves in Ethiopia, Version 01.0, page 7 Fixed ex-ante at the PoA level
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	$NCV_{biomass}$
Data unit	TJ/t
Description	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')
Source of data	IPCC default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is 'air-dried' as per paragraph 24 of AMS-II.G Version 11.1
Value(s) applied	0.0156
Choice of data or measurement methods and procedures	Default value

Purpose of data	Calculation of baseline emissions
Additional comment	-

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	Regional value for sub-saharan Africa (73.2 tCO ₂ /TJ) as per paragraph 25 of AMS-II.G Version 11.1.
Value(s) applied	73.2
Choice of data or measurement methods and procedures	Default value
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	Calculated based on the data published by the Ministry of Environment, Forest and Climate Change of Ethiopia.
Value(s) applied	0.91
Choice of data or measurement methods and procedures	Fixed ex-ante at the PoA level
Purpose of data	Calculation of baseline emissions
Additional comment	The calculated B _{old,p} value was compared with an alternate source – “Standardised Baseline (ASB0044-2019): Improved Institutional Cookstoves in Ethiopia, Version 01.0” and the most conservative value was considered. Please refer to the ER calculation spreadsheet for detail calculation and referenced literatures.

Data/Parameter	$\eta_{old,i,j}$
Data unit	%
Description	Efficiency of the old device (three stone fire) being replaced by Tikikil Stove
Source of data	As per Data/parameter table 18 (Option 1) of AMS-II.G Version 11.1.
Value(s) applied	10
Choice of data or measurement methods and procedures	Default value
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	SC _{old}
Data unit	t fuel/unit output or t fuel/hour
Description	Specific fuel consumption or fuel consumption rate of the pre-project devices
Source of data	This value will be determined at the time of inclusion of the first CPA under this PoA-DD and the determined value will be applicable for all subsequent CPAs included under the PoA
Value(s) applied	To be determined at the CPA level
Choice of data or measurement methods and procedures	<ol style="list-style-type: none"> 1. Specific fuel consumption or fuel consumption rate of the pre-project devices, that is fuel consumption per quantity of item/s processed (e.g. food cooked) or fuel consumption per hour, respectively. Specific fuel consumption or fuel consumption rate are to be determined using the CCT protocol carried out in accordance with national standards (if available) or international standards or guidelines (e.g. the CCT <input type="checkbox"/> Protocol listed by Clean Cooking Alliance (See https://www.cleancookingalliance.org/technology-and-fuels/testing/protocols.html)). 2. Use weighted average values if more than one type of device is being replaced (taking the amount of woody biomass consumed by each device as the weighting factor). 3. When the CCT is conducted on a sample basis, the sampling requirements indicated in section 6.2 of the methodology AMS-II.G Version 11.1 and guidance provided in the “Standard for sampling and surveys for CDM project activities and programme of activities” shall be followed
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	NTG
Data unit	Fraction
Description	Net to Gross Adjustment factor
Source of data	As per paragraph 39 of AMS-II.G Version 11.1
Value(s) applied	0.95
Choice of data or measurement methods and procedures	B _{y,saving,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.
Purpose of data	Calculation of leakage
Additional comment	-

Data/Parameter	N _{p,HH}
Data unit	4.6

Description	Average number of persons served per household prior to project implementation
Source of data	Published information / <input type="checkbox"/> literature Ethiopia Planning and Development Commission 2018 ¹²
Value(s) applied	Fixed ex-ante at the PoA level
Choice of data or measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	$B_{old,HH}$
Data unit	tonnes/household/year
Description	Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices
Source of data	Determined ex ante at CPA level.
Value(s) applied	To be determined at the CPA level.
Choice of data or measurement methods and procedures	Option 1: $B_{old,p}$ times $N_{p,HH}$
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	$B_{old,i,j}$
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	Determined ex ante at CPA level.

¹² <https://www.undp.org/content/dam/dagethiopia/documents/Poverty%20&%20Economic%20Growth%20in%20Ethiopia-mon,%20feb,%202011,%202019.pdf>, page 52, Table 6.2

Value(s) applied	To be determined at the CPA level.
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	$N_{d,HH}$ is the number of project device distributed per household

1.6.3. Modalities for ex ante calculation of emission reductions

>> CPAs under the Energy Efficient Stoves Program (EESP) PoA will use the baseline and monitoring methodology AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass” Version 11.1. The following demonstration outlines how the emissions reductions will be calculated as an example. This example involves the distribution of a Mirt stove and a Tikikil stove to 15,795 households in Ethiopia.

Emissions Reductions

Emissions reductions for the project activity are calculated as per Equation 1 of AMS-II.G (Version 11.1) as follows:

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

Where,

ER_y Emission reductions during year y in t CO₂e□

$ER_{y,i,j}$ Emission reductions by project device of type i and batch j during year y in t CO₂e□

LE_y Leakage emissions in the year y

The emissions reductions achieved by the Mirt stove and Tikikil Stove are calculated as per the above equation of AMS-II.G Version 11.1:

$$ER_{y,Mirt} = 18,544 \text{ tCO}_2\text{e}$$

$$ER_{y,Tikikil} = 17,496 \text{ tCO}_2\text{e}$$

Therefore,

$$ER_y = 18,544 + 17,496 = 36,040 \text{ tCO}_2\text{e}$$

$ER_{y,i,j}$ for Mirt and Tikikil stove is calculated using Equation 2 of AMS II.G Version 11.1

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

Where:

$B_{y,savings,i,j}$	Quantity of woody biomass that is saved in tonnes per cookstove 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 (fNRB)
$NCV_{biomass}$	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
$N_{y,i,j}$	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

Calculation of $B_{y,savings}$ for Tikikil Stove

$B_{y,savings}$ for Tikikil Stove is calculated as per Equation 7 of AMS-II.G (Version 11.1):

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

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
$\eta_{old,i,j}$	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 **Calculation of $B_{y,savings}$ for Mirt Stove:** $B_{y,savings}$ for Mirt Stove is calculated as per Equation 9 of AMS-II.G (Version 11.1):

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

Where,

 SC_{old} Specific fuel consumption or fuel consumption rate of the pre-project devices $SC_{new,i,j}$ Specific fuel consumption or the fuel consumption rate of the devices of type i and batch j deployed as part of the project

Two project cook stoves (1 Tikikil stove and 1 Mirt stove) are installed per household, therefore, $B_{old,i,j}$ is calculated as per Equation 10 and Equation 11 of AMS-II.G (Version 11.1) as below.

$$B_{old,i,j} = B_{old,HH} \div N_{d,HH}$$

$$B_{old,HH} = B_{old,p} \times N_{p,HH}$$

Where,

$B_{old,HH}$	Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices (tonnes/household/year)
$N_{d,HH}$	Number of project devices per household (number)
$B_{old,p}$	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 (tonnes/person/year)
$N_{p,HH}$	Average number of persons per household (number)

Leakage:

In line with the paragraph 39 of AMS-II.G (Version 11.1), $B_{y,savings,i,j}$ is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

Simplified example of ex-ante calculation of emission reductions:

Parameter	Unit	Value	Reference
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B_{old,p}	tonnes/person/year	0.91	Calculated based on the country specific historical data.
N_{p,HH}	-	4.6	Ethiopia Planning and Development Commission 2018
N_{d,HH}	-	2	The project distributes 2 stoves per household
B_{old,HH}	tonnes/household/year	4.18	Calculated as per equation 11, AMS.II.G Version 11.1
B_{old,Mirt}		2.09	Calculated as per equation 10, AMS.II.G Version 11.1
B_{old,Tikikil}		2.09	Calculated as per equation 10, AMS.II.G Version 11.1
Leakage	-	0.95	Default leakage adjustment factor of 0.95 as per paragraph 39 of AMS.II.G Version 11.1.
SC_{old}	g/kg	1031	Validated at the time of project registration. CCT Results: Open Fire (specific fuel consumption), page 6 of GTZ-SUN: Energy Mirt stove test report.
SC_{new,Mirt}	g/kg	328.53	Value approved at the post registration change (PRC-9769-001)
B_{y, savings,Mirt}	t/device/year	1.35	Calculated as per equation 9, AMS.II.G Version 11.1
$\eta_{old,i,j}$	%	10%	Default value of 10% as per data/parameter table 18 (Option 1) of AMS-II.G Version 11.1.
$\eta_{new,Tikikil}$	%	28%	Validated at the time of project registration. WBT Results: Double skirt Tikikil (thermal efficiency), Annex 1 of GTZ SUN: Energy Project: Water Boiling Test Results of Various Types of Household and Institutional Wood Stoves for Non-Injera Cooking.
B_{y, savings,Tikikil}	t/device/year	1.28	Calculated as per equation 7, AMS.II.G Version 11.1
f_{NRB,y}	%	76%	Standardised Baseline (ASB0044-2019): Improved Institutional Cookstoves in Ethiopia, Version 01.0, page 7
NCV_{biomass}	TJ/t	0.0156	IPCC default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is 'air-dried' as per paragraph 24 of AMS-II.G Version 11.1
EF_{projected_fossilfuel}	tCO ₂ /TJ	73.2	Default regional value for sub-saharan Africa (73.2 tCO ₂ /TJ) as per paragraph 25 of AMS-II.G Version 11.1.
N_{y,Mirt}	-	15,795	For the purposes of ex-ante calculations, the total number of cook stoves that will be deployed and operational
N_{y,Tikikil}	-	15,795	For the purposes of ex-ante calculations, the total

			number of cook stoves that will be deployed and operational
μ_y	-	1	For the purposes of ex-ante calculations, the value is taken as 1, however, this parameter will be monitored
$ER_{y,Mirt}$	tCO ₂ e	18,544	Calculated as per equation 2, AMS.II.G Version 11.1
$ER_{y,Tikikil}$	tCO ₂ e	17,496	Calculated as per equation 2, AMS.II.G Version 11.1
ER_y	tCO ₂ e	36,040	Calculated as per equation 1, AMS.II.G Version 11.1

I.7. Monitoring plan

I.7.1. Data and parameters to be monitored

Data/Parameter	$N_{y,i,j}$
Data unit	Number
Description	Number of project devices of type i and batch j operating during year y
Source of data	Database records (to determine the total number of stoves distributed, and the number of days that stoves have been operational), the results of the Project Operationality Sample Group (POSG).
Value(s) applied	To be determined at the CPA level
Measurement methods and procedures	The proportion of cook stoves of type i that are operating will be determined based on a representative sample of the Project Operationality Sample Group (POSG) as outlined in Section I.7.2.
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	<p>Entries made into the electronic database are undertaken by the project participant staff. Copies of the database records will be kept by the project participant in addition to hard copies of the purchase agreements. These hard copies will be used to cross check the database records. In case of inconsistencies, the project participant will take the appropriate corrective actions.</p> <p>All records of stoves distributed will be stored in a secure database.</p> <p>Survey results will be stored in an electronic database for a minimum of 2 years after the end of the crediting period of the CPA.</p>
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	Fraction based on monitoring results
Value(s) applied	To be determined at the CPA level

Measurement methods and procedures	<p>This parameter will be monitored using the following method:</p> <p>The sample households will be checked and if the pre-project devices are decommissioned and no longer <input type="checkbox"/> used, as determined by the monitoring survey μ_y value is 1.0.</p> <p>The surveys would 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.</p>
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	$\eta_{new,i,j}$
Data unit	%
Description	Efficiency of the device of each type i and batch j implemented as part of the project activity
Source of data	<p>Water Boiling Test (WBT) Result.</p> <p>Efficiency of the project stove will be monitored through Water Boiling Test (WBT) in line with paragraph 37, option (d) of AMS-II.G Version 11.1 that states "Determine the loss in efficiency annually from a representative sample of each batch and use the actual loss rate that is measured". <input type="checkbox"/></p> <p>Please note that the ex-ante calculation of the CPAs will be based on the efficiency of the project stove as per manufacturers specification or certification by a national standards body or appropriate certifying agent recognized by that body.</p>
Value(s) applied	To be determined at the CPA level (where applicable)

Measurement methods and procedures

Efficiency shall be measured/estimated either of the following:

- The efficiency of the project devices shall be based on certification by a national standards body or an appropriate certifying agent recognized by that body.
- Manufacturer specifications on efficiency based on water boiling test (WBT) may be used. The WBT shall be carried out in accordance with national standards (if available) or ☐ international standards or guidelines (e.g. the WBT Protocol¹³¹⁴ or ISO 19867-1 listed by Clean Cooking Alliance:

<https://www.cleancookingalliance.org/technology-and-fuels/testing/protocols.html>.

The sampling test of stoves by such certification bodies/agents or manufacturers shall be conducted following a 90/10 precision in accordance with the “Standard for sampling and surveys for CDM project activities and programme of activities”.

- However, the following simplified approach may be used, when the efficient cookstoves are produced by a manufacturer with a recognized management system in place (e.g. ISO certification) to ensure that the individual equipment produced do not vary beyond the range of acceptance limits (e.g. characteristics such as materials, critical dimensions):

(i) Conduct a sample test on three cookstoves with three tests conducted for each stove. The test can be carried out by project proponents by themselves or stove manufacturers;

(ii) If the standard deviation of the nine test results indicated above is very small and 90/10 precision requirement is met (in this case, the value of the t-distribution for 90 per cent confidence shall be used instead of Z value), the efficiency determined is acceptable, otherwise more sample tests would be required until 90/10 precision is met.

¹³ PPs/CMEs may conduct only the first two phases of the stove tests: cold-start high-power phase and hot-start high-power phase (not including the simmer phase) for calculation of the high-power thermal efficiency. ^[13]_{SEP}

¹⁴ The guidance provided in the WBT protocol may be followed for calibration of testing equipment. ^[14]_{SEP}

Monitoring frequency	WBT of project stoves will be conducted annually based on a representative sample of the Project Efficiency Sample Group (PESG) as outlined in Section I.7.2.
QA/QC procedures	Results of the WBT under the PESG will be stored in an electronic database and will be stored for a minimum of 2 years after the end of the crediting period of the CPA.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	$SC_{new,i,y}$
Data unit	t fuel/unit output or t fuel/hour
Description	Specific fuel consumption (i.e. t fuel/unit) or fuel consumption rate (t fuel/hour) in year y of the device(s) deployed as part of the project that is fuel consumption per quantity of item/s processed (e.g. food cooked) or fuel consumption per hour respectively
Source of data	Results of the Controlled Cooking Test (CCT)
Value(s) applied	To be determined at the CPA level (where applicable)
Measurement methods and procedures	<p>As per paragraphs 33, using the controlled cooking test (CCT) procedure.</p> <p>The CCT shall be carried out in accordance with national standards (if available) or international standards or guidelines (e.g. the CCT Protocol listed by Clean Cooking Alliance (See https://www.cleancookingalliance.org/technology-and-fuels/testing/protocols.html)).</p> <p>When the CCT is conducted on a sample basis, the sampling requirements indicated in section 6.2 and guidance provided in the “Standard for sampling and surveys for CDM project activities and programme of activities” shall be followed</p>
Monitoring frequency	Yearly
QA/QC procedures	Results of the CCT under the PESG will be stored in an electronic database and will be stored for a minimum of 2 years after the end of the crediting period of the CPA.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	Date of commissioning of project device i
Data unit	Date
Description	Actual date of commissioning of the project device
Source of data	Project Database
Value(s) applied	To be determined at the CPA level
Measurement methods and procedures	-
Monitoring frequency	Fixed and recorded at the time of commissioning/distribution
QA/QC procedures	To account for potential delays in between distribution and commissioning of cook stoves, the date of commissioning will be taken from the 1 st day of the next month following the date of distribution of the cook stove up until the end of the monitoring period. For example, for a cookstove distributed on the 7 th of September 2021, the date of commissioning of that project device would be 1 st October 2021 and the number of days will be counted from the 1 st of October up until the end of the monitoring period.
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 may opt to group the devices 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 (where applicable)
Source of data	Project Database
Value(s) applied	To be determined at the CPA level (where applicable)
Measurement methods and procedures	-
Monitoring frequency	Fixed and recorded at the time of commissioning/distribution
QA/QC procedures	The batch will be based on “Year of Commissioning” of the project cook stoves, where applicable. For instance, cook stoves distributed in 2021, 2022 and 2023 may be batched as “Year 2021”, “Year 2022” and “Year 2023”, where applicable.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	Life Span
Data unit	Number of Years
Description	The operating lifetime 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	To be determined at the CPA level
Measurement methods and procedures	-
Monitoring frequency	Fixed and recorded at the time of commissioning/distribution
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	Only reported in the cases where the CPA opts to account the efficiency loss as per paragraph 37

Data/Parameter	N_{d,HH}
Data unit	Number
Description	Number of project devices distributed per household
Source of data	Project database
Value(s) applied	To be determined at the CPA level
Measurement methods and procedures	Each project household signs a purchase contract that will have information on type and number of stove purchased by that household. This information is then fed into an electronic database. All sales of the stoves are recorded within a secure database.
Monitoring frequency	Recorded at the time of commissioning/distribution of project devices
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

1.7.2. Sampling plan

>> The sampling objective is to determine:

- i) the mean thermal efficiency of device type *i* (where the WBT is used, the weighted average is taken where multiple stove types are used and the WBT is appropriate for both); or the mean specific fuel consumption or fuel consumption rate of device type *i* (where the CCT is used). These parameters will be monitored with 95% confidence and 10% precision annually for CPA groups.
- ii) the proportion of project cook stoves of type *i* still operating within each CPA during the crediting period. The proportion of operating cook stoves will be monitored with 90% confidence and 10% precision when annual sampling is applied, and with 95% confidence and 10% precision where biennial sampling is applied.
- iii) to provide unbiased and reliable estimates of μ_y (adjustment to account for any continued use of pre-project devices during the year *y*) with 90% confidence and 10% precision when annual sampling is applied, and with 95% confidence and 10% precision where biennial sampling is applied in order to estimate use of pre-project device.

Target Population and Sampling Frame

The target population consists of households that have received project cook stoves to replace inefficient, traditional fireplaces for cooking.

The sampling frame is the list of households that have participated in the CPA for the Project Operationality Sample Group (POSG) and μ_y . For PESG, (see below for further details) the sampling frame is the list of households that have participated in the CPA groups.

Sampling Method

The following monitoring sample groups will be selected for each stove of type i :

- The Project Efficiency Sample Group (PESG) to determine the annual quantity of woody biomass used, thermal efficiency, or specific fuel consumption or fuel consumption rate of the project cook stoves of type i through either Water Boiling Test (WBT) or Controlled Cooking Test (CCT).
- The Project Operationality Sample Group (POSG) to determine the number of operational project cook stoves of type i .
- A random sub-sample of POSG will be used to monitor μ_y (i.e. adjustment to account for any continued use of pre-project devices during the year) if the sample size of POSG is larger than the sample size of μ_y . If sample size of μ_y is larger than the POSG sample size then random sub-sample of μ_y will be used for POSG survey.

For POSG simple random sampling has been selected to calculate the minimum sample size required for obtaining representative samples for each stove of type i in each CPA. The justification for this approach is as follows:

- As per “Guideline: Sampling and surveys for CDM project activities and programmes of activities (Version 04.0)”, simple random sampling is suited to populations that are homogeneous. The CPAs that are grouped will have same type of cook-stove technology distributed and the CPAs will share the same geographical boundary.

Simple random sampling has been selected for unbiased and reliable estimates of μ_y under each CPA. The μ_y survey will be designed to capture the cooking habits and project stove usage of households, including quantification of use of baseline devices, by formulating questions to determine the frequency of usage of both the project devices and baseline devices.

For PESG, a stratified random sampling has been selected to calculate the minimum sample size required for obtaining representative samples for each stove of type i for the group of CPAs. The justification for this approach is as follows:

As per “Guideline: Sampling and surveys for CDM project activities and programmes of activities (Version 04.0)”, stratified simple random sampling is suited to populations when the population under study is not homogeneous but instead consists of several sub-populations which are known (or thought) to vary. Although the CPAs that are grouped will have same type of cook-stove technology distributed and the CPAs will share the same geographical boundary, however, timing of distribution of the stoves (i.e. vintage of the stoves) may impact the efficiency and specific fuel consumption parameters of stove type i making the population non-homogenous. Therefore, stratified random sampling is deemed to be more suitable for PESG.

As outlined above, the minimum sample size will apply to each CPA where the POSG and μ_y is sampled and CPA groups where the PESG is sampled. CME may choose to use the same samples to monitor more than one parameter, where applicable.

The sample size for each of the groups listed above will be calculated with the following considerations:

- PESG: Groups of CPAs will be monitored either annually or biennially with 95% confidence and 10% precision
- POSG: Each CPA will be monitored either annually (90% confidence and 10% precision), or biennially (95% confidence and 10% precision).
- μ_y : Each CPA will be monitored either annually (90% confidence and 10% precision), or biennially (95% confidence and 10% precision).

The above frequency, confidence and precision requirements are compliant with paragraph 46 of AMS-II.G *“Energy Efficiency Measures in Thermal Applications of Non-renewable Biomass”* (Version 11.1).

For each sample group, a pre-defined number of samples will be randomly selected based on the minimum sample size calculations in sections as stated below. Where pre-existing test data can be obtained for a particular parameter, the CME may choose to apply this data to the sample size equations and adjust the sample size accordingly. In addition, by applying ex-post monitored results to the minimum sample size equations after each monitoring period, the CME may choose to alter the number of samples that are randomly selected in subsequent monitoring periods.

Where applicable, in compliance with paragraph 47 of AMS.II.G Version 11.1, efficiency of project stoves may be monitored in a common survey with other monitoring parameters; therefore, a random sub-sample within the common survey may be taken for which stove efficiency is tested, as long as the required precision for stove efficiency is achieved.

Sample Size

Sample Size for PESG

A stratified random sample for each type of cook stoves based on its “Year of Commissioning” will be selected for monitoring of the PESG.

Groups of CPAs will be monitored annually with 95% confidence and 10% precision, and the sample size is calculated as per equation 19, Appendix 3 of “Guideline: Sampling and surveys for CDM project activities and programmes of activities (Version 04.0)”:

$$n \geq \frac{1.96^2 NV}{(N-1) \times 0.1^2 + 1.96^2 V}$$

Where:

$$V = \frac{SD^2}{\bar{m}^2} = \frac{\text{weighted overall expected variance}}{\text{weighted overall expected mean, squared}}$$

Where pre-existing test data exists, the CME may choose to recalculate V and the resultant sample size based on this data. As per “Standard: Sampling and surveys for CDM project activities and programmes of activities (Version 08.0)” paragraph 14, if the sample size calculation returns a value of less than 30 samples and the parameter of interest is a numeric value, the Student’s t-distribution shall be used to ascertain the final sample size. If the sample size that is monitored does not meet the confidence/precision requirements, the CME may choose to take additional

samples until the required confidence and precision is met. Alternatively, the lower bound of the confidence interval may be used as per AMS-II.G Version 11.1.

PESG sample size calculation of CPAs will be provided in the CPA-DDs.

Sample Size for POSG

A random sample of households will be selected for spot checks either annually or biennially to determine the number of project cook stoves that are operational for each CPA. Please note that where multiple stove types have been distributed to each household within a CPA, the sample size calculated is the number of households to be surveyed and all stove types will be checked for operability within each household.

Where annual sampling is chosen, the sample size for obtaining results with 90% precision and 10% confidence can be calculated as per "Guideline: Sampling and surveys for CDM project activities and programmes of activities (Version 04.0), paragraph 12, Appendix 1.

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

Where:

n = the minimum sample size required

N = total number of households

p = expected proportion

1.645 = Represents the 90% confidence required

0.1 = Represents the 10% relative precision

Where biennial sampling is chosen, the sample size for obtaining results with 95% precision and 10% confidence can be calculated as per "Guideline: Sampling and surveys for CDM project activities and programmes of activities (Version 04.0), paragraph 12, Appendix 1.

$$n \geq \frac{1.96^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.96^2 p(1-p)}$$

Where:

n = the minimum sample size required

N = total number of households

p = expected proportion

1.96 = Represents the 95% confidence required

0.1 = Represents the 10% relative precision

As per “Standard: Sampling and surveys for CDM project activities and programmes of activities (Version 08.0)” paragraph 14, If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion. Based on the monitoring results the CME may choose to adjust the sample size in subsequent sampling periods. If the sample size that is monitored does not meet the confidence/precision requirements, the CME may choose to take additional samples until the required confidence and precision is met. Alternatively, the lower bound of the confidence interval may be used as per paragraph 46 of AMS-II.G Version 11.1.

POSG sample size calculation of CPAs will be provided in the CPA-DDs.

Sample Size for μ_y

Where annual sampling is chosen, the sample size for obtaining results with 90% precision and 10% confidence can be calculated as per “Guideline: Sampling and surveys for CDM project activities and programmes of activities (Version 04.0), paragraph 12, Appendix 1.

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

Where:

n = the minimum sample size required

N = total number of households

p = expected proportion

1.645 = Represents the 90% confidence required

0.1 = Represents the 10% relative precision

Where biennial sampling is chosen, the sample size for obtaining results with 95% precision and 10% confidence can be calculated as per “Guideline: Sampling and surveys for CDM project activities and programmes of activities (Version 04.0), paragraph 12, Appendix 1.

$$n \geq \frac{1.96^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.96^2 p(1-p)}$$

Where:

n = the minimum sample size required

N = total number of households

p = expected proportion

1.96 = Represents the 95% confidence required

0.1 = Represents the 10% relative precision

Since μ_y is a proportion (or percentage) parameter, therefore in line with “Standard: Sampling and surveys for CDM project activities and programmes of activities (Version 08.0)” paragraph 14, if the sample size calculation for μ_y returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen.

μ_y sample size calculation of CPAs will be provided in the CPA-DDs.

Implementation, Quality Assurance, and Quality Control

The CPA implementers are responsible to implement the CPAs and assist the CME in conducting monitoring. The CME will be responsible for organising all monitoring procedures under the PESG, POSG, μ_y and will ensure that those responsible will be suitably trained and qualified in the appropriate national or international standards for all monitoring procedures³³.

The CME will ensure that all CPA specific data are recorded in a standard format and the data is auditable. During the CPA operation, in the event that the project cook stove/s is no longer operational in a household, the user is required to inform the CPA implementer, who will record the date at which the stove became non-operational and enter this information into the project database. This will ensure that the number of days that any given stove is non-operational can be factored into the calculation of $N_{y,ij}$. The user will then obtain a replacement stove and inform the CPA implementer who will then record the date at which the stove has been replaced, record the type of stove replaced and then enter this information into the project database. The CPA implementer will then provide the information on stove replacement, type of replaced stove, date of replacement to the CME and the CME will record the information in the CME database. The CME will utilise this information to prepare monitoring report.

Analysis

The mean value parameters of interest sampled under the PESG will be extrapolated to all cook stoves of the type tested within their CPA group. The mean value parameter of interest will be evaluated against 95/10 confidence/precision requirements to confirm the data collected is adequate to meet CDM requirements. As per paragraph 46 of AMS-II.G Version 11.1, in the event where the results indicate that 95/10 or 90/10 confidence/precision is not achieved, the lower bound of the 95% or 90% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 95/10 precision/confidence.

The proportion of project cook stoves of type i that are in operation as determined by the POSG will be extrapolated to all cook stoves of the same type that are included in the CPA for the calculation of $N_{y,ij}$. This proportion will be evaluated against the 95/10 or 90/10 confidence/precision requirements (depending upon the frequency of monitoring) to confirm the data collected is adequate to meet CDM requirements. As per paragraph 46 of AMS-II.G Version 11.1, in the event where the results indicate that 95/10 or 90/10 confidence/precision is not achieved, the lower bound of the 95% or 90% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 95/10 or 90/10 precision/confidence.

In the instances where μ_y do not meet the desired confidence/precision (95/10 or 90/10), the upper bound of 95% or 90% confidence interval may be chosen, as an alternative to repeating the survey efforts.

³³ For example, those responsible for monitoring will be capable of Controlled Cooking Test in accordance with the specific guidelines as defined by national and international standards.

Monitoring Report

A monitoring report will be completed by the CME and submitted to the DOE for verification purposes.

I.7.3. Other elements of monitoring plan

To reduce the monitoring efforts, for POSG survey, a single sample set will be drawn based on which operability of project stoves will be surveyed. A subset of POSG sample households will be monitored for any continued use of pre-project devices (i.e. μ_y), if the sample size of POSG is larger than μ_y . If sample size of μ_y is larger than the POSG sample size then random sub-sample of μ_y will be used for POSG survey.

In order to determine the specific fuel consumption or fuel consumption rate of the project cook stoves of type i through Controlled Cooking Test (CCT), PESG survey will be conducted.

During the survey, there may be non-response from the target population. Over-sampling may be used to avoid non-response, however, sample survey may be ceased once required confidence/precision is met.

Please note that leakage is excluded from the monitoring plan, as all CPAs included in this PoA will use the default net to gross adjustment factor of 0.95 for leakage assessment as per AMS-II.G Version 11.1.

The CPA implementer will be responsible for organising monitoring of all sample groups.

In order to ascertain that project Mirt stoves are functional, the survey team will need to check that the Mirt stoves are sealed properly with mud. Since the Mirt stoves without mud sealing will have lower efficiency, to be conservative, such stoves will be considered as a non-functional stove.

The survey data will be provided to the Coordinating/Managing Entity (CME) who will produce periodic monitoring reports. Please note that with the exception of the Project Operability Sample Group (POSG), which will be monitored at the CPA level, the sample size for PESG, will be selected based on CPA groups. The CPA groups will be homogeneous as they implement the same type of cook-stove technology in the same geographical boundary.

SECTION J. Crediting period type and duration

>> Crediting Period Type: Renewal

Crediting Period duration: 17 October 2020 to 16 October 2027

SECTION K. Eligibility criteria for inclusion of CPAs

>> The eligibility criteria has been developed in line with the paragraph 16 of "Standard: Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programmes of activities Version 03.0".

A CPA to be included in the PoA fulfills the following conditions:

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	Geographical Boundary	The CPA must be implemented within the geographic boundary of the PoA as defined in section A.2 of the PoA-DD.	The CPA implementer will provide the GPS coordinates of CPA location that prove that the CPA falls within the physical/geographic boundary of the PoA.
2	Double Counting	For each CPA to be included under the PoA, it must be ensured that no double counting has occurred. Each project device must be new and equipped with a unique serial code. The CPA will not already be included in another PoA or bundled CDM project activity, nor developed as a stand-alone CDM project.	Stoves to be implemented under each CPA will be new and equipped with a unique serial code to ensure that no double counting has occurred. Each CPA will provide an example of the unique serial code to be used for project cook stoves that are distributed. In addition, the CME will confirm that the proposed CPA has not been included under another PoA through the use of the CME Inclusion Management System and by checking the UNFCCC website.
3	Technology	The technology/ies to be implemented are new, fuel efficient stoves for cooking with firewood in domestic households with a specified efficiency of at least 20%.	The CPA will provide evidence such as manufacturer specification that each project cook stove is new, with a specified efficiency of at least 20% and will be distributed to domestic households.
4	Start Date	The start date for each CPA to be included under this PoA (the earliest date at which real action has occurred, e.g. the date of the first stove installation/distribution) is confirmed with documentary evidence (e.g. installation/distribution records) and will not occur before the 5 th of September 2012, the date that the CDM-PoA-DD and 1 st CDM-CPA-DD were published on the UNFCCC-CDM website for global stakeholder consultation.	The CPA operator will provide cookstove distribution database as an evidence of the start date of the CPA (i.e. the earliest date at which real action has occurred, e.g. the date of the first stove installation/distribution), which will not occur prior to the date of commencement of DOE validation of the PoA. The CME will record the start date and confirm that a document check has been done.
5	Methodology	All CPAs to be included in the PoA comply with all applicability conditions of the methodology AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass” Version 11.1.	The CPA will follow all applicability conditions of the methodology AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass” Version 11.1. The CME will confirm that the CPA follows the provisions of the methodology.

6	Additionality	All CPAs to be included in the PoA meet the requirements pertaining to the demonstration of additionality as specified in section C of the PoA-DD.	As per paragraph 2C of “Guidelines on the Demonstration of Additionality of Small-Scale Project Activities” Version 09.0 (EB 68 Annex 27) the CME will confirm that the CPA remains part of the positive list of small scale technologies that are considered automatically additional prior to inclusion under the PoA, and that each unit will save no more than 5% of the small-scale CDM threshold.
7	Stakeholder Consultation	Local Stakeholder Consultation (LSC) must be conducted for each CPA to be included in the PoA.	The CPA implementer shall provide evidence such as stakeholder consultation meeting report. The CME will then confirm that the LSC has been completed for the CPA to be included under the PoA.
8	Public Funding	Each CPA included under this PoA does not receive funding from Annex-I parties that results in a diversion of Official Development Assistance.	The CPA implementer will provide an affirmation that funding for the CPA from Annex-I parties, if any, does not result in a diversion of Official Development Assistance.
9	Target Group	Domestic communities and/or households are the target group of the CPA.	The CPA implementer will confirm through the signed copies of user agreement that the project cook stoves have been distributed to communities and/or domestic households.
10	Sampling	Each CPA must follow the sampling plan outlined in section I.7.2 of the PoA-DD.	The CPA will follow the sampling plan as outlined in section I.7.2 of the PoA-DD.
11	Size Limit	The CPA in aggregate meets the small-scale threshold criteria of 180 GWh thermal energy savings, and remains within this threshold throughout the crediting period.	The CPA implementer will confirm that the aggregated project cook stoves implemented do not claim emissions reductions exceeding the small-scale threshold of 180 GWh thermal, and that this threshold will not be exceeded at any time within the crediting period.
12	De-Bundling	The CPA satisfies the debundling rules for PoA.	The CME will demonstrate that the CPA satisfies debundling rules for PoA.
13	Approval	The CME approves the participation of the CPA in the PoA.	A letter from the CME will be provided confirming participation of the CPA in the PoA.

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

Coordinating/managing entity and/or project participants	<input checked="" type="checkbox"/> Coordinating/managing entity <input checked="" type="checkbox"/> Project participant
Organization name	World Vision Australia
Country	Australia
Address	1 Vision Drive, Burwood East, Melbourne
Telephone	+61 3 9287 2233
Fax	+61 3 9940 5599
E-mail	Dean.Thomson@worldvision.com.au
Website	http://www.worldvision.com.au
Contact person	Dean Thomson

Coordinating/managing entity and/or project participants	<input type="checkbox"/> Coordinating/managing entity <input checked="" type="checkbox"/> Project participant
Organization name	Swedish Energy Agency
Country	Sweden
Address	PO Box 310 Kungsgatan 43 SE-63104 Eskilstuna Sweden
Telephone	+46 (0)16 544 24 30
Fax	+46 (0)16 544 2099 <input type="checkbox"/>
E-mail	christer.gustafsson@energimyndigheten.se
Website	www.swedishenergyagency.se
Contact person	Christer Gustafsson

Coordinating/managing entity and/or project participants	<input type="checkbox"/> Coordinating/managing entity <input checked="" type="checkbox"/> Project participant
Organization name	World Vision Ethiopia
Country	Ethiopia
Address	AMCE-Bole Road, Bole Sub-City, Kebele 11 H#518, Addis Ababa
Telephone	+251-116-291078
Fax	+251-116-293346
E-mail	Kebede_Regassa@wvi.org
Website	http://www.wve.org.et/
Contact person	Kebede Regassa

Coordinating/managing entity and/or project participants	<input type="checkbox"/> Coordinating/managing entity <input checked="" type="checkbox"/> Project participant
Organization name	First Climate Markets AG
Country	Germany
Address	Industriestrasse 10 61118 Bad Vilbel Germany
Telephone	+49 6101 55658 73
Fax	+49 6101 55658 77
E-mail	Nikunj.Agarwal@firstclimate.com
Website	https://www.firstclimate.com/en/
Contact person	Nikunj Agarwal

Appendix 2. Affirmation regarding public funding

Non-use of ODA declaration letter signed by CME has been submitted to the DOE for validation. .

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

N/A

Appendix 7. Summary of post-registration changes

N/A

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
09.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Remove a duplicated instruction; • Make editorial improvement.
08.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Improve consistency with the “CDM project standard for programmes of activities” and with the PDD and CPA-DD forms; • Make editorial improvement.

Version	Date	Description
07.0	25 May 2017	Revision to: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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.
04.0	25 June 2014	Revision to: <ul style="list-style-type: none"> • 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 <i>Guideline: Completing the programme design document form for CDM programmes of activities</i> (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.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: programme of activities, project design document		