



**Programme of activities design document form
(Version 09.0)**

BASIC INFORMATION

Title of the PoA	Improved cookstove programme for climate & community impact by SDG 13 Ventures
Version number of the PoA-DD	05
Completion date of the PoA-DD	23/04/2021
Coordinating/managing entity	SDG 13 Ventures Pte Ltd
Host Parties	Rwanda
Applied methodologies and standardized baselines	Applied Methodology: AMS-II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-11.1 Standardized Baseline- Not applicable
Sectoral scopes	03-Energy demand

PART I. Programme of activities (PoA)

SECTION A. Description of PoA

A.1. Purpose and general description of PoA

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The proposed small scale CDM Programme of Activities seeks to reduce greenhouse gases emissions by disseminating fuel- efficient wood and charcoal stoves in Rwanda of sub-Saharan African region.

As per analyses in the Africa Energy Outlook 2019 show, the lack of access to clean cooking remains very acute in sub-Saharan Africa with access increasing only slightly from 15% in 2015 to 17% in 2018. Since 2015, only 25 million people have gained access to clean cooking in the region, meaning that the number of people without access increased to over 900 million in 2018 as population growth outpaced provision efforts. Sub-Saharan Africa is the only region where the number of those without access continues to rise significantly, highlighting the urgent need for action¹.

The vast majority of people in sub-Saharan Africa thus rely on gathering biomass for cooking, in particular in rural areas, which dramatically damages health and impairs productivity improvements. Almost 490 000² premature deaths per year are related to household air pollution from the lack of access to clean cooking facilities, with women and children the worst affected. Forest degradation, sometimes leading to deforestation, is another serious consequence of the unsustainable harvesting of fuelwood. Regarding the way of use of this energy, a large proportion of households depend of traditional cookers named "03 stones or triangle iron or crude clay/mud constructions" remains the most common practice.

1. Policy/measure or stated goal of the PoA

The proposed programme of activities seeks to increase access of households and communities to improved cookstoves by disseminating high thermal efficiency and low greenhouse gas emitting cooking stoves known as Improved Cook Stoves (ICS) to the rural and urban households of Rwanda. Their old low efficiency and high greenhouse gas emitting stoves would be replaced. The implementation of this PoA, through implementation of several CPAs, will result in the reduction of firewood consumption & consequent emissions from combustion leading to climate change mitigation in a sustainable manner. Overall objectives are reduction of greenhouse gases, conservation of forests and woodlands as well as improved health conditions of ICS users due to improved indoor air quality along with drudgery reduction in everyday cooking.

The individual households using ICS will sign an agreement with the CME acknowledging the inclusion of their stove into CPAs under this PoA.

With respect to each CPA, the CME/CPA implementer may potentially distribute information about the benefits of undertaking such programme including its associated economic, social and environmental benefits. This will help in creating awareness amongst interested stakeholders.

2. Framework for the implementation of the proposed PoA

¹ <https://www.iea.org/reports/sdg7-data-and-projections/access-to-clean-cooking>

² <https://openknowledge.worldbank.org/bitstream/handle/10986/22521/Clean0and0impr000a0landscape0report.pdf?sequence=1&isAllo wed=y>

SDG 13 Ventures Pte Ltd (herein after called as “SVPL”) is the coordinating/managing entity (“CME”) for this - PoA. SDG 13 Ventures Pte Ltd is a company registered in the Republic of Singapore. SVPL will purchase ICS for distribution to households in Rwanda. The PoA will facilitate the dissemination of ICS manufactured by appropriate ICS manufacturers or technology suppliers meeting CPA eligibility criteria to the end user.

SVPL through its representative in Host Country will coordinate with the users of ICS directly or through CPA Implementer or its representative to ensure that all requirements with respect to a CDM PoA, such as assisting with validation and registration, record keeping, monitoring and survey of households at a regular interval are met. In addition to implementing the activities as per design and complying with the requirements of the CDM-PoA, the programme management would also be responsible for the environmental integrity of the programme.

ICSs may be distributed directly by the CME or CPA Implementer or alternatively through the Designated Operators (DOs) or other partners, such as technicians, retailers, agents or other sub-contracted third parties. The PoA aims to leverage carbon finance to bridge affordability gap and, increase consumer awareness that enable previously underserved communities to gain access to improved energy saving technologies. Additional partners and networks will be progressively added to the project activities if required. Local partnerships will allow for targeted outreach and education to diverse distribution locations throughout the countries. Each partner will be responsible for directly managing all parties under their partnership as well as collecting/maintaining appropriate monitoring and distribution records.

CPAs under the program will include a group of similar technologies, having individual installed capacities are equal to or below the CDM micro-scale thresholds at the CDM Unit level i.e. individual ICS. The PoA implements two technology types through the small scale approved methodology AMS-II.G Version 11.1: 1) Woody biomass based improved cookstoves; 2) Charcoal based improved cookstoves.

A record keeping system and unique identification of the project is made possible by user's information collected through the Beneficiary Agreement and compiled in distribution records. This will include user name, identification number and address/location of the user's house, stove unique serial code and distribution date. The record keeping system will ensure that each ICS can be traced to one specific CPA to avoid double counting.

For example, an acceptable serial code can be J20VB100024 stating:

The first character identifies the model, the next two – year of manufacture, the next two after identify batch number and then the stove number from that batch i.e. each code will identify model, year of manufacture and unique manufacturing identifier.

When the operating life of ICS is over, it will be replaced by a new ICS and during the replacement process. In the database, the new stove number will be matched and linked to the new stove number. As well as the total number of stoves per CPA will remain the same. In case the user is not willing to replace the ICS, a new user will be provided with an ICS with its id linked to a defunct stove's id which has been part of the thereby keeping the total number of stoves in a CPA the same.

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

The CME confirms that the PoA, and all actions taken as part of it, are voluntary and coordinated. A review of the national energy policies of the Rwanda shows that there are no mandatory laws, policies or requirements mandating the use of ICS.

Though the Government of Rwanda's (GoR) Energy Sector Strategic Plan (2013-2018)³ identifies

³ http://www.minecofin.gov.rw/fileadmin/templates/documents/sector_strategic_plan/Energy_SSP_June_2013.pdf

dissemination of improved cookstoves (ICS) as one way to reduce fuel wood consumption. The government promotes the use of improved ICS, however it's not mandatory.

4. Sustainable development benefits

The following sustainable development benefits are envisaged from the programme.

a) Environment well being

- i. The programme will lead to the reduction in GHG emission due to reduction in use of non-renewable biomass and it will also ensure natural recovery of forests and/or reforestation.
- ii. The programme will lead to reduction in Indoor Air Pollution from wood smoke and avoid smoke related health disorders.
- iii. The reduction in biomass/charcoal consumption for cooking through efficient use leads to improved ecological balance.
- iv. The protection of standing forests will ensure the maintenance of watersheds that regulate water table levels and prevent flash flooding.
- v. The programme will lead to prevention of fire hazards in the household kitchen and the improved cooking stove technology is environmentally safe.
- vi. Reducing the demand for wood fuel and charcoal decreases deforestation. This will lead to positive effects on the water cycle. An intact vegetation cover preserves water resources in the ground and prevents soil erosion.

b) Social well being

- i. The programme will contribute to the preservation of wood resources so as to avoid inter-communal and/or inter-ethnic, man – animal conflict over resources.
- ii. There will be reduction of the workload as a result of reduced time for collecting the firewood, which can be used more productively for other income generating activities.
- iii. The programme will effectively address the issue of productive time, especially for women as ICS save time in both cooking and fuel collection. Increased productive time opens up opportunities for learning, income generation & even rest and recreation thereby improving quality of life.

c) Economic well being

- i. The fabrication, distribution, repair and maintenance of ICSs are expected to generate local employment.
- ii. The costs incurred in the purchase of firewood/charcoal will be reduced as ICS require significantly lesser fuel. Thereby, leading to direct savings at the household.

d) Technological well being

- i) The introduction of a modern technology disseminated deep within communities helps in technological self-reliance in the area.

A.2. Physical/geographical boundary of PoA

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The geographical area, within which all CPAs included in this PoA will be implemented, is the territorial boundary of Host country Rwanda and the same will be the geographical boundary of the PoA.

1. Rwanda

Geo-coordinates for Rwanda:

2° 50' 23.8992" S and 28° 51' 42.1452" E

1° 2' 50.82" N and 30° 53' 56.6592" E



A.3. Technologies/measures

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A typical CPA will replace conventional firewood stoves with higher efficiency ICS models by leveraging resources provided by the PoA in rural/urban areas, while it also envisaged to replace conventional charcoal stoves in rural/urban areas. ICSs are more efficient than conventional firewood/charcoal stoves as they reduce heat loss and improve heat transfer and combustion efficiency. A standard manufacturer/third party Water Boiling Test (WBT) for each model implemented will substantiate stove performance (efficiency). Each respective CPA-DD will describe the technical specification of the cook-stove envisaged for dissemination under the CPA.

The ICS models are fuel efficient, resulting in a decrease in fuel use in comparison to conventional pre-project stoves while also reducing particulate matter and carbon emissions. Design considerations have also incorporated ergonomics and safety.

The project activity will continually assess biomass and charcoal stove technology options with the goal of providing the high performing, affordable and locally appropriate technologies to the local environments when possible. As the PoA expands, several models of biomass and charcoal stoves produced by ICS manufacturers may be included in the PoA. Inclusion of such stoves would be subject to compliance with requirements of the methodology and the eligibility criteria of the PoA. The CME is committed to investing in research and development for the improvement of the current stoves being proposed to be disseminated. Thus, during the life of the PoA, research and development may result in dissemination of more efficient ICS models, which shall be absorbed by this PoA, subject to methodological and eligibility criteria of the PoA. Upon inclusion into the project activity, all ICS will remain valid throughout the lifetime of the project period until the CME chooses to discontinue crediting of the improved stoves. Each CPA will provide a detailed description on the specific stove model/s implemented/envisaged to be implemented and the target customers for each of them.

A.4. Coordinating/managing entity

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SDG 13 Ventures Pte Ltd is the Coordinating/Managing Entity (CME) of the PoA and will communicate with the Board. The contact details of CME are provided in the Appendix 1 of this PoA-DD.

A.5. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Rwanda (host Party)	Private entity- SDG 13 Ventures Pte Ltd	No

A.6. Public funding of PoA

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This PoA has not received public funding from Annex I parties that could result in a diversion of official development assistance. This will be confirmed in each CPA included in the POA.

SECTION B. Management system

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The CME will manage the PoA and hence will play a pivotal role in the development of CPAs and will oversee the inclusion of CPAs under the PoA. Through a technical review, the CME assesses the competence of potential CPA implementers to ensure that they fulfil technical and eligibility requirements of potential CPAs and to plan technical and administrative processes to meet PoA requirements.

The CME shall have the competencies to check the features of potential CPAs and ensure that each CPA meets all requirements and eligibility criteria before inclusion in the PoA. CME has tie-ups with local NGOs, women's groups & organizations and has a team of people having extensive experience in adaptation projects and have very good local network in the Host Countries. SVPL will also utilise dedicated professionals having in depth knowledge and extensive capabilities in survey and sampling to get quality and reliable data for emission reduction calculations for CPAs.

The management system is designed as per CDM Project Standard for Programme of Activities (Version 02.0 EB 97 Annex 07) and includes all relevant information as per paragraph 36 & 37 therein.

The description of the operational and management arrangements established by the CME for the implementation of the PoA is as below.

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

The programme is managed by SVPL as the CME of the PoA. The roles of the different actors and their responsibilities are shown in the table below.

Person/Entity	Responsibility
CME	<ul style="list-style-type: none"> SVPL Management: oversight of management system & sign-off on CPA inclusions and monitoring reports, review of competencies of team members Technical review team: technical review of process and documentation; proposal of CPA-DDs and monitoring reports to SVPL management. CDM Compliance Manager/Consultant: writing PDDs & monitoring reports, ensuring compliance with CDM rules
CPA Implementer/Local partner	<ul style="list-style-type: none"> Oversee operation of distribution centres; execution of set up activities; works with project manager on all planning; reports to CME. Project Manager: project planning and management; issue and risk management; execution of set up activities such as recruitment and training; reporting of monitoring data;

	<ul style="list-style-type: none"> Logistics Manager: planning; identification of target households; contractor management; overall day to day management of installation staff; weekly and monthly reporting. Data administrators: monitoring database management; accounting; data reconciliations; monthly reporting; local HR; Pre- & Post-distribution data collection: conveying project messages; selling the project; signing up householders wanting a stove; sign up data capture; distribution data capture Distribution team: management of distribution process; ensuring quality stove distributions; Monitoring team: gathering compliance monitoring data; gathering marketing data; data input
Overall responsibility for the roles and responsibilities and associated below processes lies with the CME. The CME assesses the competencies of individuals responsible for each of the roles stated above.	
Manufacturing and logistics	<p>Overall responsibility for manufacturing and logistics lies with the CPA Implementers. The process is as follows: Depending on the stove model, complete stoves or components for the stoves are:</p> <ul style="list-style-type: none"> manufactured (some imported, others produced locally) by a stove manufacturer Stoves are distributed to warehouses within each CPA CPA Implementers coordinate the distribution of stoves to recipient households
CPA household identification	<ul style="list-style-type: none"> A process for identifying households is managed by CPA Implementers. This involves working with local community leaders and other partners to help identify recipient households suitable for the distribution of a stove; In partnership with community leaders, NGOs and other local organizations, CPA Implementers initiate a communication process to ensure that households understand the benefits of the stoves, that cultural issues are addressed and that users are trained in the optimal use and performance of the stove; CPA Implementer pre-distribution teams visit recipient communities in each CPA and ensure recipients understand and acknowledge the conditions for participation in the CPA; Each stove is assigned a unique distribution number chronologically; this is used to determine the CPA into which the stove is included.
Distribution	<ul style="list-style-type: none"> CPA Implementers train stove distribution teams to distribute stoves within each CPA CPA Implementers coordinate the receipt of stoves and components in the distribution process CPA Implementers will be trained in the distribution of the stove to a standardized delivery and communication procedure CPA Implementers will be responsible for physically distributing the ICSs to the recipient household
Data Capture	<ul style="list-style-type: none"> The CPA implementer checks the quality of ICS and record keeping work If the work is satisfactory, distribution data is collected by the CPA Implementer, which includes: <ul style="list-style-type: none"> Username: the household family name, plus identification number of the ICS recipient (if available) Location: the address and/or physical location description (i.e. village) of the household, plus a GPS location reference (if available and accurate) Date and time of collection of ICS by user.

	<ul style="list-style-type: none"> • Distribution data is collected by the CPA Implementer and uploaded to the monitoring database. The database will include a unique reference number for each stove
CPA Inclusion	<p>CPA inclusions are the overall responsibility of the CME.</p> <ul style="list-style-type: none"> • Data from each CPA is provided by the CPA Implementer to the CME. • The CDM Compliance Manager oversees the writing of each CPA-DD • The CDM Compliance Manager submits to the SVPL technical team for technical review • The technical team proposes the CPA inclusion to the SVPL Management for approval
Monitoring	<p>Monitoring activities will be conducted as follows:</p> <ul style="list-style-type: none"> • Surveys completed in the field by trained local monitoring teams • Data captured by the monitoring teams is passed to SVPL data administration team • Data is checked for completeness, consistency and accuracy • Project manager summarizes data in a report to the SVPL CDM compliance manager • CDM compliance manager writes monitoring reports for each monitoring period • Technical review by in-house technical team • CME management approval <p>Submission of issuance request to CDM Executive Board</p>

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

The distribution record including user information will be collected and recorded at the point of distribution by the staff or distributors. The information collected from the end-user will be transferred to an electronic database, which will be updated regularly. The distribution record carries all distribution information including the traditional stove type (charcoal stove/firewood stove) used prior to ICS installation, name of representative member of household, phone number (if available and user-permitted for sharing), address etc. Likewise, monitoring records are transferred from each monitoring organization, if any, to the CME. The CME will ensure that appropriate records are maintained for each CPA.

Training, including that of field personnel, if needed to ensure monitoring activities are conducted effectively. This will include spot checking a random sample of homes with ICS to ensure the stoves are continuing to be used. The procedures to complete this sampling are described in below section in line with EB 86 Annex 04 confidence/precision requirements.

SVPL conducts an ongoing programme of training and capacity development for key personnel. This training is premised on documentation that includes:

- Management Information Systems & Data Capture Process
- Stove Distribution Guidelines

Records of training and capacity development will be kept by the CME on each member of staff's file.

(iii) Procedures for technical review of inclusion of CPAs under the PoA

The technical review of CPA inclusions will be undertaken at CME level by an in-house technical team. This review will be undertaken in accordance with the eligibility criteria outlined in this PDD and the most recent guidance issued by the CDM Executive Board.

Following its review, the technical team will affirm the CPA's compliance with the eligibility criteria and recommend its inclusion in the PoA to the CME board. The proposed inclusion will then be either approved or rejected by the CME board.

(iv) Procedure to avoid double counting of ICS/CPA under the PoA

Double-counting of emissions reductions will be avoided by the unique referencing of stoves included in each CPA. This will be done through:

- **GPS references:** if possible, each stove will have a unique GPS-referenced location. During the verification process the DOE will be able to check the existence of stoves related to this GPS location reference.
- **Name, location and/or ID number:** an additional check of double-counting may be made against the household name, location and/or ID number of the ICS recipient ascribed to each stove. This may be checked physically during the verification process.
- **Unique reference numbers:** each stove will also have a unique reference number in the monitoring database. Only one stove will be installed per household. The DOE will be able to check this during the verification process.

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

The CME is responsible for managing the record and documentation system for each CPA under the PoA. In most cases data will be collected electronically and uploaded directly to the monitoring database. Where data is collected manually, it will be collated by the CME.

Distribution data will be collected from each CPA by the CPA Implementer and uploaded into the monitoring database. This will ensure that each stove is individually referenced and logged for monitoring and verification purposes.

Monitoring data will be collected by the monitoring team responsible and passed to the CME for collation. Periodic monitoring reports and emissions reduction calculations will be generated from this data.

All records will be securely maintained and backed-up by the CME.

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

Each CPA under the proposed PoA will be exempt from a de-bundling check due to each independent subsystem/measure being less 1% of the small-scale methodology energy output threshold.

This has been included as an eligibility criterion for the inclusion of each CPA in the PoA.

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

CME have the overall responsibility for implementing, managing and operating of all the CPAs under this PoA. The CME will have legal contracts put in place with CPA Implementers and, as appropriate, with entities assisting with the implementation of the CPA. These legal contracts shall clearly state that the implementations of CPA activities are subscribed to this PoA.

(viii) Measures for continuous improvements of the PoA management system.

The CME will undertake an annual/ biennial review of the overall PoA management system. This will be conducted at the time of each annual or biennial monitoring activity. This review will ensure that best practices are maintained through the lifetime of the PoA.

SECTION C. Demonstration of additionality of PoA

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The proposed PoA is a voluntary coordinated action by SDG 13 Ventures Pte Ltd. There is no mandatory law or requirement in Rwanda to foster the dissemination of improved cook stoves. Hence this voluntary coordinated action would not be possible in the absence of the PoA, due to the cost associated with it.

As per para 5.2.3 **Option 3** of the applied small-scale methodology AMS-II.G, the referred "TOOL19: Demonstration of additionality of microscale project activities" Version-9, EB101 Annex-15 is applicable due to its paragraph 14 and 15, which state that *"For CPAs applying microscale thresholds at the unit level rather than at the aggregate level of the CPA, the term 'project activities' in paragraphs 4, and 11 to 13 above shall be read as 'units'.⁴ If each of the units contained in the CPA satisfies the condition to qualify as a 'microscale CDM unit', then the coordinating/managing entity is not required to demonstrate compliance of the CPA with the microscale or small-scale thresholds at the aggregate level of the CPA. In such cases, the requirements related to debundling stated in paragraph 6 above do not apply."*

Consequently, CPAs under this PoA are not limited in size by CPA thresholds a priori, as each of the ICS units contained in the CPAs aims to achieve energy savings at a scale of no more than 600 MWh/year, which is equivalent to 1,800 MWh_{th} of annual energy savings per appliance.

As part of the CPA inclusion check, it has to be demonstrated for each CPA that it is exempted from performing the debundling check, whether 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 methodologies applied (Methodological tool: Assessment of debundling for small-scale project activities, V04, EB 83, Annex 13, par. 14) and the subsystems/measures are indicated in the PDDs to be each implemented at or in multiple locations.

Since the criterion for exemption of the debundling check is stricter than the criterion for automatic additionality, additionality is given if the debundling check is passed and does not need to be assessed separately.

As required by paragraph 12 of the TOOL 19, which states that

"Energy efficiency project activities that aim to achieve energy savings at a scale of no more than 20 GWh per year are additional if any one of the conditions below is satisfied:

- (a) The geographic location of the project activity is in an LDC/SIDS or SUZ of the host country;*
- (b) The project activity consists of one or more of the following technology/measures¹⁴ related to energy efficiency where end users of the technology/measure are households, communities or SMEs:*
 - (i) High efficiency biomass fired devices (e.g. energy efficient cookstoves);¹⁵*
 - (ii) Micro-irrigation systems;*
 - (iii) Energy efficient pump-set for agriculture.*

i.e. each ICS qualifies as a 'microscale CDM unit'.

⁴Units are also referred to as "independent subsystems" or "technology/measures" in CDM regulatory documents.

In line with paragraph 12 Tool 19 EB 101 Annex-15, CPAs under this PoA will solely composed of isolated units where the users of the technology/measure will be households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit will not be larger than 600MWh thresholds. As the project is in LDC and ICS will be used by individual household/SME and each ICS size will be less than 600MWh, hence the CPA will be automatically additional.

As each ICS has costs associated with its purchase and distribution and awareness generation, this programme will not occur in absence of the CDM revenue. The action is not financially viable without the support of revenues from the sale of CERs. The end-users for the ICS are currently using crude devices, which indicates and exacerbates the cycle of poverty/suppressed incomes. The potential users for ICS are typically lower income with the problem (lack of ICS) seen more as a woman's problem thereby relegating it lower in the priority order for household expenditures/investments. The actions under the PoA will alleviate these barriers by promoting distribution of ICSs to end-users at upwards of an 60% subsidy, thereby making their ownership and subsequent impact possible.

SECTION D. Start date and duration of PoA

D.1. Start date of PoA

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14/04/2020 (the date of prior intimation sent to UNFCCC)

D.2. Duration of PoA

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28 years 00 months

SECTION E. Environmental impacts

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

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The environmental impact analysis will be undertaken at CPA level.

E.2. Analysis of environmental impacts

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To be done at CPA level

E.3. Environmental impact assessment

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To be done at CPA level

SECTION F. Local stakeholder consultation

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

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The CME has decided to conduct local stakeholder meeting at CPA level

F.2. Modalities for local stakeholder consultation

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NA

F.3. Summary of comments received

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NA

F.4. Consideration of comments received

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NA

SECTION G. Approval and authorization

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The CME has achieved approval from host country Rwanda dated 29/10/2020.

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

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Improved cookstove programme for climate & community impact by SDG 13 Ventures

H.2. Reference number of generic CPA

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CPA-XXX

H.3. Purpose and general description of generic CPA

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The main objective of this CPA is dissemination of the efficient improved cooking stove woody biomass-based or charcoal based ICS to the rural/lower-income urban households, which will result in reduced firewood/charcoal consumption leading to climate change mitigation in a sustainable manner & other benefits. The traditional wood stoves will be replaced by wood-based improved cookstoves and traditional charcoal based stoves will be replaced by improved charcoal based stoves, hence there will be no fuel change than baseline scenario. Overall objectives are reduction of greenhouse gases, conservation of forests and woodlands as well as improved health conditions of ICS users due to improved indoor air quality & a general improvement in overall quality of life.

Proposed ICS is a single pot/multi pot improved cookstove with a robust, improved air flow system & combustion chamber constructed of metal and outer body of locally suited materials. The ICS saves on fuel usage, reduces smoke and enables drudgery reduction.

The small-scale project type applicable to the CPA is Type II, i.e. an energy efficiency improvement project activity "that reduce energy consumption, with a maximum energy saving of 60 GWh per year (or an appropriate equivalent) in any year of the crediting period. In this context, for project activities that improve thermal energy efficiency, the maximum energy saving of 60 GWh(e) per year is equivalent to 180 GWh(th) per year saving."

Whereas the CPA qualifies as a microscale project type II as it aims to achieve energy savings at a scale of no more than 20 GWh per year, paragraph 14 and 15 of the Tool for Demonstration of additionality of micro-scale projects highlights the irrelevance of microscale and small-scale thresholds to CPAs involving isolated units such as cooking stoves. Hence to CPAs under this PoA there will be no limits on energy saving on annual basis as long as each sub-system under CPA meets the microscale threshold.

The proposed CPA helps in achieving following co-benefits, which will contribute in sustainable development in host country.

H.4. Technologies/measures

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The ICS to be implemented in this project activity is one of the available, high quality Improved Cookstove Models with minimum tested thermal efficiency of 20%, which will be distributed to rural/urban households using fuelwood/charcoal for cooking. Proposed ICSs are single/multi pot improved cookstoves.

The ICS distributed under this project activity will carry a lifespan of at least 4 years and thermal efficiency of at least 20% as per the Methodology, AMS-II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-11.1.

ICS models chosen will allow for significant savings of firewood & charcoal compared to traditional stoves and is especially suitable for the cooking habits of households in the target region. Their design ensures efficient combustion of fuel and cleaner fire and therefore uses considerably less fuel as compared to traditional stoves. This means speedy cooking, time and fuel savings, cleaner pans, kitchen walls and indoor atmosphere. The ICSs and underlying technology have previously been distributed widely with an established track record.

As per the research paper, a three stone stove (open fire) has an output of 6.6kW⁵, the proposed ICS to be used under this PoA will have output around 0.9 kW to 1.8kW which is well below the threshold. The output figures are nominal energy output based on the feed rate of the fuel used. As the efficiency of improved cookstoves is in the range of 30-35%, the nominal energy will give a much larger useful energy to the end consumer thereby saving time for cooking.

Energy flows from conventional woody biomass to households are therefore maintained, but the same amount of energy as used in the baseline scenario is gained from a relatively smaller amount of biomass. The baseline scenario is equal to the current practice i.e. in absence of the proposed project activity the equivalent amount of thermal energy generated using firewood to meet cooking energy demand.

SECTION I. Application of methodologies and standardized baselines

I.1. References to methodologies and standardized baselines

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The PoA and its CPAs will apply a single approved small-scale methodology as mentioned below

Type II: Energy Efficiency Improved Projects

Methodology: AMS-II. G- Energy efficiency measures in thermal applications of non- renewable biomass

Version: 11.1

Sectoral Scope: 03

Web link reference:

<https://cdm.unfccc.int/methodologies/DB/ZI2M2X5P7ZLRGFO37YBVDYOW62UHQP>

Tools:

"TOOL21: Demonstration of additionality of small-scale project activities" Version-13, EB105 A4

"TOOL19: Demonstration of additionality of microscale project activities" Version-9, EB101 A15

"TOOL30: Calculation of the fraction of non-renewable biomass"; Version-02, EB 102, A7

⁵ Détermination des performances techniques des fourneaux utilisés au Bénin par la technique d'ébullition de l'eau. (Page-3)

I.2. Applicability of methodologies and standardized baselines

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The methodology measures below constitute the justification for the choice of the selected methodology by showing that each CPA meets each applicability condition of the methodology.

S. No	CDM Methodology requirement	Project justification
1	This methodology comprises efficiency improvements in thermal applications of non-renewable biomass. Examples of applicable technologies and measures include the introduction of high efficiency biomass fired project devices (cook stoves or ovens or dryers) to replace the existing devices and/or energy efficiency improvements in existing biomass fired cook stoves or ovens or dryers	<p>The proposed CPA will distribute high efficiency single or multi-pot improved cook stove for thermal application of the renewable biomass, which will replace inefficient traditional cookstove e.g. 3-stone fires leading to saving of non-renewable biomass.</p> <p>The wood based ICS will replace traditional wood based stove and charcoal based ICS will replace traditional charcoal stoves; therefore, no greenfield installations are included.</p> <p>This criterion will be checked from data recorded on the baseline stove used prior to ICS installation.</p>
2	In the case of cook stoves, the methodology is applicable to introduction of single pot or multi pot portable or in-situ cook stoves with rated efficiency of at least 20 per cent.	<p>The single pot or multi-pot portable or in situ improved cooking stoves will have a specified efficiency of at least 20% as per water boiling test or compliance with Tier II and above as per ISO as tested and certified by third party. Every ICS model implemented in the CPA will present a certificate issued by manufacturer or an appropriate certifying agent at the time of CPA inclusion proving the thermal efficiency as required by the CDM methodology.</p> <p>The Water Boiling Test (WBT) method shall be used to test the efficiency of the cookstove to meet this eligibility requirement, following the requirements indicated in "Data / Parameter table 12" which details the options for testing and certification as well as supporting documentation (e.g. certificate issued by third party or test results) that needs to be presented to the validating DOE.</p>
3	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.	<p>The CPA to be included will be a type II category CPA. The General Guidelines for SSC methodologies, version 23, paragraph 4.17 and para 51 of AMS II.G Version-11.1, states the following:</p> <p>In the case of CPAs solely composed of "microscale CDM units", the coordinating/managing entity is not required to demonstrate compliance with the small-scale CDM thresholds at</p>

		<p>the aggregate level of the CPA. In such cases: The definition of 'microscale CDM units' provided under Tool 19, "Demonstration of additionality of microscale project activities" version 9.0, section 6, para 14 and 15, shall apply;</p> <p>For CPAs applying microscale thresholds at the unit level rather than at the aggregate level of the CPA, the term 'project activities' in paragraphs 4 and 11- 13 above shall be read as 'units'. If each of the units contained in the CPA satisfies the condition to qualify as a 'microscale CDM unit', then the coordinating/managing entity is not required to demonstrate compliance of the CPA with the microscale or small-scale thresholds at the aggregate level of the CPA. In such cases, the requirements related to de-bundling stated in paragraphs 6 above do not apply.</p> <p>The annual energy savings of each project device to be included under the CPA(s) will not be more than 1% of the small-scale CDM thresholds and satisfy the condition to qualify as a micro-scale CDM unit i.e. energy savings of each project device shall not exceed 1800 MWh_{th}/yr as per Tool 19 "Demonstration of additionality of micro-scale project activities" V 09.0. Therefore, demonstration of a compliance of the CPA with the small-scale thresholds at the aggregate level of the CPA is no longer required.</p>
4	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.	<p>Statistics from the Forest department show that forests were estimated to cover 659,000 ha in 1960, which has reduced to 240746 ha in 2007⁶. This reflects a loss of approximately 64 per cent of forests in between 1960 and 2007, which is more than 1.3 per cent per year. The Wood remains the main source of domestic energy for more than 90 per cent of Rwandans, where in firewood is mainly used by rural areas and charcoal in urban areas.</p> <p>Further the study conducted in June 2009 in various districts of Rwanda reveals that 98% of rural households uses wood fuels as their main source of</p>

⁶ <https://www.rema.gov.rw/soe/chap6.pdf>

		<p>energy for cooking, which consist 92% firewood, 5% charcoal and 3% other residue⁷.</p> <p>A recent study conducted by Ministry of Land and Forestry, Rwanda in 2017⁸, reveals that wood demand and supply ratio is 2:1 and the shortage is projected to increase until in future unless alternative sources of wood energy are sought. The consumption of fuelwood for Rwandan households is estimated at 2.7 million tonnes per year and charcoal making accounts for about 50% of total fuelwood used. The Business as Usual scenario on wood supply/demand, estimates the deficit between wood supply and demand to be 4.3 million tonnes (oven dry weight) in 2017, which is projected to increase to 7.5million tonnes by 2026. This is due to a high increase demand for fire wood and wood for charcoal. This must imply over-exploitation of already low stocked forests. The analysis also shows that 93% of total wood demand mentioned above is for cooking purpose (57% firewood and 36% charcoal). It can therefore be concluded that non-renewable biomass has been used in Rwanda since long back before 31st December 1989.</p>
5	For cases where the biomass is sourced from renewable sources, the project participants should use a corresponding Type I methodology.	Not applicable.
6	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.	There is no change in fuel type used than baseline scenario, the project activity is improvement in energy efficiency of the appliance.
7	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).	A record keeping system and unique identification of the project device will be used. This will include user name, identification number and address/location of the user's house, stove unique serial code and distribution date. The record keeping system will ensure that each ICS can be traced to

⁷ <https://www.cleancookingalliance.org/binary-data/RESOURCE/file/000/000/36-1.pdf>

⁸ https://www.climateinvestmentfunds.org/sites/cif_enc/files/fip_final_rwanda.pdf

		one specific CPA to avoid double counting.
8	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 CME/CPA implementor will sign an end user agreement with individual household/user to ensure only CME can claim the emission reduction. A default distribution agreement for end users including the provision that emission reductions generated by the stove are owned by the CME will be provided for each CPA.
9	<p>The use of this methodology in a project activity under a programme of activities is legitimate if the following leakages are estimated and accounted for, as required on a sample basis using a 90/30 precision for the selection of samples:</p> <p>a) Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities can also be a potential source of leakage. If this leakage assessment quantifies a portion of non-renewable woody biomass saved under the project activity that is then used as the baseline of other CDM project activities then $B_{old,i,j}$ is adjusted to account for the quantified leakage;</p> <p>b) Increase in the use of non-renewable woody biomass outside the project boundary to create non-renewable woody biomass baselines can also be a potential source of leakage. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass outside the project boundary then $B_{old,i,j}$ is adjusted to account for the quantified leakage;</p> <p>c) As an alternative to subparagraphs (a) and (b) $B_{old,i,j}$ can be multiplied by a net to gross adjustment factor of 0.95 to account for both leakages, in which case surveys are not required.</p>	The CME chooses to account for all leakage in the project activity by applying the adjustment factor of 0.95 to the $B_{old,i,j}$. For more details see specific CPA-DD.
10	<p>To determine the value of the fraction of non-renewable biomass (fNRB) to be applied in a component project activity (CPA) of a POA, use one of the two options as follows:</p> <p>(a) Conduct local own studies to determine the local fNRB value (sub national values); or</p> <p>(b) Use default national values approved by the Board. The choice of which option to use shall be made ex ante.</p>	The CME has selected option (b) use default national values approved by the Board. The value is fixed at PoA level. The value has been sourced from ASB0041-2018, wherein the fNRB value is 77% calculated based on data provided by DNA in PSB0045.

	However, a switch from a national value of fNRB (i.e. option (b)) to sub-national values (i.e. option (a)) is permitted, under the condition that the selected approach is consistently applied to all CPAs.	
11	Monitoring approaches for $B_{y,savings,ij}$ and values for parameters fNRB (when Option (a) in paragraph 48(c) is chosen) and the quantity of woody biomass $B_{old,ij}$ may be determined either at the CPA level before the inclusion of the CPA or at the PoA level before the registration of the PoA-DD	The CME chooses to determine the parameter $B_{old,ij}$ on the CPA level before the inclusion of the CPA in the POA.

I.3. Application of multiple methodologies

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Not applicable

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

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The project boundary of the CPA follows the definition in AMS-II.G, Version 11.1. The project boundary is the physical, geographical area of the ICS that utilises biomass. The emissions sources to be included in, or excluded from, each CPA boundary in the CPAs are presented in the table above. The geographical boundary of CPA is same as of PoA.

	Source	GHG	Included?	Justification/Explanation
Baseline	Combustion of non- renewable biomass for cooking	CO ₂	Yes	Main source of emission
		CH ₄	No	Not considered as per the methodology. Exclusion is conservative.
		N ₂ O	No	Not considered as per the methodology. Exclusion is conservative.
	Use and production of charcoal for cooking	CO ₂	Yes	Main source of emission
		CH ₄	No	Not considered as per the methodology. Exclusion is conservative.
		N ₂ O	No	Not considered as per the methodology. Exclusion is conservative.
Project activity	Combustion of non- renewable biomass for cooking	CO ₂	Yes	Main source of emission
		CH ₄	No	Not considered as per the methodology for simplification.
		N ₂ O	No	Not considered as per the methodology for simplification.

Source		GHG	Included?	Justification/Explanation
	Use and production of charcoal for cooking	CO ₂	Yes	Main source of emission
		CH ₄	No	Not considered as per the methodology for simplification.
		N ₂ O	No	Not considered as per the methodology for simplification.

According to AMS-II.G (version 11.1), the spatial extent of the project boundary is the physical, geographical site of the efficient devices that utilize biomass. Also, as per methodology prescription a net to gross adjustment factor (i.e. default value of 0.95) has been considered in the PoA to account for leakages, as an ex-ante parameter. Therefore, no other emission sources for leakage emission are required in the project boundary, hence not included in the table above.

I.5. Establishment and description of baseline scenario

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As per paragraph 23 of the applied methodology AMS-II.G version 11.1, "it is assumed that in the absence of the project activity, the baseline scenario would be the projected use of fossil fuels to meet similar thermal energy needs as those provided by the project devices." Thus, the prevalent baseline technology is deemed as fuelwood based traditional cooking stoves.

The quantity of biomass used in absence of the project activity for target consumers will be determined at the CPA level. Assessments, information used in initial CPAs may be used in subsequent CPAs in lieu of conducting fresh assessments at each CPA level.

The emission reductions are calculated by multiplying the thermal energy from annual biomass savings stemming from non-renewable biomass with an emission factor for fossil fuels. As per AMS-II.G Version 11.1, the biomass saving is calculated by referring to paragraph 33 of option 3 of the AMS-II.G where baseline wood use ($B_{old,HH}$) was determined through survey methods.

As specified in para 25 of AMS II.G Version 11.1, emission factor for the substitution of non-renewable woody biomass by similar consumers, either the default regional values in table 2 of applied methodology or a value calculated from Equation (3) of applied methodology may be used.

The proposed programme of activities will disseminate ICS in Rwanda, as per Appendix 1. Default regions of AMS II.G Version 11.1, Rwanda falls in to sub-Saharan Africa region.

The CME has decided to use default values in line with table 2 of AMS II.G Version 11.1 i.e. a value of 73.2 tCO₂/TJ is used as the emission factor for the substitution of non-renewable biomass by similar consumers ($EF_{\text{projected fossil fuel}}$).

Hence this default value will be used for baseline emission calculation for all CPAs.

Lastly, there are no relevant national/sectoral policies, regulations or circumstances that affects the baseline scenario as described above.

I.6. Estimation of emission reductions

I.6.1. Explanation of methodological choices

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In accordance with AMS-II.G, version 11.1, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for cooking.

$B_{y,savings,i,j}$ shall be determined using option 3 (equation 7 in particular) as per paragraph 32 of the methodology. The loss in efficiency of the project device type i shall be determined based on

paragraph 37(c) or 37(d) of the methodology to be specified in the specific case CPA. $B_{old,i,j}$ shall be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, thereby eliminating the need for ex-post surveys to determine leakages, as per para 39 of the methodology. Further, in case of switching from baseline device using firewood to efficient project device using processed biomass (briquette, pellets, and woodchips) the leakage effects related to the processed biomass production shall be taken into account.

Emission reduction calculation

According to paragraph 24 of methodology AMS-II.G, version 11.1, emission reductions would be calculated as

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

Where:

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

j = Indices for the situation where there is more than one batch of project device

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

Since the CPAs under this PoA will involve the deployment of improved cookstoves, the following equation will be applicable as per AMS-II.G, Version 11.1:

$$ER_{y,i,j} = B_{y,saving,i,j} \times N_{y,i,j} \times f_{NRB,y} \times \mu_y \times NCV_{biomass} \times EF_{projected_fossilfuel}$$

Where,

$B_{y,saving,i,j}$ = Quantity of woody biomass that is saved in tonnes per cook stove device of type i and batch j during year y

$N_{y,i,j}$ = Number of project devices of type i and batch j operating during year y

$f_{NRB,y}$ = Fraction of woody biomass that can be established as non-renewable biomass (fNRB)

μ_y = Adjustment to account for any continued use of pre-project devices during the year y when applying equations 6 and 8 (fraction). Use 1.0 in other cases

$NCV_{biomass}$ = 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')

$EF_{projected_fossilfuel}$ = Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers. Use a value of 73.2 t CO₂/TJ

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

$B_{y,savings,i,j}$ and $f_{NRB,y}$ are determined as follows:

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

In line with para 32 of applied approved methodology AMS-II.G version 11.1, to determine $B_{y,saving,i,j}$. Here CME has chosen option 3 i.e. Water Boiling Test (WBT) with corresponding formula given below:

$$B_{y,saving,i,j} = B_{old,i,j} \times L_y \times [1 - (\eta_{old,i,j} / \eta_{new,i,j})]$$

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

L_y is the leakage adjustment factor or 0.95 (as per default value) of AMS-II.G version 11.1

$\eta_{new,i,j}$ = Efficiency of the project device i and batch j

$\eta_{old,i,j}$ = Efficiency of the old devices being replaced by project devices of type i and batch j

The calculations in the equations above assume that there is only one device per household. The above equation will be used for CPAs where only one stove per household is distributed. However, as initially CME is targeting to distribute the single pot ICS and to minimize time of cooking may also consider the distribution of 2 ICS per household.

In line with para 34 of applied approved methodology AMS-II.G version-11.1, in case 2 ICS is provided to household in project case, an adjusted formula shall be used.

For example, if 2 project devices are installed per household, 0.5 times the baseline woody biomass consumption per household ($B_{old,HH}$) is used as the total annual quantity of woody biomass that would have been used in the absence of the project activity in each device ($B_{old,i,j}$).

The baseline saving shall be determined as

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

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)

Determination of the Share of Non-Renewable Biomass

According to methodological tool "Calculation of the fraction of non-renewable biomass" version 02.0, para 8, equation 1, shall be used to calculate f_{NRB} :

$$f_{NRB} = \frac{NRB}{NRB + RB}$$

Where:

$f_{NRB,y}$: fraction of non-renewable biomass (%)

NRB: non renewable biomass (tons)

RB: Renewable biomass (tons)

For f_{NRB} calculation details please refer Appendix-4 of PoA DD.

Leakage

According to AMS-II.G the following potential sources of leakage have to be considered:

A) Use of NRB savings by non-project households

According to AMS-II.G para 39 the default net to gross adjustment factor of 0.95 is applied to account for leakage and therefore surveys are not required.

B) Transfer of Equipment

"If equipment currently being utilised is transferred from outside the boundary to the project activity, leakage is to be considered."

This leakage source can be ruled out since no used improved cookstoves will be transferred or deployed from outside the geographical project boundary to the project activity.

I.6.2. Data and parameters fixed ex ante

Data / Parameter:	$B_{old,HH}$
Data unit:	tones/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:	Historical data or survey of local usage will be conducted for each target consumer group included in a given CPA
Value(s) applied:	To be determined at CPA level
Choice of data or Measurement methods and procedures:	Combination of literature and/or field survey by a dedicated expert team/third party survey will be used to determine the annual quantity of woody biomass have been used per household in absence of the project activity. If survey conducted should refer the AMS-II.G, Version-11.1 non-binding survey questionnaire for baseline fuel consumption pattern. The same shall be established in each CPAs.
Purpose of data	Baseline emission calculation
Additional comment:	--

Data / Parameter:	$B_{old,i,j}$
Data unit:	tonne/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:	Historical data or survey of local usage will be conducted for each target consumer group included in a given CPA
Value(s) applied:	To be determined at CPA level
Choice of data or Measurement methods and procedures:	<p>The annual quantity of wood that would have been consumed in absence of the project activity will be calculated as below</p> $B_{old,i,j} = B_{old,HH} / N_{d,HH}$ <p>Where, $B_{old,HH}$ is determined through survey and $N_{d,HH}$ is a monitoring parameter</p>

Purpose of data	Baseline emission calculation
Additional comment:	CME plans distribution of only one ICS per households then $B_{old,i,j}$ equals $B_{old,HH}$

Data / Parameter:	$B_{old,c,HH}$
Data unit:	tonne/year
Description:	Annual quantity of charcoal 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:	Historical data or survey of local usage will be conducted for each target consumer group included in a given CPA
Value(s) applied:	To be determined at CPA level
Choice of data or Measurement methods and procedures:	Combination of literature and/or field survey by a dedicated expert team/third party survey will be used to determine the annual quantity of charcoal have been used per household in absence of the project activity. If survey conducted should refer the AMS-II.G non-binding survey questionnaire for baseline fuel consumption pattern. The same shall be established in each CPAs.
Purpose of data	Baseline emission calculation
Additional comment:	--

Data / Parameter:	$C_{c,w}$
Data unit:	Kg wood / Kg Charcoal
Description:	The conversion factor from charcoal to wood
Source of data:	Default value as per applied methodology AMS-II.G version 11.1
Value(s) applied:	6
Choice of data or Measurement methods and procedures:	Default value as per para 35 of AMS II.G Version 11.1
Purpose of data	Calculation of baseline emissions
Additional comment:	The value is fixed ex-ante

Data / Parameter:	$NCV_{biomass}$
Data unit:	TJ/tonne
Description:	Net calorific value of the non-renewable woody biomass, briquettes or charcoal used in project devices
Source of data:	Default value as per applied methodology AMS-II.G version 11.1 if only non-renewable woody biomass and charcoal used
Value(s) applied:	0.0156 (for non-renewable woody biomass and charcoal)
Choice of data or Measurement methods and procedures:	Default value as per applied methodology AMS-II.G version 11.1, only non-renewable woody biomass and charcoal will be used under CPAs, no CPA will use processed biomass.
Purpose of data	Baseline emission calculation
Additional comment:	The value is fixed ex-ante for non-renewable woody biomass and charcoal

Data / Parameter:	$EF_{projected_fossilfuel}$
Data unit:	tCO ₂ /TJ

Description:	Emission factor for the substitution of non-renewable woody biomass by similar consumers
Source of data:	Default value as per applied methodology AMS-II.G version 11.1
Value(s) applied:	73.2
Choice of data or Measurement methods and procedures:	Default value as per methodology has been applied for sub-Saharan Africa region
Purpose of data	Baseline emission calculation
Additional comment:	The value is fixed ex-ante

Data / Parameter:	L_y
Data unit:	Fraction
Description:	Leakage adjustment factor
Source of data:	Default value as per applied methodology AMS-II.G version 11.1
Value(s) applied:	0.95
Choice of data or Measurement methods and procedures:	As per the methodology AMS-II.G version 11.1, $B_{old,i,j}$ can be 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	Baseline emission calculation
Additional comment:	The value is fixed ex-ante

Data / Parameter:	f_{NRB,y_Rwanda}
Data unit:	Fraction
Description:	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass
Source of data:	ASB0041-2018: Standardized baseline: Fuel switch, technology switch and methane destruction in the charcoal sector of Rwanda, Version 01.0 https://cdm.unfccc.int/methodologies/standard_base/2015/sb126.html
Value(s) applied:	0.77
Choice of data or Measurement methods and procedures:	The fNRB value calculated as per the methodological TOOL30 "Calculation of fraction of non- renewable biomass" version 01.0, based on data provided by the DNA in PSB0045. The referenced source is valid till 19/12/2021.
Purpose of data	Baseline emission calculation
Additional comment:	The valid version of Standardized baseline available at the time of CPA inclusion to be used, in case Standardized baseline not available the fNRB value to be established as per tool TOOL30 "Calculation of fraction of non-renewable biomass" by CME/CPA implementor.

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

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Emission reductions for each CPA will be calculated according to the following formula:

1. The sample calculation below is shown for single pot wood fuel based ICS, considering 1 ICS per household.

$$ER_y = B_{y,saving,i,j} \times N_{y,i} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel}$$

Where,

$B_{y,saving,i,j}$ = Quantity of woody biomass that is saved in tonnes per cook stove device of type i during year y

$N_{y,i,j}$ = Number of project devices of type i operating during year y

$f_{NRB,y}$ = Fraction of woody biomass that being established as non- renewable biomass using survey methods (77.0%)

$NCV_{biomass}$ = 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')

$EF_{projected_fossilfuel}$ = Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers. Default value of 73.2 t CO₂/TJ for Sub-Saharan Africa

Further,

$B_{y,saving,i,j} = B_{old,i,j} \times L_y \times [1 - (\eta_{old,i,j} / \eta_{new,i,j})]$

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 (assumption 4.5 Tonne/year)

L_y is the leakage adjustment factor or 0.95 (as per default value) of AMS-II.G version 11.1

$\eta_{new,i,j}$ = Efficiency of the project device i (assumption 38%)

$\eta_{old,i,j}$ = Efficiency of the old devices being replaced by project devices of type i (10%)

For example, considering one IC stove per household, the number of IC stoves will be 50000 the saving is calculated as

$$B_{y,saving,i,j} = 4.5 \times 0.95 \times [1 - (10\%/38\%)]$$

$$B_{y,saving,i,j} = 3.1486 \text{ tonne wood/per year/per stove}$$

Hence

$$ER_y = 3.1486 \times 50000 \times 0.0156 \times 73.2 \times 0.77$$

$$ER_y = 138,424 \text{ tCO}_2\text{e/year (rounded down)}$$

2. The sample calculation below is shown for single pot charcoal based ICS, considering 1 ICS per household.

$$ER_y = B_{y,saving,i,j} \times N_{y,i,j} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel}$$

Where,

$B_{y,saving,i,j}$ = Quantity of woody biomass that is saved in tonnes per cook stove device of type i during year y

$N_{y,i,j}$ = Number of project devices of type i operating during year y

$f_{NRB,y}$ = Fraction of woody biomass that being established as non- renewable biomass using survey methods (77.0%)

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')

$EF_{\text{projected_fossilfuel}}$ = Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers. Default value of 73.2 t CO₂/TJ for Sub-Saharan Africa

Further,

$$B_{y,\text{saving},i,j} = B_{\text{old},i,j} \times L_y \times [1 - (\eta_{\text{old},i,j} / \eta_{\text{new},i,j})]$$

Where,

$B_{\text{old},i,j}$ = 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 (Tonne/year)

L_y is the leakage adjustment factor or 0.95 (as per default value) of AMS-II.G version 11.1

$\eta_{\text{new},i,j}$ = Efficiency of the project device i (assumption 32%)

$\eta_{\text{old},i,j}$ = Efficiency of the old devices being replaced by project devices of type i (10%)

$$B_{\text{old},i,j} = B_{\text{old},c,HH} \times 6$$

Where,

$B_{\text{old},c,HH}$ = Annual quantity of charcoal 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 (assumption 0.969 tonnes/household/year)

Hence,

$$B_{\text{old},i,j} = B_{\text{old},c,HH} \times 6 = 0.969 \times 6 = 5.81 \text{ tonne/year}$$

For example, considering one IC stove per household, the number of IC stoves will be 50000 the saving is calculated as

$$B_{y,\text{saving},i,j} = 5.81 \times 0.95 \times [1 - (20\%/50\%)]$$

$$B_{y,\text{saving},i,j} = 3.314 \text{ tonne wood/per year/per stove}$$

Hence

$$ER_y = 3.314 \times 50000 \times 0.0156 \times 73.2 \times 0.77$$

$$ER_y = 145,695 \text{ tCO}_2\text{e/year (rounded down)}$$

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:	ICS distribution database and Survey records
Value(s) applied	To be determined at CPA level
Measurement methods and procedures:	Measured directly or based on a representative sample. Sampling standard shall be used for determining the sample size to achieve 95/10 confidence precision. A discount shall be applied based on the percentage of devices operational as determined by the sample survey, e.g. if survey shows that 10%

	<p>of the devices is non-operating, an adjustment factor of 0.9 shall be applied to number of project devices commissioned in a particular batch. Separate samples shall be taken for each batch.</p> <p><i>Sampling Frame:</i> Project Database of each CPA (or combined PoA database in case of PoA level sampling) as defined by distribution date, appliance type, serial number, and end-user information.</p> <p>The number of stoves still operating will be determined based on representative sampling. The total number of operational stoves shall be calculated as the fraction of stoves of type <i>i</i> and age <i>a</i> found operational in the sampling survey multiplied by total number of stoves of type <i>i</i> and age <i>a</i> in the project database.</p>
Monitoring frequency:	At least once every two years
QA/QC procedures:	<p>For each CPA, CME and or CPA implementer (if different than CME) shall maintain a distribution record to calculate this parameter. The CME supervises the activities of each CPA implementer (when not the CME itself), and provides training, guidelines and templates to facilitate accurate testing and record keeping.</p> <p>In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of stoves of type <i>i</i> and age <i>a</i>.</p>
Purpose of data	Calculation of baseline emission
Additional comment:	All data sources will be transparent and verifiable. Also, if at the CPA-level it is assumed ex-ante that there is only one project stove being used per household for calculating $B_{old,i}$, then, ex-post sampling based monitoring shall also include assessment of presence of multiple operational project stoves in a sampled household. The number of project stoves in the CPA shall be adjusted accordingly to claim emissions reduction only for one operational project stove per household to ensure equivalence with the baseline established.

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
Source of data:	Distribution record of ICS
Value(s) applied	To be determined at CPA level
Measurement methods and procedures:	For each batch the date of distribution of first ICS will be recorded and used as date of commissioning for that batch.
Monitoring frequency:	Recorded at the time of commissioning/distribution of first ICS of the batch
QA/QC procedures:	NA
Purpose of data	Start date
Additional comment:	The record to be kept for crediting period + 2 years

Data / Parameter:	η_{old}
Data unit:	%
Description:	Efficiency of the system being replaced (Traditional Cooking Stoves)
Source of data:	Default value as per applied methodology AMS-II.G version 11.1 or as per ICS replacement type recorded
Value(s) applied	0.1 for wood based ICS 0.2 for charcoal based ICS

Measurement methods and procedures:	The default value of 0.10 is used for wood stove, as the replaced system is a three stone fire, or a conventional device with no improved combustion air supply or flue gas ventilation, i.e. without a grate or a chimney. The default value of 0.20 is used for charcoal stove, as the replaced system is a three stone fire, or a conventional device with no improved combustion air supply or flue gas ventilation, i.e. without a grate or a chimney.
Monitoring frequency:	Recorded at the time of commissioning/distribution for type of traditional stove replaced
QA/QC procedures:	NA
Purpose of data	Calculation of Quantity of woody biomass that is saved in tonnes per device
Additional comment:	The record to be kept for crediting period + 2 years

Data / Parameter:	NCV_{biomass}
Data unit:	TJ/tonne
Description:	Net calorific value of the non-renewable woody biomass, briquettes or charcoal used in project devices
Source of data:	Default value as per applied methodology AMS-II.G version 11.1 in case woody biomass/charcoal used, else yearly third party sample test report if bric
Value(s) applied	Non-renewable woody biomass-0.0156 (fixed ex-ante)
Measurement methods and procedures:	Default value as per applied methodology AMS-II.G version 11.1 for non-renewable woody biomass. The project will not use processed biomass under the CPAs.
Monitoring frequency:	Annual
QA/QC procedures:	NA
Purpose of data	Baseline emission calculation
Additional comment:	The value is fixed ex-ante for non-renewable woody biomass and charcoal. The record to be kept for crediting period + 2 years

Data / Parameter:	$\eta_{\text{new},i,j}$
Data unit:	%
Description:	Efficiency of the device of each type <i>i</i> and batch <i>j</i> implemented as part of the project activity
Source of data:	Certification by a national standards body or an appropriate certifying agent recognized by that body
Value(s) applied	To be determined at CPA level

Measurement methods and procedures:	<p>Efficiency shall be measured/estimated as per 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 procedures specified by the partnership for clean indoor air.</p> <p>The sampling test of stoves by such certification bodies/agents or manufacturers shall be conducted following a 95/10 precision in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities". The following simplified approach may be used, when the efficient cookstoves are produced by a manufacturer with a good quality management system in place to ensure that the individual equipment produced do not vary beyond the range of acceptance limits (e.g. characteristics such as materials, critical dimensions):</p> <p>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; If the standard deviation of the nine test results indicated above is very small and 95/10 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 95/10 precision is met.</p>
Monitoring frequency:	<p>(i) Recorded at the time of commissioning/distribution (ii) Adjusted for the loss of efficiency as per para 37 (c) or para 37 (d) of AMS-II.G. version 11.1.</p>
QA/QC procedures:	The value will be used from third party report hence not required.
Purpose of data	Baseline emission calculation
Additional comment:	If any sample stove is found to be operating below the 20% efficiency, the proportionate number of stoves of that type included in the CPA will be considered to be non-operational and not accounted for ER calculation.

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:	ICS distribution database and Sample Survey Records
Value(s) applied	To be determined
Measurement methods and procedures:	<p>The sampled households will be checked for presence of baseline stove and if it was being used along with project stove for cooking. For samples where baseline stove was found not being used, $\mu_Y = 1.0$.</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 in two year

QA/QC procedures:	A 95 /10 confidence / margin of error shall be achieved for the sampling parameter irrespective of annual / biennial monitoring frequency as per para 23 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 08.0. In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of stoves.
Purpose of data	To calculate baseline emission
Additional comment:	The record to be kept for crediting period + 2 years

Data / Parameter:	N_{d,HH}
Data unit:	Number
Description:	Number of project devices distributed per household
Source of data:	Distribution record of ICS
Value(s) applied	To be determined at CPA level
Measurement methods and procedures:	Recorded at the time of commissioning/distribution of project devices and it can be crosschecked with user details having number of ICS.
Monitoring frequency:	Recorded at the time of commissioning/distribution of ICS
QA/QC procedures:	The procedure will be developed in electronic system to record number of ICS provided to particular household in any CPA
Purpose of data	To calculate baseline emission
Additional comment:	The record to be kept for crediting period + 2 years

Data / Parameter:	Life span
Data unit:	Number of years
Description:	The operating lifetime of the project device.
Source of data:	Lab test report by National Agency
Value(s) applied	To be determined at CPA level
Measurement methods and procedures:	The value will be taken from a test report conducted for specific ICS type at the time of CPA inclusion/distribution/commissioning.
Monitoring frequency:	Fixed and recorded at the time of commissioning/distribution of ICS
QA/QC procedures:	NA
Purpose of data	To calculate baseline emission
Additional comment:	The record to be kept for crediting period + 2 years

I.7.2. Sampling plan

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Sample Plan:

The monitoring plan is designed to monitor the parameters listed in Section above, which are required for calculation of the actual GHG emission reduction achieved by the CPA using ex post sampling survey. The share of operating stoves and the continued use of pre-project devices will be determined based on sampling procedures as outlined below. The CME will be responsible for conducting the sampling surveys and maintaining a database with all operating stoves.

No monitoring for leakage through competitive uses of biomass is required, as the parameter $B_{old,i,j}$ is multiplied by 95% to account for leakage..

As per the Guideline for Sampling and Surveys for CDM Project Activities and Programme of Activities, version 04, the sampling plan is the following:

(a) Sampling Design

Due to the large number of ICS envisioned to be distributed as part of the CPAs to be included in the PoA, it is not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling will be undertaken as part of a PoA-wide Sampling Plan (by grouping and sampling across CPAs) that is designed in line with the requirements of the Guideline “Sampling and surveys for CDM project activities and programme of activities”, version 04.

(i) Objective and Reliability Requirements:

According to para 14 of "Tool19: Demonstration of additionality of microscale project activities", (Version 09.0), the unit in this CPA is a “microscale CDM unit”, and CPA sampling plan is designed based on the requirements of the methodology applied and standard (Sampling and surveys for CDM project activities and programmes of activities, version 08.0). Thus, the survey will be conducted to achieve the confidence / precision of 95/10 for sampling surveys in all cases, even when they are conducted at the CPA level in line with para 23 of Sampling and surveys for CDM project activities and programmes of activities, version 08.0.

Monitored Parameter:

$N_{y,i,j}$	Number of project devices of type i and batch j operating during year y
$\mu_{y,i,j}$	Adjustment to account for any continued use of pre-pre-project devices during the year y
$\eta_{new,i,j}$	Efficiency of the device of each type i and batch j implemented as part of the project Activity

(ii) Target Populations:

- The target population for the proportion of ICS still in operation ($N_{y,i,j}$ and $\eta_{new,i,j}$) of this POA are all households in the POA database which are using fuel wood/charcoal in ICS distributed under the POA for cooking.
- The target population for pre project appliances ($\mu_{y,i,j}$) is the set of old stoves still in use under CPAs database.

(iii) Sampling Frame

To ensure the homogeneity of the CPAs included for a single sampling plan, two sampling frames shall be defined. Overall, all CPAs will have same group of end users which is from households from rural/urban areas. The CPAs are to be implemented in rural areas; thus, it is expected that the geographical locations do not have influence on the parameter of interest. Therefore, all above mentioned parameters can be assumed to be highly homogeneous for each ICS model regardless of how the end user group and distribution/installation location is defined.

1) Sampling frame for proportion of ICS in operation ($N_{y,i,j}$ and $\mu_{y,i,j}$)

The sample frame refers to all the information sources on the Database. There are two primary mechanisms for data collection: the Registration Process for newly distributed/installed ICS and the Monitoring Survey (which includes a household questionnaire and visual inspection of ICSs) that will be used throughout the lifetime of the PoA. The detailed information collected from Registration Process is used to populate the stoves Database and the Monitoring Survey follows Guideline “Sampling and Surveys for CDM Project Activities and Programme of Activities”, version 04.

The POA is open to different CPA Implementers and different models of ICS. As explained below (on section “Sampling Method”), to take the different characteristics of different CPA Implementer and ICS models into consideration, CPAs shall be grouped together to create a Primary Sampling Unit, which is homogenous. As per EB 86 Annex 04, Appendix-2, paragraph 1, for the use of a single sampling plan covering a group of CPAs, provided the homogeneity of population can be demonstrated, or differences are taken into account in the sample size calculation, a 95/10 confidence/precision is applied for sampling.

The first step is to identify the Primary Sampling Units. Primary sampling units are CPAs, which have:

1. The same CPA Implementer
2. The same ICS models

That is CPAs with the same CPA Implementer and same ICS model can therefore be grouped together and form a Primary Sampling Unit. In the event the POA has CPAs with two different CPA Implementers using the same ICS model, these form two different Primary Sampling Units. Same is true if the same CPA Implementer has two different ICS models being implemented – this will form two Primary Sampling Units. This is justified by the fact that CPA Implementer might vary in terms of performance and it is important for the CME to collect and monitor accurate data for each CPA Implementer distributing each stove model.

2) Adjustment to account for any continued use of pre-project devices during the year ($\mu_{y,i,j}$)

In line with applied approved methodology AMS-II.G version 11.1, as installing data logger is not practical and if any use of pre project device *can be monitored in a common survey with other monitoring parameters; therefore, a random sub-sample within the common survey can be taken to determine continued use of old cookstoves and its proportional usage by including suitable questionnaire.*

There will be two situations 1) project ICS are completely discarded 2) the old stoves used along with project ICS.

Hence in first case it will be simple multiplication of fraction of total number of project ICS displaced by old cookstoves by total number of cookstoves in CPA, to achieve precise results based on survey result sample size calculation can be repeated.

However, for second case, surveys may be conducted if the use of data loggers to record the continued operation of baseline devices is demonstrated to be not practical, for example when the baseline device is the three-stone fire. The surveys should be designed to capture the cooking habits and stove usage of households in the region, including quantification of use of baseline devices, by formulating questions and/or collecting evidences to determine the frequency of usage of both the project devices and baseline devices. For example, if there were 3 pre-project devices per household and it was determined during the survey that use of one of them continues during the crediting period then a conservative adjustment factor of 0.66 is applied for the relevant monitoring period. Another example would be the case where there was only one pre-project device per household and its use during the project period continues along with the project stove to meet 25% of the cooking needs of the household in which case the adjustment factor will be 0.75. Where a more precise data is available i.e. the thermal capacity of the project and pre-project devices and respective utilization hours, a weighted average adjustment factor may be used.

3) Sampling frame for operating efficiency of distributed ICS ($\eta_{new,i,j}$):

The efficiency measure for project ICS will be determined whichever way the CME prefers at the time of inclusion in the CPA. Thus, the sample size will be calculated upon which efficiency measurement is applied. If CME measures the efficiency of the project devices based on a national standards body or an appropriate certifying agency recognized by that body, the sample size will be determined according to the requirements of the national standards body or certifying agent. But in other cases, the surveys should be designed to validate the measurement procedures with the manufacturer's specifications, management system, or saucepan capacity, respectively by conducting the required test based on the 95/10 precision. The certification or related data to measure or estimate the efficiency of project ICSs will be recorded or monitored by CME.

(iv) Sampling Method

The sampling method for monitored parameters $N_{y,i,j}$, $\eta_{new,i,j}$ and $\mu_{y,i,j}$ is Simple Random Sampling and samples will be randomly selected from the primary sampling units as illustrated above. To ensure a random selection of ICS, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its unique ID number. Each ICS can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of ICS in the Database for that pre-defined sampling frame. Applying the random number generators, the ICS can then be randomly chosen from the defined population up to the required sample size as calculated by the CME.

To determine the parameters, sampling will involve the following approaches (outcome in brackets):

$N_{y,i,j}$: Visual inspection of the premises to see if ICS is operational and in use. Interview with end user if required to verify that ICS is still in use (Yes/No)

$\mu_{y,i,j}$: Pre project device only is in use then fraction to be used to calculate total number, however if pre project device is used along with project ICS, proportion of usage of each will be determined by cooking habits evaluated by survey questionnaire during the monitoring period.

$\eta_{new,i,j}$: Test to be conducted as per chosen approach

Using the formulas in the section "Sample Size" below, the CME will randomly sample the required number of ICS from the primary sampling units. It is important to note that for $\mu_{y,i,j}$ where partial usage of both old stoves and project ICS are observed, for each household under sample cooking habits must be taken into consideration.

(v) Sample Size

For the estimation of the proportion or mean value of the parameters investigated, the minimum sample size for each sample frame has to achieve the 95/10 confidence/precision.

The procedure to determine the sample of households will ensure that they adequately represent the broader project population, minimizing sampling error. Using, a 95 per cent confidence level, and a 10 per cent margin of error, random samples will be selected from each Primary Sampling Unit. There are three parameters that will be estimated through sampling: the number of stoves still in operation during the monitoring period as determined by the monitoring survey ($N_{y,i,j}$), Efficiency of the device of each type i and batch j implemented as part of the project Activity ($\eta_{new,i,j}$) and the continued use of old stoves, ($\mu_{y,i,j}$). In line with AMS-II.G version 11.1, all can be sampled in a single survey with a random sample of households using the above described confidence/precision levels depending on annual or biennial monitoring frequency. The $N_{y,i,j}$ and $\mu_{y,i,j}$ requires proportion/percentage parameters, however the efficiency of ICS is continuous variable and will be a mean value.

In order to calculate the required sample size estimates, values for the proportions, mean values, and standard deviations are required. As per Guidelines for Sampling and surveys for CDM project activities and programmes of activities, version 07.0 Appendix 1 paragraph 5, there are different ways available to obtain the estimates of the parameter of interest:

- (a) Refer to the result of previous studies and use these results;
- (b) In a situation where information from previous studies is not available, a preliminary sample as a pilot could be conducted and use that sample is used to provide the estimates;
- (c) Use best guesses based on the researcher's own experiences.

For the registration/inclusion purpose of CPA-DD, option C shall be applied. For the first monitoring period, values from a pilot shall be applied. For the following monitoring periods, the estimates shall be adjusted taken into account the results of the previous monitoring period(s) or the result from recent pilot study, which is conducted after the previous monitoring periods.

To estimate the sample size for parameters $N_{y,i,j}$ and $\mu_{y,i,j}$ the following equation is used:

$$1.96^2 N \times p (1-p)$$

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

Where:

n = Sample size

N = Population size (Total number of households/ICS)

p = Expected proportion

1.96 = Represents the 95% confidence required

0.1 = Represents the 10% relative precision

The following assumptions are made to exemplify the sample size calculation for parameters: $N_{y,i,j}$ and $\mu_{y,i,j}$.

The CME envisage distribution of 600,000 ICSs over next five year. Hence, population size, N, is taken as 600,000 households/ICS (Assuming one ICS for one household).

It is expected at least 90% of ICS will be operational, hence the expected proportion p for $N_{y,i,j}$ is taken as 0.9.

Sample size calculation:

The calculation of the required sample size for each parameter in the first monitoring period is illustrated below for a 95/10 level of confidence and precision. In all cases a conservative approach is taken, however if for any parameter the required 95/10 confidence/precision is not met then the CME will randomly select an additional sample and collect further data from this sample to ensure the pooled data meet or exceed the required thresholds.

Parameter $N_{y,i,j}$: Based on the above assumptions, the resulting sampling size for a 95/10 confidence/precision is calculated as:

$$n \geq \frac{1.96^2 \times 600,000 \times 0.9 (1-0.9)}{(600,000-1) \times 0.1^2 \times 0.9^2 + 1.96^2 \times 0.9 (1-0.9)}$$

Which comes out to be

$$n \geq 42.68$$

$$n = 43$$

Therefore, in this case a sample size of 43 is to be sampled from each primary sampling unit.

In case the resulting sample size to achieve the desired confidence/precision levels is smaller than 30 ICS, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion in line with para 14 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version-08. If the parameter of interest is a numeric mean value (i.e. not a proportion or percentage) the Student's t-distribution shall be used if the resulting sample size is less than 30.

Parameter $\eta_{new,i,j}$:

For the purposes of determining sample size in the first monitoring period, the efficiency of stoves will vary.

To estimate the sample size for parameter $\eta_{new,i,j}$ the following equation is used:

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

Where,

$$V = (SD/mean)^2$$

n = Sample size

N = Population size (Total number of households/ICS)

Mean= Expected mean of ICS thermal efficiency

SD = Expected standard deviation

1.96 = Represents the 95% confidence required

0.1 = Represents the 10% relative precision

Based on the above assumptions, the sample size calculation for a 95/10 confidence/precision would be

$$n \geq \frac{1.96^2 \times 60,000 \times (0.05/0.5)^2}{(60,000-1) \times 0.1^2 + 1.96^2 \times (0.05/0.5)}$$

Using above values the sample size comes out to be 3.84 or 4.

The CME may choose to use the same samples to monitor more than one parameter, where parameters have same units. Sampling more than one parameter within the same sample (household) helps reduce travel needs for monitoring and the associated costs. At the same time this approach ensures the random selection of samples for every parameter.

Oversampling is strongly encouraged, not only to compensate for any attrition, outliers or non-response associated with the sample, but also to prevent a situation at the analysis stage where the required reliability is not achieved and additional sampling efforts would be required. The sample size shown above will be adjusted upwards to account for non-responses, CME shall determine the appropriate non-responses rate based on previous experience.

1.7.3. Other elements of monitoring plan

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The Monitoring Plan applied in this PoA involves a number of key elements that ensure that the CME have high-quality, unbiased and reliable information regarding the performance of the project in terms of implementation and outcomes, and for the purposes of calculating Certified Emission Reductions (CERs) following AMS-II.G version 11.1 on the basis of the amount of non-renewable biomass saved by the ICS in the project activity. The key elements are the following:

- Project database management
- Spot Checks of ICS
- Sample Plan for the Monitoring Survey
- Data Quality, Consistency and Duplication Checks
- Monitoring Reporting

Project Database Management:

The information collected by the CME/CPA implementer will be stored in the electronic database available with CME and it will be updated on ongoing basis by trained staff. The database will be sortable by the information collected as per Registration Process and will be made available to the DOE at verification. The CME/CPA implementer will verify accuracy and completeness and confirm that there is no double entry of serial numbers in the database. The CPA implementer will identify any discrepancy and the correct information will be entered into the database.

In case a replacement stove is being issued to a customer already registered on the project database, a new registration will not be required. The replacement stove will be recorded in the project database in such a way that it is clear that the replaced stove ceases to be included in the

CPA; and the replacement stove is associated with the customer's details as a new stove, and is included in the CPA as a new stove with a new serial number.

All partners will be required to conform with CPA implementation and monitoring systems designed by CME under services agreements signed with CME which will cover the above mentioned role and responsibilities.

All technical staff responsible for installation and maintenance of the stoves will be trained in terms of the understanding the requirements of CDM on the monitoring system. The technical, operational and maintenance trainings provided for the personnel will be described in each monitoring report.

Spot Checks of ICS Installed:

Trained field staff will continually randomly select households included in the database and visit them to cross-check the information on the database with the factual evidence in the field. Any inconsistencies found (e.g. change in the address of a user) will be updated on the database, and in the case ICSs are found to be no longer in use, they will be clearly marked as such and excluded from emission reductions calculations. The spot check will be performed during first year of operation of the CPA, wherein for each CPA random selection of household will be done through central database system, afterwards a team will visit to each household selected and will confirm the information as per registered database. In case any change in information the same will be updated and an action will be decided based on changes observed. These spot checks will also be used as part of sample required establishing the ICS in operation and if any use of pre-project devices along with ICS.

SECTION J. Crediting period type and duration

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Fixed crediting period

10 years 00 months

SECTION K. Eligibility criteria for inclusion of CPAs

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No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA	The PoA boundary corresponds to the boundaries of Rwanda host country. All distributed ICS in a CPA shall be located within geographical boundary of Rwanda.	Location and boundary specified in the specific CPA- DD stating that the ICS location is limited to a region of Rwanda (as mentioned in project boundary section) and is supported by Distribution records of ICS.
2	Conditions that avoid double counting of emission reductions like unique identification of product and end-user locations	A unique numbering system for ICS will be applied in each CPA, assigning a unique number to each ICS and allowing to clearly identify for each ICS to which CPA it belongs.	The ICS installed in any CPA under this PoA shall be uniquely identifiable by unique numbering and will be supported by the distribution records. Each ICS distributed will include CPA assignment and will have corresponding end user details (i.e. name, address etc.). Additionally, unique id shall be displayed on the stove itself. The unique numbering or identification regime is included in the specific CPA-DD and will be verifiable by the DOE.

3	The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications	CPAs under this PoA will consist of the distribution of ICS with a thermal efficiency of at least 20% efficiency as per water boiling test or compliance with Tier II and above as per ISO to household users cooking with non-renewable biomass or charcoal in the baseline scenario. The CPA consists of replacement of conventional firewood cook-stoves for biomass fired ICS as defined in the PoA-DD. Stove types replaced and implemented will be defined in the CPA-DD, and hence appliances involving the efficiency improvements in the thermal applications of non-renewable biomass as per AMS-II.G.	Type of conventional cook-stoves replaced and ICS type/s implemented and compliance with the technological requirements of AMS-II.G will be described in the specific CPA-DD. Document: Project product data sheets or specification or product information sheets from manufacturer / Stoves distribution records.
4	Conditions to check the start date of the CPA through documentary evidence	Any CPA start date shall not be before the PoA starting date i.e. date of publication of PoA DD at UNFCCC website.	Starting date as stated in the CPA-DD. Each CPA shall provide verifiable evidence of the CPA start date as demonstrated. Evidence may include but are not limited to: - the first end user agreement
5	Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs	A CPA shall consist in the distribution of ICSs with efficiency improvements in thermal applications of non-renewable biomass/charcoal. ICS shall have a thermal efficiency of at least 20% efficiency as per water boiling test or compliance with Tier II and above as per ISO. The test certificate of efficiency of ICS shall be WBT or ISO based only.	CPA-DD shall apply AMS II. G. Version 11.1
6	The conditions that ensure that the CPA meets the requirements pertaining to the demonstration of additionality	The additionality of the project activity is demonstrated as per Option 3 of the applied small-scale methodology AMS-II.G, the referred "TOOL19: Demonstration of additionality of microscale project activities" Version-9, EB101, Annex-15	Each of the requirements listed below are proven to define the CPA as automatically additional. The specific CPA is eligible when all evidences are documented: The project is located in LDC 1) The project activities are solely composed of isolated units where the users of the technology/measure are households: CPA- DD to show description of the technology and specifies target population, and; 2) Where the size of each unit is no larger than 600MWh of the small-scale CDM thresholds: CPA-DD to show energy saved by the ICS is less than 600MWh/year or 1.80 GWh _{th} /year based on design specifications of stoves.

7	The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis	The local stakeholder consultation and environmental impact analysis will be conducted at the CPA level.	The CME will check and ensure that local stakeholder is conducted at the time of start date of CPA or an exemption to be taken from EB. The EIA will be required only if ICS manufactured in host country, however as CME will import ICS, the same may not be applicable and shall be justified in CPA DD.
8	Conditions to provide an affirmation that funding from Annex I Parties, if any, does not result in a diversion of official development assistance	The CME and the CPA operator (in case of being different from the CME) shall confirm that in case of public funding, there is no diversion of Official Development Assistance.	Statement of CME and the CPA Implementer (in case of being different from the CME) on use of ODA. In case of ODA involved in funding or pre-funding parts of a CPA, a confirmation that no diversion of ODA occurs will be provided.
9	Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid- connected/off-grid) and distribution mechanisms (e.g. direct installation)	Distribution mechanisms have been specified in the PoA-DD by means of the "General operating and implementing framework of PoA" at the PoA level. The distribution mechanism is the direct distribution of ICS to the households through the CME or regional partners. The target group is households.	The selected distribution mechanisms included in each CPA are distinguished in each CPA. The same can also be verified by agreements to be signed with ICS users, confirming that traditional wood stoves were used for cooking in the baseline situation and type of user.
10	Where applicable, the conditions related to sampling requirements for the PoA in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities"	Monitoring of all CPAs will adhere to all requirements related to sampling for a PoA in accordance with the sampling guidelines including all annexes and amendments till EB 86 Annex 04.	Specification of the sampling methods applied and compliance with the sampling requirements are established at the PoA-DD. For each CPA-DD Sampling will be undertaken as part of the PoA Sampling Plan, and in the CPA-DD describes how the PoA Sampling Plan is to be applied
11	Approval of CPA by CME	The CME approves each CPA to be included into its registered PoA.	Statement of CME giving approval for the CPA to be included into its registered PoA.
12	CER ownership	End users receiving ICSs under the specific CPA contractually cede their rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC to the CME of the PoA.	A default distribution agreement for end users including the provision that emission reductions generated by the stove are owned by the CME will be provided for each CPA.
13	Awareness and agreement of those operating a CPA on PoA subscription	Contractual provisions to ensure that those operating the CPA are aware and have agreed that their activity is being subscribed to the PoA.	Evidence for inclusion, in case CPA operators are different from the CME: A declaration from CPA implementers, stating that they are aware and have agreed that their activity is being subscribed to the PoA will be provided for each CPA.

14	Exclusiveness of CPA	The CPA shall not be previously: 1. Registered as a CDM project activity 2. Included as a CPA in any other registered PoA, or deregistered as a CPA of a PoA	Confirmation by CME
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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	SDG 13 Ventures Pte Ltd
Country	Singapore
Address	100 Peck Seah Street #10-18 PS100 Singapore 079333
Telephone	+91-9930751591, +65 6962 0655
Fax	--
E-mail	sdg13ventures@gmail.com
Website	www.sdg13ventures.com
Contact person	Ms Neha Juneja

Appendix 2. Affirmation regarding public funding

This PoA has not received public funding from Annex I parties that could result in a diversion of official development assistance.

Appendix 3. Applicability of methodologies and standardized baselines

Please refer PoA DD

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

Please refer PoA DD

Appendix 5. Further background information on monitoring plan

Please refer PoA DD

Appendix 6. Summary report of comments received from local stakeholders

Please refer PoA DD

Appendix 7. Summary of post-registration changes

Not applicable

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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.
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.

<i>Version</i>	<i>Date</i>	<i>Description</i>
04.0	25 June 2014	<p>Revision to:</p> <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	<p>EB 70</p> <p>Revision to reflect changes to the <i>Guideline: Completing the programme design document form for CDM programmes of activities</i> (EB 70, Annex 6).</p>
02.0	13 March 2012	<p>EB 66</p> <p>Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities" (EB 66, annex 12).</p>
01.0	27 July 2007	<p>EB 33, Annex 41</p> <p>Initial publication.</p>
<p>Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: programme of activities, project design document</p>		