



REDUCED EMISSIONS FROM IMPROVED AND EFFICIENT COOKING IN UGANDAN COMMUNITIES



PERSISTENTCLIMATE INDIA PRIVATE LIMITED

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The proposed grouped Project aims to reduce greenhouse gas emissions by distributing fuel-efficient Improved Cook Stoves (ICS) in various regions of Uganda. As per analyses in the Africa Energy Outlook 2019 show, the lack of access to clean cooking remains widespread in sub-Saharan Africa with access increasing only slightly from 15% in 2015 to 17% in 2018¹. Since 2015, only 25 million people have gained access to clean cooking in the region², meaning that the number of people without access increased to over 900 million in 2018³ as population growth outpaced provision efforts. Sub-Saharan Africa is the only region where the number of those without access to clean cooking practices continues to rise, highlighting the urgent need for action.

As a result, the vast majority of people in sub-Saharan Africa rely on gathering biomass for cooking. Particularly so in rural areas, which dramatically damages health and impairs productivity improvements. Almost 500,000 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. Fuelwood from forests and/or other natural areas (e.g., woodlands) containing these resources, requires traditional cooking methods. These traditional cooking devices are referred to as “3 stones”, “triangle iron”, and/or “crude clay-” or “mud-constructions”. Burning fuelwood in such traditional devices is representative for the scenario existing prior to the implementation of the proposed Project.

The proposed Project Implemented by PersistentClimate India Private Limited with local partners in Uganda seeks to increase access of households and communities to improved cookstoves by disseminating Improved Cook Stoves featuring high thermal efficiency and low greenhouse gas emissions. These ICS shall be distributed across the households and communities in Uganda, replacing previously used traditional devices, typically featuring low fuel efficiency and high rates of emissions among not only greenhouse gas emissions but also particulate matter and other emissions detrimental to health and posing risks of fire. The implementation of this Project will result in the reduction of firewood/woodfuel (charcoal) consumption & associated greenhouse gas emissions in a sustainable manner. Project objectives include 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.

¹ Para 1.2.1 Clean cooking, https://iea.blob.core.windows.net/assets/2f7b6170-d616-4dd7-a7ca-a65a3a332fc1/Africa_Energy_Outlook_2019.pdf

² Figure 6.3E ► Côte d'Ivoire fuels and technologies used for cooking, https://iea.blob.core.windows.net/assets/2f7b6170-d616-4dd7-a7ca-a65a3a332fc1/Africa_Energy_Outlook_2019.pdf

³ Page 14, https://iea.blob.core.windows.net/assets/2f7b6170-d616-4dd7-a7ca-a65a3a332fc1/Africa_Energy_Outlook_2019.pdf

As each distributed ICS represents a project unit included in the proposed project, the individual households using the ICS will sign an agreement waiving their rights to carbon credits, acknowledging the same. The project proponent is intentional educating the users of the ICS' regarding its associated economic, social, and environmental benefits. This will help in creating awareness amongst interested stakeholders.

The project primarily targets one cooks improved cookstove per Household; if more than one cook stove is distributed, the same shall be discounted and counted as one.

PERSISTENTCLIMATE INDIA PRIVATE LIMITED (hereinafter called "PersistentClimate") is the project proponent ("PP") for the proposed Project. Persistent Climate is a company registered in India and will facilitate the distribution of the ICS' to households in Uganda (beneficiaries).

PERSISTENTCLIMATE INDIA PRIVATE LIMITED in Uganda will put measures in place to ensure that all requirements with respect to the applied VERRA monitoring methodology of the proposed grouped projects are sufficiently met. Requirements including data, required for accurate and conservative quantification of emissions reductions and other sustainable impacts (SDIs), including but not limited to record-keeping and performing household surveys at a regular intervals, are met.

The estimated annual average GHG emissions reductions through the implementation of the Project is 143,707tCO₂e (rounded down) with a total of 1,437,074 tCO₂e for the entire crediting period.

The first monitoring period for the project is from 02/01/2021 to 31/07/2022. The actual emission reduction achieved during the monitoring period is 147,136 tCO₂e.

1.2 Sectoral Scope and Project Type

Sectoral Scope: 03 – Energy Demand

Project Type: Type II – Energy Efficiency Improvement Project

Grouped Project: Yes

1.3 Project Eligibility

The proposed Project is eligible under the scope of the VCS Program as:

- 1) The proposed Project reduces Kyoto Protocol greenhouse gases, expressed in tCO₂e
- 3) The proposed project activities are supported by a methodology approved under the VCS Program, i.e Energy Efficiency And Fuel-Switch Measures In Cookstoves, VM0050 v1.0⁴

⁴ <https://verra.org/wp-content/uploads/2024/10/VM0050-EE-and-Fuel-Switch-Measures-in-Cookstoves-v1.0.pdf>

The proposed Project is not excluded from the scope of the VCS Program as per Table 1 of VCS-Standard, v4.7.

1.4 Project Design

The proposed Project is designed to allow for the inclusion of additional project activity instances subsequent to project validation. Each ICS represents a project unit provided the ICS is meeting the eligibility criteria for inclusion of additional project activity instances – including but not limited to an efficient and Improved (high thermal efficiency) displacing traditional cooking methodologies/practices to the end users in the host country of Uganda - can be added subsequent to validation. Therefore, the proposed Project is a grouped project.

☒ The project is a grouped project

Eligibility Criteria

The Project is a grouped project. Each new project activity instance will be assessed against the eligibility criteria below:

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1.	Defined geographical boundary	The new project instance boundary shall be confined to national boundaries of Uganda.	Records of household location under the customer registration database. For this instance, records of sales (customer registration database) with clear delineation of project boundary i.e. host country of Uganda is provided to the VVB for their reference.
2.	Conditional to avoid double counting	To prevent double counting of ICSs distributed under the project, ICS shall be uniquely marked, and new project instance implementers shall provide assurances/declarations that they are not included in any other CDM or Voluntary GHG offset	- Unique marking on each ICS (such as a Logo/Serial number or batch number which identifies it as part of the new project instance together with the project database) - Written attestation from the project proponent/implementer confirming that the ICSs distributed in the new project

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
		schemes outside of this project	instance are not part of any other CDM or Voluntary GHG trading scheme. Confirmation that ICSs distributed do not belong to project activities or instances that leave one VCS project and subsequently enroll in another VCS project.
3.	The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications	All technologies implemented in the project must demonstrate a minimum thermal efficiency of 25%.	- Thermal efficiency test results and/or an Independent Third-Party lab testing certificate in accordance with sample testing requirements in line with applied methodology demonstrating thermal efficiency greater than baseline device efficiencies (over 25%) in accordance with efficiency testing measures stipulated under VERRA applied methodology. - Product description and specifications which includes WBTs/Manufacturer's efficiency undertaken for each type of stoves. For this instance, lab test efficiency certificate or Technical Specifications for model distributed under this instance clearly showing the efficiency above baseline devices efficiency will be submitted to VVB.
4.	Additionality	The new instance shall adhere the additionality requirements of the VM0050.	The additionality demonstration as per the VM0050 shall be established by each instance, the evidence of same shall be furnished to the VVB.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
5.	Baseline	The new instance shall adhere the baseline requirements of the VM0050.	Baseline scenario assessment shall be part of each instance and adhere the requirements of VM0050. The baseline values shall be part of VVB validation.
6.	The conditions that ensure that new project instances meet the requirements pertaining to the demonstration of additionality in VCS Standard.	The additionality shall be demonstrated as per the provisions laid down in methodology VM0050.	There is no mandatory legal requirement for installation of cookstoves in households/ institutions of Uganda. The evidence of applicable policies shall be submitted to VVB. Additionality has been demonstrated as per the provisions laid down in methodology VM0050 Refer section 3.5 for further substantiation.
7.	Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance	Under this project, new project instance operators shall be required to provide an affirmation that funding from annex I parties, if any, does not result in a diversion of official development assistance	Individual new project instance operators shall sign ODA declarations for new project instances implemented by them to attest that no funding from annex 1 parties that leads to diversion of ODA has been used in the project. the statement shall specify whether or not annex 1 funding is used within the project where funding is sought from annex 1 parties the ODA declaration shall be supported by details regarding annex 1 funding that affirms that the funding doesn't divert ODA For this project activity instance, no funding from Annex-1 parties is received and hence, no ODA declaration is required.
8.	The Group project-specific requirements stipulated by the project proponent including any conditions related to undertaking local	The local stakeholder consultation will be conducted at the initially during the group PD level. Each new project instance/project will be implemented in similar	The conditions to meet the requirements on undertaking the local stakeholder consultation have been proven in section further sections of this PD. The conditions to meet the requirements on undertaking the

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
	stakeholder consultations and environmental impact analysis	social economic situations. The key stakeholders of the program both at group project activity and new project instance level are the same. No further actions needed at the new project instance level to satisfy the eligibility criteria.	environmental impact assessment have been proven in the group Project.
9.	Where applicable, the conditions related to sampling requirements for the group project in accordance with the “Standard for sampling and surveys for CDM project activities and programme of activities”	Monitoring of all new project instances will adhere to all requirements related to sampling for a group project activity in accordance with the sampling guidelines, i.e. Guideline “Sampling and surveys for CDM project activities and programmes of activities”, version 04.	Specification of the sampling methods applied and compliance with the sampling requirements are established at the group Project For each new project instance, sampling will be undertaken as part of the group project activity sampling plan, and in the new project instance-PD describes how the group project activity sampling Plan is to be applied For this instance, sampling plan is described in sections 5.3 of this document.
10.	Approval of new project instance by project proponent	The project proponent approves each project instance to be included into its registered group project activity.	Statement of project proponent giving approval for the new project instance to be included into its registered group project activity. Since, for this instance project proponent is the implementer, no further approval is required, however for the cases, where implementer other than PP, an approval on the same shall be given by PP in order to include the instance into this grouped project.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
11.	VER ownership	End users receiving ICSs under the specific new project instance contractually cede their rights to claim and own emission reductions under the VCS to the project proponent of the group project.	A default distribution agreement for end users including the provision that emission reductions generated by the stove are owned by the project proponent will be provided for each new project instance. Waiver of carbon credits from the end users are submitted to the VVB for this instance.
12.	Start Date of the New Instance	All future instances shall have the start date after the date of first instance.	The evidence to support the start date of future instances shall be furnished to VVB.
13.	<u>Applicability</u> of VCS methodology	All future instances shall fulfill the all-applicability criteria of VCS methodology VM0050.	The justification shall be part of 'Monitoring Report' during the first time inclusion of any new instance.
14.	Awareness and agreement of those operating a new project instance on group project subscription	Contractual provisions to ensure that those operating the new project instance are aware and have agreed that their activity is being subscribed to the new project instance.	Evidence for inclusion, in case new project instance operators are different from the project proponent: a declaration from project proponent/implementer, stating that they are aware and have agreed that their activity is being subscribed to the group project will be provided for each new project instance. Since, for this instance, project proponent is the only implementer, no further requirements related to awareness and agreement on their instance to be subscribed under this grouped project, however, for the cases, where implementer other than PP, an agreement on the awareness between PP and new instance implementer shall be furnished.

1.5 Project Proponent

Organization name	PERSISTENTCLIMATE INDIA PRIVATE LIMITED
Contact person	PRAKASH KUMAR MISHRA
Title	Mr.
Address	K- 255, Pocket K Sarita Vihar- New Delhi-110076 India
Telephone	+91- 9811905234
Email	prakashpure@gmail.com p.mishra@persistentclimate.com admin@persistentclimate.com

1.6 Other Entities Involved in the Project

Organization name	EZYLIFE HOLDINGS LTD
Contact person	Lister Byamugisha
Title	Mr.
Address	Kapchorwa, Uganda
Telephone	+256 787818792
Email	lbyam@ugezylife.com

1.7 Ownership

The Project is owned by 'PersistentClimate India Private Limited' (hereafter PersistentClimate) in accordance with the VCS Program specifications on project ownership. This entails that the legal right to control and operate the project activities lies with 'PersistentClimate' and that beneficiaries shall be informed that their ICS is included in the proposed Project as a unique project activity instance upon which the same beneficiary shall wave his/her rights to VCUs resulting from the adoption of the project activity instance. The manufacturers of the ICS and local partners shall also not claim any GHG benefits from the projects under this grouped project.

Agreement/Declaration to this effect shall be signed by the respective party/ies.

1.8 Project Start Date

02/01/2021, the start date, is the date on which the first ICS was distributed under the project.

1.9 Project Crediting Period

02/01/2021 to 01/01/2031, ten year fixed crediting period.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

The estimated annual GHG emissions reductions of the Project are:

√ 100,001 – 1,000,000 tCO₂e/year

In line with the definitions of Project with respect to scale, the indicated scale is applicable:

Project Scale	
Project	X ⁵
Large project	

The estimated GHG emissions reductions throughout the project crediting period are depicted in the table below:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
1.	38,169
2.	124,574
3.	159,291
4.	159,291
5.	159,291
6.	159,291
7.	159,291
8.	159,291
9.	159,291

⁵ Values lesser than 300,000 tCO₂e/year

10.	159,291
Total estimated ERs	1,437,074
Total number of crediting years	10
Average annual ERs	143,707(Rounded down)

1.11 Description of the Project Activity

The proposed grouped Project is the distribution of improved Cookstoves (ICS) among households and communities in Uganda with the objective to displace traditional, unimproved cookstoves (in the case of charcoal) and open fires for cooking. The ICS are mainly manufactured/assembled locally in Uganda. The project technology under the (improved cookstoves) proposed grouped project has an average lifespan of 7 years and minimum thermal efficiency of 25%. These ICS' are designed to improve combustion efficiency when compared to the traditional methods of cooking and devices deployed for cooking, and to reduce heat loss with highly improved combustion efficiency by enabling regulation of the oxygen/air supplied to the chamber to ensure better burning (complete combustion means less CO and other side-emissions and thus, more health benefits as well). Moreover, the design of these ICS' *result in the reduction of* particulate matter and carbon emissions. The ICS' manufactured currently and envisaged for inclusion under the proposed Project instances are made up of a fuel chamber for combusting the woody biomass (firewood and charcoal). The pot rest is above the fuel chamber.

The ICS' distributed and/or will be distributed/implemented under the proposed Project are flexible in terms of their designs and models; however, CME/PP will continuously be focused on design improvements to benefit the end users in all aspects including, faster/efficient cooking, safety from shoot/smoke emission, less fuel consumption and thus money savings etc. This will be assessed and implemented by the CME with the local manufacturer/assembling partners/suppliers. As such the Project is not limited to the distribution of a specific ICS model or type throughout the crediting period, however, all ICS' must comply with the eligibility criteria as stipulated in section 1.4 of this PD. Regardless of new insights into ICS' design improvement, any ICS model included in the Project will remain valid in terms of generating carbon offsets and other co-benefits as mentioned above throughout the lifetime of the project period until the CME/PP is unable to move with monitoring and verification of the grouped project due to unforeseen events i.e. carbon market situation.

Each distributed ICS can be traced throughout the project's crediting period as every ICS under the project is allocated with a unique serial number which can be further back traced in a central/master database and maintained by the PP. A record-keeping system and unique identification of the ICS will be maintained by the CME, including the user's information collected through the Beneficiary Agreement and compiled in ICS distribution records. This will include, among others username, identification number and address/location of the user, stove

unique serial number and date of distribution. The record keeping system will ensure that each ICS can be traced to appropriately monitored throughout the crediting period and also to avoid any double counting. The instance is planned to distribute 50,000 ICS in phased manner. In first phase total 12,500 stoves are planned to be distributed and in 2nd phase remaining 37,500 will be distributed.

The group project under the first instance will distribute the following three models of stoves:

- I. *Burn Kuniokoa Cookstove (Wood Fired)*
- II. *Burn Jikokoa (Charcoal Fired)*
- III. *MASUPA STOVES (Charcoal fired)*

Fig. 1 Photo of Classic Burn Stove



Table 1: Pot Dimensions.

Component/Dimension	Measurement
Diameter of pot	32 cm
Height of pot	13 cm
Thickness of pot	1 mm
Weight of pot	408 gm

BURN WOOD STOVE



Fig 1: Burn Kuniokoa Cookstove sample

Table 2:

Technical Specifications:

Stove Manufacturer	BURN
Stove Model	Kuniokoa
Stove Type	Natural draft, Side-Feed Semi-Gasifier Stove
Materials	
Stove Body	CRCA Carbon Steel painted high gloss black epoxy powder coat
Pot Rest	StainlessSteel
Burning Chamber	StainlessSteel
Fuel FeedingDoor	StainlessSteel
Stick Shelf	CRCA
Legs	Aluzinc



Figure: Masupa Size 1 Model

Table :3

TECHINICAL SPECIFICATIONS

1.0.	Stove Technical Specifications	
1.1	The stove metal frame is made out of a 28gauge iron sheet	Height: 23cm
1.2	Weight	9kg
1.3	Inner insulation	Light weight ceramic liner
1.4	Briquette and charcoal grate/grill	Reinforced with Ceramic perforations
1.5	Type of fuels/feedstock suitable for the stove	Briquettes, and Charcoal
1.6	Bottom	Made out of a 30gauge soft galvanized iron sheet reinforced made of a grog and cement slab
1.7	Cooking pot socket	Can accommodate house hold cooking pots of diameter 20cm to 25cm
1.8	Technical Specifications: Stove Efficiency, Emissions and Safety	
2.0	Thermal efficiency	38.2% thermal efficiency
2.1	High power PM _{2.5}	8mg/MJ
2.2	High power CO emissions	9g/MJ
2.3	Safety ratings	88%
2.4	Minimum temperature for stove surface	24°C

Type of Stove	Average Tested Initial Efficiency
Burn Jikokoa Model	53.7%
Masupa Model	38.2%
Kuniokoa Model	42.40%

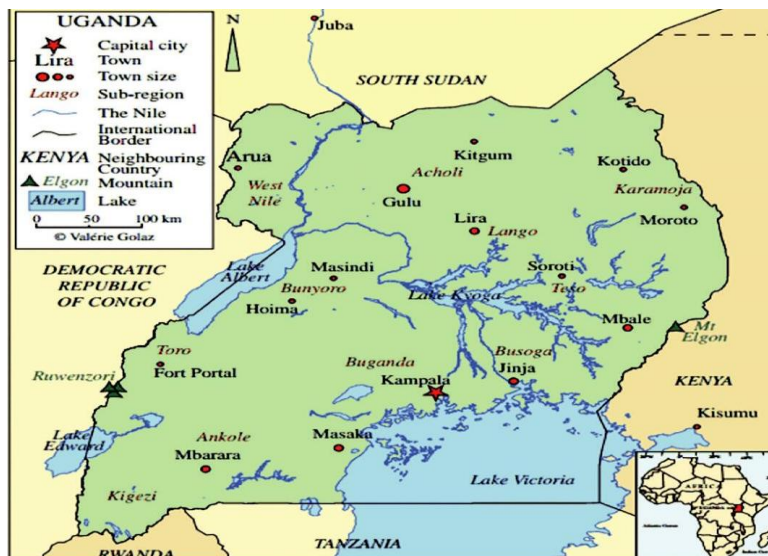
The project participant will either distribute/replace the ICS after the end of lifetime of each model or will not claim the ERs after the end of lifetime. The lifetime is mentioned under the section 5.1 under data/parameter available at the time of validation.

The project has the following target of intended distributions:

Phase-I	Year-1	12,500	ICS
Phase-II	Year-2	37,500	ICS

1.12 Project Location

The geographic boundaries, within which project technologies (ICS) shall be distributed are the political boundaries of the Host Country of Uganda. The physical location of each device/ICS distributed as a project activity instance under the proposed grouped Project will form the actual project activity instance boundary. Program/group project put provision to capture each ICS location distributed under the proposed Project will be kept and maintained by the grouped project proponent.



Geo-coordinates for Uganda:

Latitude	Longitude
1.373333 N	32.290276 E
1° 22' 23.9988" N	32° 17' 24.9936" E

At the time of first verification the following districts cover the distribution:

1. Mbale:

Latitude	Longitude
1° 04' 55.52" N	34° 10' 30.11" E

2. Jinja:

Latitude	Longitude
0° 26' 20.47" N	33° 12' 11.41" E

3. Tororo:

Latitude	Longitude
0° 41' 34.76" N	34° 10' 51.06" E

4. Wakiso:

Latitude	Longitude
0° 24' 15.98" N	32° 27' 33.98" E

5. Sironko tc:

Latitude	Longitude
1° 13' 60.00" N	34° 14' 60.00" E

6. Kampala:

Latitude	Longitude
0° 18' 58.61" N	32° 34' 55.88" E

7. Manafwa:

Latitude	Longitude
0° 57' 04.3" N	34° 16' 27.6" E

1.13 Conditions Prior to Project Initiation

The purpose of the project activity is to reduce the demand for non-renewable biomass for household cooking needs and also to promote efficient cooking in order to avoid harmful emission due to unimproved cooking in the Ugandan communities. Majority of households living in the rural and peri-urban areas of Uganda still use traditional biomass cookstoves and open fire cooking systems. The proposed grouped project focus on to introduce efficient and improved cooking practices reduces harmful CO, CO₂, particulate matters, shoots and fire which intern improve the environmental, health, social and economic burdens to the end users primarily caused due to inefficient cooking combustion of biomass for cooking (please Refer Section 3.4; Baseline Scenario)

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The PP confirms that the proposed project activity and all the actions taken as a part of the project activity are voluntary and coordinated action. A review of the national energy policies of the country shows that there are no mandatory laws, policies or requirements mandating the use and distribution of Improved and Efficient Cookstoves.

Uganda's Renewable Energy Policy was adopted in 2007 whose targets were to increase the rate of adoption of efficient charcoal stoves from 20,000 in 2007, to 2,500,000 by 2017 in urban areas and efficient fuel wood stoves from 170,000 in 2007, to 500,000 by 2012 and 4,000,000 by 2017. In addition, the policy was to offer training opportunities for artisans at the village level for the manufacture, installation and maintenance of efficient cooking stoves. However, the current status of how much has been achieved is unknown. The country has not had the financial and technical support, nor created the enabling conditions required to attract the level of private investment needed to create a thriving market for clean cookstoves and fuels. The policy⁶ doesn't mandate the households to purchase the improved cookstoves and does not enforce the implementers too.

1.15 Participation under Other GHG Programs

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

The Project has not been registered or is not currently seeking registration under any other GHG programs. The project has not participated under any other GHG program.

1.15.2 Projects Rejected by Other GHG Programs

The Project Participant hereby declares that any other GHG program has not rejected the project activity; an undertaking for the same has been submitted by the Project Participant.

⁶ <https://s3-eu-west-1.amazonaws.com/s3.sourceafrica.net/documents/118159/Uganda-Renewable-Energy-Policy.pdf>

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The Project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading.

1.16.2 Other Forms of Environmental Credit

The Project has not sought or received another form of GHG-related credit, including renewable energy certificates.

1.17 Sustainable Development Contributions

1.17.1 Sustainable Development Contributions Activity Description

The following sustainable development benefits are expected to be envisaged from the project activity:

- Distribute 50,000 ICS' in Uganda, benefitting more than 50,000 individuals from clean, efficient/improved and affordable energy (SDG 7.1.2) in phase manner.
- Reduces the total biomass usage in the project area to generate approximately 3.5 million tCO_{2e} of emission reductions. (SDG 13; and SDG 7).
- Significantly reduce Indoor/Household Air Pollution (HAP) in the households due to reduced exposure to PM and/other emissions (SDG 3.9.1)
- Reduction of respiratory disease, due to improved combustion efficiency and consequently less fumes, such as Chronic Obstructive Pulmonary Disease (COPD) among adult family members, particularly women and the elderly. (SDG 3.4.1)
- Reduce the risk of mortality among infants and children under five years of age due to (1) acute lower respiratory illnesses (ALRI), such as pneumonia and bronchitis, the cause of mortality in 12% of children under five, and (2) burns resulting from children falling into open cooking fires. (SDG 3.2.1, 3.2.2) and risk of fire due to open and shoot production in inefficient cooking ways.
- Reduces the proportion of time generally women spend on unpaid domestic work related to collection of firewood, and cooking meals on inefficient traditional cookstoves which is generally slower in cooking meals and thus more time for cooking. (SDG 5.4.1)
- Fuel/money savings to the households and communities due to less fuel/biomass consumption.

1.17.2 Sustainable Development Contributions Activity Monitoring

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
------------	------------	---------------	-----------------------------	-------------------------------	-------------------------------------

1)	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	3.9.1 Mortality rate attributed to household and ambient air pollution	The efficient cook stove leads to a reduction in fuel consumption and as a consequence to an improvement in indoor air quality. This has positive impacts on decreasing in health-related issues like respiratory problems, eye and throat irritations. The relevant indicator is: Mortality rate attributed to household and ambient air pollution.	The contribution to SDG 3 is calculated as the number of households confirming improvement in air quality. To collect information on the improvement of air quality, the Monitoring Kitchen Survey includes 2 questions related to that topic: Do you think there is any difference in how much smoke is produced by the improved stove compared to the 3-stone fire? Do you think the improved stove produces more or less smoke than the 3-stone? The share of households confirming less smoke by the improved stove in the Monitoring Kitchen Survey will be multiplied with the number of stoves disseminated under the specific VPA and will result in the number of households confirming improvement in air quality.	Mortality rate attributed to household and ambient air pollution
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				$S_{\text{(less smoke)}} = S_{\text{install}} \times [HH]_{\text{(less smoke,y)}} \times U_{\text{(p,y)}}$ $S_{\text{less smoke}}$ No of households with improved in-air quality S_{install} Number of stoves installed $HH_{\text{less smoke,y}}$ Share of households confirming less smoke through improved stove $U_{\text{p,y}}$ Usage rate in year y	
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2)	5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate	5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age and location	Women and girls perform the majority of unpaid domestic work. This leaves them with less time to rest, study and realise their economic potential, leaving them in time poverty. In regards to time, women are poorer than men as unpaid domestic duties, such as collecting firewood, must be added to their market productive work, making time much scarcer. Women are widely recognized as being principally responsible for natural resource collection. These trends demonstrate that reducing the amount of firewood required by households has the potential to reduce the time poverty of women, because the time burden of collecting firewood, which falls disproportionately on women, will be reduced. The average % decrease per household in time spent gathering firewood will be	The overall reduction in time spent collecting firewood by the project activity are then calculated as follows: $TR_y = (T_{b,y} - T_{p,y}) / T_{b,y}$ Where: TR_y = Total reduction time spent collecting firewood for project activity in year y (%) $T_{b,y}$ = Baseline time spent collecting firewood per household per day (hours) $T_{p,y}$ = Project time spent collecting firewood per household per day (hours)	Reduction in time spent collecting fuelwood from the forests.
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			taken as a proxy contribution towards the SDG target.		
3)	13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	GHG Emissions measured in tons CO2	Implemented activities to increase	The emission reductions will be quantified as per the methodology applied.	GHG Emissions measured in tons CO2
4)	7.3: By 2030, double the global rate of improvement in energy efficiency	Number of project households predominantly using clean cooking devices such as Improved Cook Stoves.	For this project, the baseline scenario is the number of households using traditional cook stoves. This project increases the adoption rate of efficient cookstoves.	The outcome of SDG 7 will be measured by the number of efficient cookstoves distributed during the project.	Number of project households predominantly using clean cooking devices such as Improved Cook Stoves.
5	8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries.	monitory saving after implementing energy efficient stove.	The survey will be undertaken to arrive the figure of monitory saving after implementing energy efficient stove.	The outcome of SDG 8 will be measured by survey.	Monitory saving will be monitored through the project survey.

1.18 Additional Information Relevant to the Project

Leakage Management

Not applicable as the project adopts a adjustment factor of 95% to account for leakage.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

Further Information

Not Applicable

2 SAFEGUARDS

2.1 No Net Harm

No potential negative environmental or socio-economic impacts have been identified for the project. The project involves the distribution and installation of improved cook stoves to households in Uganda which currently use mostly traditional open fire for cooking. The activities under the proposed project promote improved cook stoves that result in reduced fuel consumption and emissions due to cooking and heating water in homes. The ICS used in this project have characteristics that improve the efficiency of combustion and thermal transfer to the pot compared with three-stone fires or traditional pot support. Furthermore, traditional cooking methods involve open fires that result in the emissions of local pollutants such as carbon monoxide and particulate matter in often poorly ventilated rooms, which lead to respiratory problems. In addition, open fires are frequent causes of burns and other injuries. Switching from fireplaces to ICS reduces the incidence of such injuries and health problems. Therefore, the ICS installed under this project presents positive environmental impacts wherever they are applied, and no negative environmental impacts have been identified.

2.2 Local Stakeholder Consultation

The Local Stakeholder meeting was conducted physically on the 06th of June 2022. The invitations were sent out on email and the newspaper advertisements were published on 09-May-2022. This ensured that the project adhered to the criteria of giving reasonable time notice to stakeholders invited. Stakeholders were chosen in such a manner that they represent the various fields e.g. the experts of climate change, cookstoves, consultants, NGOs including the potential users. The minutes of the meeting were recorded by the project participant. The meeting invitation through the newspaper is presented here. The further details of local stakeholder meetings i.e. Minutes, photographs inter alia are presented in Appendix 1. The local stakeholders will be further engaged during the verification. The implementers shall keep the provisions of input register at local site. The stakeholders shall be encouraged to provide ongoing feedback/grievance as part of continuous ongoing stakeholder communication. The stakeholders shall be communicated through the house visits. A register will be placed at the office of distribution partners.



JOB MART Monday, May 9, 2022 **N 53**

EMPLOYERS OUGHT TO STIPULATE WORK, HOURS AND OVERTIME FOR EMPLOYEES

Where the employee exceeds the working hours agreed with the employer (8 hours per day/48 hours per week or 10 hours per day or 56 hours per week), the employee will be entitled to overtime.

The employer should have in place guidelines that the employee will have to fulfill before being entitled to overtime, for instance, work in excess of the working hours has to first be approved by the line manager before it is performed.

The overtime may be monetary or an employee can be given alternative time/day with pay, in compensation for the overtime worked.

Where the employee has been given an alternative day of rest, the employee should agree with the immediate supervisor on the particular day or time. The employer should endeavour that this is applied for in writing.

The writer is the executive director Federation of Ugandan Employers

BETWEEN THE LINES

The provisions of the job description should be reduced to key performance indicators that are quantifiable and measurable.

There are a number of issues related to the duty of the employer to provide work, working hours and overtime. Some of these issues have emerged due to the rapidly changing world of work. The employer should stipulate the duty to provide work through issuing employee with a job description for the particular position. The HR team should at all times ensure that the job description is updated and sent to the organisation's database. In addition, the employer should take care of the job description provision "... to mean such duties and responsibilities that are assigned to you (employee) from time to time to fulfill the purpose of the position. The provisions of the job description should be reduced to key performance indicators that are quantifiable and measurable at the period within which they apply. The key performance indicators should be signed by the employee and employer's representative i.e. immediate supervisor. There should also be regular performance appraisal conducted by the supervisor in line with the set key performance indicators. However, the employer's duty to provide work may be done away with in case of natural calamity, act of God, instances of industrial action and civil strife, among other circumstances, that may make the employer reasonably unable to provide work. This, therefore, should be documented in the employer's HR policy manual. The employees' employment contracts should be amended in case any of the above circumstances occur. Once an employee has been assigned duties and responsibilities, it is also incumbent upon the employer to have in place working hours in the employees' employment contracts. Where an employee works over and above the stipulated working hours, overtime will be applicable. The employer should specify the employee's working hours in writing. The maximum working hours are eight per day, with a lunch break inclusive, for instance, 8:30am-5:00pm. This translates into 48 hours a week. Flexible working arrangements may also be considered. The employer and employee may agree that the working hours should be more than eight per day in writing and signed by both parties. Where this is agreed, the employer should endeavour that the payment is commensurate to the hours worked. In case the employer operates in shifts (day and night), he may agree with the employee that the working hours are 10 per day or 56 hours per week.

ezy life

INVITATION

To an upcoming local stakeholder consultation on the voluntary carbon emission reduction project by PersistentClimate, India and EzyLife, Masaka Enterprises, Uganda, titled:

"Reduced Emission from Improved and Efficient Cooking in Ugandan Communities"

Dear Stakeholder,

You are kindly invited to participate in a stakeholder consultation meeting. PersistentClimate is developing a new carbon emission reduction project under the voluntary Carbon Standard (VCS).

Reduced Emission from Improved and Efficient Cooking in Ugandan Communities. The project will distribute efficient/improved cookstoves (ICS), to domestic households and communities in Uganda that are reliant on biomass with inefficient cooking practices.

We strive to develop projects aligned with the UN Sustainable Development Goals that are relevant and beneficial to the local community and the natural environment through the continued input of local stakeholders.

Your feedback is important to us and, for your convenience, can be submitted via email through Byem@ezylife.com or Call 0787818792 / 0706198589 / 0774021339

Date: 6th June 2022
Time: 8:00am
Venue: Mukwano Suite

Please contact us for more information:
EzyLife Kampala CID 124/19 Address: +256787818792 Email: Byem@ezylife.com

2.3 Environmental Impact

No negative environmental impacts have been identified from the project and an environmental impact assessment (EIA) is not required for the project.

There are no major impacts on the environment due to the installation of the ICS. The local ecology is not likely to get impacted by this type of grouped project activities. The group activity included under this group project helps in reducing the consumption of the non-renewable biomass, thus, reducing the pressure on forest, reduction in indoor air pollution and other co-benefits e.g. good health impacts by improved cooking practices, reduced emissions of GHGs including particulate matters and preventing any fire thus, having positive environmental impacts.

2.4 Public Comments

There were no comments received during the 30 days listing period. The VCS PD was open for the public comment for 30 days period (22 July 2022 – 21 August 2022) on VCS registry.

2.5 AFOLU-Specific Safeguards

This section is not applicable as the project is a non-AFOLU project.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Following approved baseline & monitoring methodology is applied.

Methodology: VM0050- Energy efficiency and fuel-switch measures in cookstoves, Version 1.0.

Tools: “TOOL30: Calculation of the fraction of non-renewable biomass”; Version-03, EB 108, Annex 11

3.2 Applicability of Methodology

The table below demonstrates and justifies how the Project meets each of the applicability conditions of the methodology, and tools applied by the project.

Methodology ID	Applicability condition	Justification of compliance
VM0050	1) The project activity corresponds to: a) Replacement of non-renewable biomass (e.g., firewood, charcoal)-fired cookstoves with any of the following:	The project involves replacing traditional, non-renewable biomass-fired cookstoves (e.g., firewood, charcoal) with more efficient cookstoves

	i) More efficient project devices that use the same fuel as in the baseline; ii) Efficient project devices fired by renewable biomass or bioethanol; iii) Efficient project devices fired by liquefied petroleum gas (LPG); or iv) Electric-powered project devices. b) Replacement of solid or liquid fossil fuel (e.g., coal, kerosene)-fired cookstoves with any of the following: i) Efficient project devices fired by renewable biomass or bioethanol; ii) Efficient project devices fired by LPG; or iii) Electric-powered project devices.	that use the same fuel. The new Improved cookstoves have higher thermal efficiency, reducing fuel consumption and emissions.
	2) Project devices are used in households, communities, institutions, or small or medium enterprises (SMEs), collectively referred to in this methodology as the “target population.	The project activity instances are ICS designed to be used for cooking in domestic premises, or in community-based kitchens. The project targets households, community-based kitchens, institutions (e.g., schools) or small and medium-sized enterprises (SMEs) only in Uganda. The improved cookstoves distributed to these groups, ensuring that the project addresses the energy needs of the target population and contributes to reducing emissions and

		improving efficiency in cooking practices
	3) Where renewable biomass is used, it is exclusively renewable and qualifies as one of the following: a) A by-product, residue, or waste stream from agriculture, forestry, and related industries; or b) Originating from dedicated plantations that comply with all relevant applicability conditions in the most recent version of CDM TOOL16.	Not Applicable. The project does not use renewable biomass from agricultural by-products, residues, or waste streams, nor does it use biomass from dedicated plantations.
	4) Where biomass residues are used, they would have been left to decay or burned without energy recovery before implementation of the project activity, and their use does not involve a decrease in carbon pools – in particular of dead wood, litter, or soil organic carbon – on the land areas from which the biomass residues originate.	Not Applicable. The project does not involve the use of biomass residues, as it focuses on the distribution of improved cookstoves that use non-renewable biomass like firewood and charcoal.
	5) Where biomass residues from a production process are used, project implementation does not result in an increase in the processing capacity of raw input or any other substantial changes (e.g., product change) in this process.	Not Applicable. The project does not involve the use of biomass residues from a production process.
	6) Where more than one type of renewable biomass is used, each of the biomass types used complies with the applicability conditions. Note – Renewable biomass may be processed into fuels, such as briquettes, wood chips, or charcoal.	Not Applicable. The project does not use renewable biomass in any form, including processed fuels like briquettes, wood chips, or charcoal. It focuses on improved cookstoves that use non-renewable biomass

		(firewood and charcoal) and does not involve multiple types of renewable biomass.
	7) Where project activities introduce renewable biomass as charcoal, it is renewable charcoal produced by efficient charcoal production processes ⁶ (e.g., retort sedentary kilns, improved sedentary kilns, Casamance kilns). Methane produced during the charcoaling process is captured and destroyed or combusted for energy purposes	Not applicable. The project does not introduce renewable biomass as charcoal nor involve the production of renewable charcoal through efficient processes. The project focuses on the distribution of improved cookstoves using non-renewable biomass like firewood and charcoal, without any involvement in charcoal production or methane capture during the charcoaling process.
	8) Project devices using renewable biomass (fuel-switch) or non-renewable biomass (improved efficiency) are single-pot, multi-pot portable, or in-situ cookstoves with an initial thermal efficiency of at least 25%.	The manufacturer's specifications shall indicate the thermal efficiency of each ICS. Only ICS' with a high-power thermal efficiency of at least 25%, with input fuel as firewood and charcoal. The initial ICS models at the time of grouped project validation distributed: 1. Burn Kuniokoa (wood fired stove) 2. Burn Jikokoa (Charcoal Fired stove) 3. Masupa (Charcoal Fired Stove)

		However, moving forward other ICS models can be included. The initial efficiencies of each model are tabulated below and demonstrated that each model under this group project meets the requirement of minimum efficiency: <table><tr><th>Type of Stove</th><th>Average Tested Initial Thermal Efficiency</th></tr><tr><td>Burn Jikokoa Model</td><td>53.70%</td></tr><tr><td>Masupa Model</td><td>38.20%</td></tr><tr><td>Kuniokoa Model</td><td>42.40%</td></tr></table>	Type of Stove	Average Tested Initial Thermal Efficiency	Burn Jikokoa Model	53.70%	Masupa Model	38.20%	Kuniokoa Model	42.40%
Type of Stove	Average Tested Initial Thermal Efficiency									
Burn Jikokoa Model	53.70%									
Masupa Model	38.20%									
Kuniokoa Model	42.40%									
	9) Project devices using LPG or bioethanol are single-pot, multi-pot portable, or in-situ cookstoves with an initial thermal efficiency of at least 30%.	Not Applicable. As project activity does not include LPG or bioethanol.								
	10) Electric project devices meet the maximum risk factor score of 15 on the Cookstove Durability Protocol and have the following minimum thermal efficiency: a) Hot plates and electric hobs: 40% b) Induction stoves and other electric stoves: 70%	Not Applicable. As project activity does not include any Electric project devices.								

	11) Project devices using LPG comply with all of the following conditions: a) The baseline fuel either includes non-renewable biomass or is a more carbon intensive fossil fuel (demonstrated by the baseline survey, see Section 6.2); b) The project has a provision for metering LPG supplied to each consumer at the LPG filling station, in order to determine household LPG consumption; and c) The project does not seek to issue any carbon credits for periods after 31 December 2045.	Not Applicable. As project activity does not include LPG Project devices.
	12) Electric project devices use the following electricity sources: a) Decentralized renewable energy systems: Decentralized energy systems using fossil fuels are not eligible, except for backup generators that supply less than 1% of the annual electricity of the decentralized renewable energy system. b) Self-generated renewable electricity (with a maximum of 20% electricity from non-renewable sources for backup); or c) National or regional electricity grid.	Not Applicable. As project activity does not include any Electric project devices.
	13) The project proponent designs incentive mechanisms to reduce the use of inefficient baseline devices and practices that can be replaced by the project devices and describes these mechanisms in the project description.	The project includes the design of incentive mechanisms, such as distributing the improved cookstoves (ICS) at a very subsidized price to the end users.

	14) Where a project device has ended its technical life, the project proponent either replaces it with a comparable or better project device or retrofits its essential components to continue meeting the minimum service level requirements (i.e., thermal energy generation), otherwise no further emission reductions may be claimed for the project device.	The operating lifetime of the improved cookstoves (ICS) is 7 years as per the manufacturer specification. After this period, the cookstoves will be replaced with comparable or better devices to ensure that they continue to meet the minimum service level requirements, such as thermal energy generation.
	15) Project proponents implement a method for the distribution and identification of project devices that avoids double counting of emission reductions by other mitigation actions and includes unique product identification on the stove itself at the time of distribution/sale (e.g., program logo, alpha/numeric ID, and end-user location, such as geographic coordinates, complete address information).	Each ICS shall be allocated a unique serial number. These serial numbers are captured in a central master database together with the end users/beneficiaries' details characteristics such as the address of the end user, date of distribution of ICS and their contact details as much as possible, results from surveys, etc. This record keeping system will ensure that each ICS can be traced, and double counting can be avoided.
	16) The project complies with any national, sub-national, or local regulations or guidance for the installation, commercialization, distribution, and use of improved cookstoves and/or fuel supply and use for the target population. National, regional, and local regulatory frameworks for the provision of the type of	There is no specific national regulatory framework in place for the installation, commercialization, distribution, and use of improved cookstoves (ICS) in Uganda.

	thermal energy services provided by the project activity must be documented.	
	17) Where project activities reduce emissions from non-renewable biomass, including firewood and charcoal, the risk of double counting is assessed on a national basis by evaluating at validation and crediting period renewal whether there are REDD+ projects or jurisdictional REDD+ programs whose project boundary overlaps with the expected fuel source area of the project. The project proponent must report on the findings of this assessment for informational purposes in the project description.	The improved cookstoves (ICS) are distributed to end users in Uganda, and the areas where they are distributed do not overlap with any REDD+ projects or jurisdictional REDD+ programs ⁷ .

Tool 30, version 3.0: Calculation of the fraction of non-renewable biomass, may be used by: (a) DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or (b) project participants to calculate project- or PoA-specific f_{NRB} values.	Option (b) applied to calculate the project specific f_{NRB} value as described under section 4.1 of the PD.
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3.3 Project Boundary

The project boundary is the physical, geographical site of the improved and efficient cookstoves that utilize biomass in the various districts of host country of Republic of Uganda.

The project boundary is shown in the map for the grouped project:

⁷ <https://www.reddprojectsdatabase.org/category/project/?country=uganda>



Source		Gas	Included?	Justification/Explanation
Baseline	Thermal energy generation	CO ₂	Yes	Major source of Emission
		CH ₄	Yes	Major source of Emission
		N ₂ O	Yes	Major source of Emission
Project	Thermal energy generation	CO ₂	Yes	Major source of Emission
		CH ₄	Yes	Major source of Emission
		N ₂ O	Yes	Major source of Emission

According to applied methodology the spatial extent of the project boundary is the project boundary includes the project devices, the geographical site where they are located, and the locations from which baseline and project fuels are sourced. Also, as per methodology prescription a adjustment factor (i.e. default value of 0.95) has been considered in the grouped project 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.

The project will be located within the boundary of Republic of Uganda. Refer Section 1.12 of this document.

Baseline Scenario: Continuation of the current situation, i.e. use of nonrenewable biomass as fuel for the existing, less efficient thermal applications.

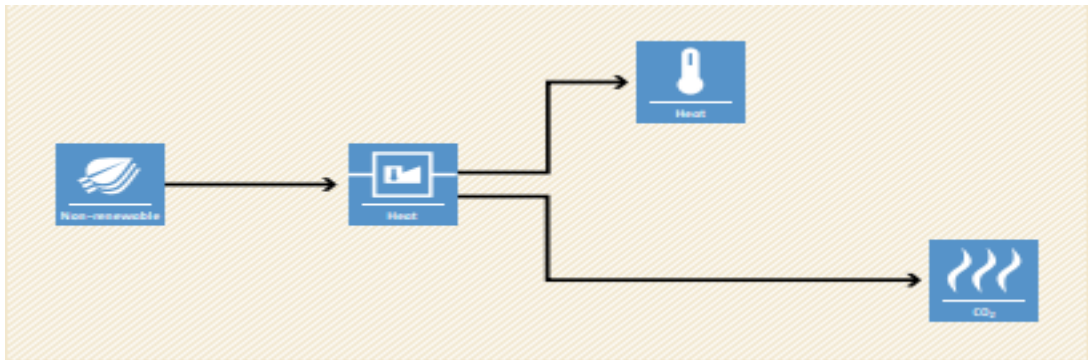


Fig: Baseline Boundary highlighting the usage of traditional cook stove

Project Scenario: Installation of more-efficient thermal energy generation units utilizing nonrenewable biomass and/or complete replacement of existing less-efficient thermal applications and/or retrofitting of existing thermal energy generating appliances reduces GHG emissions by saving nonrenewable biomass.

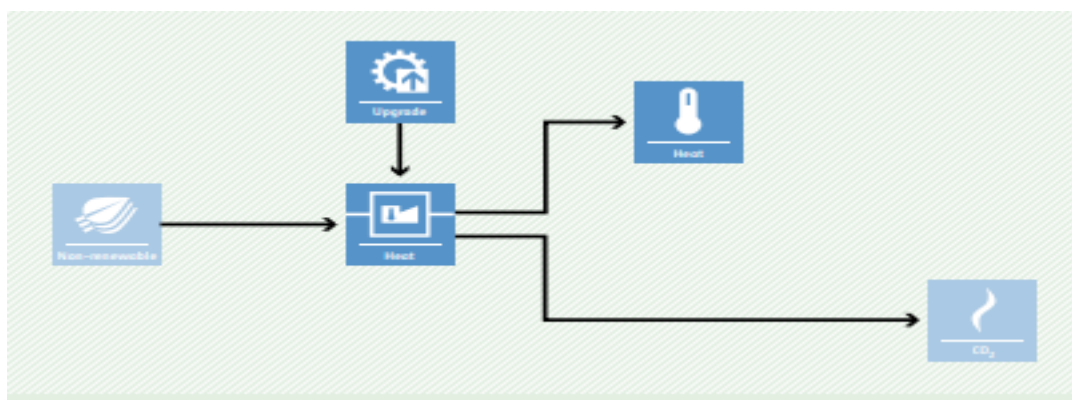


Fig: Project Boundary highlighting the usage of Project Device

3.4 Baseline Scenario

The existing traditional stoves used in the baseline are simple structures made from clay or having stone or metal tripods with poor combustion air supply or flue gas ventilation system i.e. without a grate or a chimney. These stoves use non-renewable biomass.

As per information available in public domain^{8,9} the penetration level of ICS is very low in host country Uganda and approximately 94% of Ugandan households primarily depend on biomass for cooking, and among them, 73% use firewood, indicating the continued reliance on inefficient firewood-based cooking practices in the host country.

As per the VCS Methodology Change and Requantification Procedure v4.0, the project is not required to undergo a baseline reassessment, since this grouped project and the technology used do not fall under any of the categories specified in Section 2.3.2, point 1, footnote 4. However, in line with paragraph 2.3.2, point 2, for projects not subject to baseline reassessment, the PP has applied the new methodology to identify the most plausible baseline scenario and to calculate baseline emissions for the remainder of the crediting period, in accordance with the revised baseline scenario requirements.

⁸ <https://www.myclimate.org/information/carbon-offset-projects/detail-carbon-offset-projects/uganda-efficient-cook-stoves-7245/>

⁹ <https://mecs.org.uk/wp-content/uploads/2022/06/Ugandas-cooking-energy-sector-a-review.pdf>

The baseline scenario for this project has been identified and justified in accordance with the requirements outlined in the applied VM0050 methodology. The key steps undertaken for the selection and justification of the baseline scenario are as follows:

Step 1: Identification of Alternative Baseline Scenarios

The alternative baseline scenarios were identified based on the type of thermal energy service provided, the type of cookstove, the fuel type, and the associated GHG sources. The baseline scenario reflects the prevailing cooking practices among the target population in the absence of the project activity.

A baseline survey was conducted to gather data on the current cooking practices. The survey results indicated the following:

- The majority of households rely on **inefficient cooking methods**, such as three-stone fires or traditional cookstoves.
- **Non-renewable woody biomass**, including firewood and charcoal, is the predominant fuel used for cooking.
- The people primarily collect fuelwood and charcoal from the local market by purchasing it.
- On average, households consume approximately 4.40 tonnes of woody biomass and 0.95 tons of charcoal per year to meet their thermal energy needs.

The baseline alternatives include the following scenarios:

(1) The proposed project activity undertaken without being registered as a VCS project activity;

(2) Continuation of the current situation wherein the 94% population is using the nonrenewable biomass for cooking¹⁰. Refer the research paper in footnote which states at page at page 3:

“94% Ugandan households that primarily depend on biomass, 73% use firewood while 21% use charcoal for cooking, electricity (1.4%), kerosene (0.6%), and other sources including LPG, bio-fuels account for 3.9% (UBOS, 2021)”.

As per the methodology requirements, alternative technologies such as cookstoves fueled by renewable biomass, LPG, electricity, or solar thermal energy were excluded, as they are not representative of the current practices in the target area.

To ensure reliability, a Kitchen Performance Test (KPT) was conducted with 40 randomly selected households. This included qualitative surveys and daily measurements of woody biomass

¹⁰ <https://mecs.org.uk/wp-content/uploads/2022/06/Ugandas-cooking-energy-sector-a-review.pdf>

consumption over four consecutive days. The KPTs followed the guidelines of the Clean Cooking Alliance (KPT Version 4.0, March 2018). The findings corroborated the results of the baseline survey, confirming that large amounts of non-renewable woody biomass are consumed in the baseline scenario.

Step 2: Consideration of Existing and Forthcoming Government Policies and Legal Requirements

A review of existing and forthcoming government policies and regulations was conducted to assess their potential impact on baseline alternatives. The key policies and frameworks reviewed included, but were not limited to, the Renewable Energy Policy for Uganda (2007)¹¹, the National Biomass Energy Strategy (NBEST)¹², and the Energy Policy for Uganda (2002)¹³.

The findings revealed the following:

- No mandatory legal or regulatory requirements enforce the adoption of improved cookstoves or prohibit the use of non-renewable woody biomass in the project area.
- Non-compliance with any existing regulations related to cooking practices is widespread in the region, indicating that the baseline scenario accurately reflects the prevalent practices in the absence of the project activity.

Step 3: Assessment of Financial, Institutional, and Information Barriers

The identified alternative baseline scenarios were further assessed for financial, institutional, and informational barriers. The analysis showed that:

- Households in the project area lack the financial resources^{14, 15, 16} to afford improved cookstoves or alternative fuels independently.

¹¹ https://climate-laws.org/documents/the-renewable-energy-policy-for-uganda_36b0?id=the-renewable-energy-policy-for-uganda_87ef

¹²

<https://www.undp.org/sites/g/files/zskgke326/files/migration/ug/bc55cfee7ca385c20ba6e8738870a7d1c5bd851e40d1eac263fd5ff5d2de60a3.pdf>

¹³ <https://energyregulators.org/wp-content/uploads/2021/01/Uganda-Energy-Policy.pdf>

¹⁴ <https://www.frontiersin.org/journals/sustainability/articles/10.3389/frsus.2024.1404806/full>

¹⁵ <https://iea.blob.core.windows.net/assets/e329674b-f51f-4eb0-b0fd-402ddc016d90/Uganda2023.pdf>

¹⁶ <https://ugandaradionetwork.net/story/accessibility-cost-of-appliances-slows-adoption-of-clean-cooking-technologies-in-urban-communities>

- There is limited institutional support or infrastructure for the widespread distribution and adoption of alternative technologies.
- Awareness and knowledge about the benefits of improved cookstoves are minimal among the target population.

These barriers prevent the adoption of alternatives, leaving the continued use of inefficient cookstoves and non-renewable biomass as the most likely baseline scenario.

Baseline Survey:

In accordance with the applied methodology, the baseline scenario represents the continued use of non-renewable wood fuel (firewood) and charcoal by the target population to meet similar thermal energy needs as provided by project cookstoves in the absence of the project activity. The baseline cookstoves are traditional stoves or three-stone fires using firewood, with no improved combustion air supply or gas ventilation.

In accordance with Section 6.2 of VM0050 v1.0, the PP established control households to represent pre-project conditions and enable follow-up baseline surveys. Control households were identified prior to the first verification under VM0050 V1.0, as required for existing projects transitioning to this methodology. Furthermore, in line with Correction 1 in the “Correction and Clarifications to VM0050 Energy efficiency and fuel switch measures in cookstoves v1.0”, follow-up baseline surveys are required to be conducted in these control households at most every five years from the date of the last survey. Since this is the first monitoring period while transitioning to VM0050 for an already registered project, the PP identified and established these control households accordingly as per the VM0050 V1.0. These households have not received Project cookstoves or any other improved cooking device and therefore continue to represent the baseline cooking practices. These Control households are statistically equivalent to baseline households and located under similar geographic and cooking conditions. On baseline reassessment in 5 years’ time, the PP will contact these same households for reassessment. If the household has moved out of the geographic area, or if the household is not available for any reason, or if the households independently adopt improved stoves or are reached by other initiatives, the PP will add new households to the control group from within the same region.

A baseline survey along with KPT was conducted in accordance with the applied methodology VM0050 v1.0 and the KPT protocol during the period from 24-November-2024 to 1-December-2024. The survey questionnaire was developed in alignment with section 6.2 and Appendix 3 of VM0050 V1.0 to collect data on baseline fuel types, sources, cooking technologies, and household size. The survey period was scheduled to avoid major festivals, holidays, or similar events, thereby minimizing any potential influence on household cooking behavior and ensuring representative results. The survey was designed and implemented following the most recent

versions of the CDM Standard for Sampling and Surveys and the Guidelines for Sampling and Surveys for CDM Project Activities and Programmes of Activities. The data collection method involved face-to-face interviews using a structured questionnaire to gather accurate and consistent data.

The sample size was sufficient to achieve a relative precision level of 8.9% at 90% confidence. Hence, the 90/10 confidence/precision level was met for the baseline KPT analysis. The detailed household responses and the baseline survey/KPT analysis are provided in the baseline survey and KPT excel spreadsheet.

From the baseline survey results, it was found that the majority of families use traditional stoves. The firewood is obtained directly from farm, or purchases from other community members or from local. Similarly, charcoal is mainly collected from purchased.

The survey further recorded an average adult equivalent household consists of 4.54, while the average household size is 5.8. As per the baseline survey, 85% and 15% are using firewood and charcoal, respectively, in rural areas of Uganda. The project aims to replace these traditional stoves with improved project stoves. Women play a key role in stove usage and firewood collection, with cooking-related tasks predominantly carried out by female members. All this information was cross-checked with other sources¹⁷¹⁸, The value of fuel consumption derived using baseline KPT by the project is conservative compared to the values used by other registered projects¹⁹.

Overall, the baseline survey provided valuable insights into the prevailing cooking practices and challenges associated with traditional cookstove usage within the project boundary.

3.5 Additionality

The additionality has been assessed in line with section 7.0 of the applied methodology

Step 1: Regulatory Surplus

The proposed project is a voluntary coordinated action by PersistentClimate India Pvt Ltd, and there is no mandated government programme or policy in the host country of this project ensuring the distribution of domestic fuel-efficient cookstoves. The project activity is not mandated by any

¹⁷ World Bank, 2023

¹⁸ THIRD NATIONAL DEVELOPMENT PLAN (NDPIII) 2020/21 – 2024/25

¹⁹ Fuel consumption value in baseline scenario in Uganda as cross-checked from a registered VPA, GS VPA ID: 11579. The baseline survey recorded a value of 6.62 tonnes/HH/Year and 1.22 tonnes/HH/Year for wood and charcoal consumption in baseline respectively.

law, statute, or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute, or other regulatory framework.

Step 2: Positive List

The project activity must meet both of the following conditions to qualify for the positive list:

1) The project activity introduces:

- a) **Efficient biomass-fired cookstoves that replace inefficient biomass-fired cookstoves;**
- b) **Efficient, solely renewable biomass-fired cookstoves that replace fossil fuel-fired cookstoves; or**
- c) **Electric cookstoves that replace inefficient biomass-fired or fossil fuel-fired cookstoves.**

Justification: Under the project activity, Efficient biomass-fired cookstoves ICS are distributed at a subsidized price to end users that replace inefficient cookstoves

2) The project activity installs or distributes improved cookstoves at zero cost to the end-user and has no revenue source other than from the sale of verified carbon units (VCUs).

Justification: The project is being distributed at highly subsidized cost to the end-user. Please refer to the substantiation below.

Since the project does not provide ICS installation to households free of charge and is not included in government schemes or supported by multilateral funds, PP has demonstrated additionality through step 3 project method as detailed below.

Step 3: Project Method

The VCS tool VT0008 “ADDITIONALITY ASSESSMENT” Version-1.0²⁰ is applied to demonstrate additionality.

The Tool provides for a step-wise approach to demonstrate and assess additionality. These Steps include:

- Step 1: Identify alternatives to the project activity
- Step 2: Barrier analysis

²⁰ <https://verra.org/wp-content/uploads/2024/10/VT0008-Additionality-Assessment-v1.0.pdf>

- Step 3: Investment analysis
- Step 4: Common practice analysis

Step 1: Identify alternatives to the project activity

Step 1 does not need to be applied as the applicable methodology provides procedures and requirements for identifying the alternative scenarios or baseline scenario.

In line with the requirements of VCS Tool VT0008, Section 5, project proponents must complete either Step 2 (Barrier analysis) or Step 3 (Investment analysis), unless the methodology indicates otherwise. The PD has selected Step 3 (Investment analysis) to demonstrate additionality; therefore, Step 2 (Barrier analysis) is not applicable.

Step 3: Investment analysis

The objective of this step is to conduct an investment analysis to assess the economic or financial attractiveness of the alternative scenarios identified in Step 1 or the applicable methodology.

Actual Cost of Purchase/Sale of ICS			Subsidized Sale to Households		Actual Cost of Purchase/Sale of ICS - Subsidized Sale to Households
Model	Cost of Purchase \$US/ICS	Distribution Cost \$	Model	Price to end-user \$US/ICS	Loss, without Carbon Revenue
Masupa	4.5	1.5-2.5	Masupa	2.6	Model \$US/ICS
Burn Jikokoa	28	1.5-2.5	Burn Jikokoa	19.0	Masupa 3.9
Kuniokoa	26	1.5-2.5	Kuniokoa	19.0	Burn Jikokoa 11.0
Based on the Invoice of Manufacturers and End Users					Kuniokoa 9.0

As the project proponent will sell ICS at a lower price than purchase cost of ICS and there are no other economic benefits than sale of VCU's i. e the project activity is less financially attractive in the absence of carbon credits, The PP selects option 1, Investment Comparison Analysis with NPV as the financial indicator. The NPV is chosen since it is a direct assessment of the profitability and therefore a direct assessment of the financial and economic feasibility of the project.

The NPV is calculated in the absence of revenues from carbon finance to demonstrate that the project is not financially and economically viable in those conditions ($NPV < 0$).

The NPV is calculated with the following main parameters: -

An inflated discount rate as per world bank for year 2021 is 2.2%²¹ (for conservativity purpose).

Discount rate is considered as 14.15%

The Net Present Value (NPV) analysis is presented using the following income and expense data, ensuring a conservative approach by including all revenues but excluding certain costs:

- **Income sources:**
 - Included: Revenue from stove sales.
 - Excluded: Revenue from carbon credits.
- **Expense sources:**
 - Included: Costs related to stove, O & M²², distribution,
 - Excluded (to simplify the analysis and maintain conservatism): Certain operational expenses (e.g., salaries), support costs (e.g., logistics, administration), and certification process costs.

An NPV analysis considering all expense sources excluded for simplicity purposes would show a project further unfeasible from a financial and economic point of view. The NPV sheet has been submitted along with this submission to the assessment team.

Project Revenue and Costs: Over 7-year period.

Total discounted cost	\$ 3278917.51
Total Revenue	\$ 1959948.1

²¹ <https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=UG>

²² Based on available research, including publicly accessible studies on improved cookstove repair costs in Uganda, and considering prevailing local market conditions and field experience from the project area and relevant management assumption, the annual operation and maintenance cost is conservatively estimated at **US \$ 1.4 per stove per year**.

Net Present value excluding VCUs Revenue (USD)	-1318969.40
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A sensitivity analysis has been conducted to evaluate the variations in the NPV with respect to selected key financial parameters, namely the cost of stove, O & M cost of improved cookstoves (ICS), and the inflation rate. These parameters were chosen for the analysis due to their relevance to the market dynamics and economic conditions at the project location. The key findings of the sensitivity analysis are summarized in the table below.

Parameter	Variation (%)	New NPV
Stove Cost	10%	-1597970.3
	0%	-1318969.4
	-10%	-1039968.5
Inflation Rate (%)	10%	-1646861.2
	0%	-1318969.4
	-10%	-991077.7
O&M Cost	10%	-1339244.7
	0%	-1318969.4
	-10%	-1298694.1

As evident from the table above, the project NPV remains negative across all iterations with $\pm 10\%$ variations in the key financial parameters. This clearly demonstrates the project's additionality under all scenarios and underscores the critical importance of carbon revenue for the project's viability and long-term sustainability.

It is evident from the above analysis that the project is not financially attractive without carbon revenue.

Step 4: Common Practice Analysis:

As per information available in the public domain^{23,24} the penetration level of ICS is very low in the host country, Uganda and 80% population is still using inefficient firewood cooking practices; thus, project activity is not a common practice.

As each ICS has costs associated with its purchase and distribution and awareness generation, this programme/grouped project will not occur in the absence of carbon revenue. The action is not financially viable without the support of revenues from the sale of VCU. The end-users of the ICS are currently using crude/conventional cooking devices, which indicates and exacerbates the cycle of poverty/suppressed incomes etc.

The potential users for ICS are typically lower income population in Uganda 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 project will alleviate these barriers by promoting the distribution of ICSs to end-users at upwards of a reasonable level of subsidy, thereby making their life easy, and safe (from pollutants while cooking on inefficient cookstoves) and other associated benefits/impacts e.g. better health conditions, money savings (due to saving in cooking fuel), time savings etc. and other subsequent impacts possible.

The project activity is not a common practice, is demonstrated using the Common Practice Analysis in accordance with section 5.5 of VT008 V1.0.

Referring to clause 5.5.1(2) of the VT008 V1.0, since the project activity distributes efficient biomass-fired improved cookstoves (ICS), replacing inefficient biomass-fired cookstoves, the project type is identified as "switch of technology with or without a change in energy source,". Therefore, VT0008 Step 4b is applied.

As per clause 5.5.2(1) of VT008 V1.0, the Applicable capacity/output range is calculated.

The project's total design capacity is 50,000 ICSs, to be distributed in two phases (Phase 1: 12,500; Phase 2: 37,500). As per clause 5.5.2 of VT0008 Step 4b, the applicable capacity/output range for common practice comparison is $\pm 50\%$ of total design output. Therefore:

- a. Lower bound = $50,000 \times 0.5 = 25,000$ ICS;
- b. Upper bound = $50,000 \times 1.5 = 75,000$ ICS.

²³ <https://www.myclimate.org/information/carbon-offset-projects/detail-carbon-offset-projects/uganda-efficient-cook-stoves-7245/>

²⁴ <https://mecs.org.uk/wp-content/uploads/2022/06/Ugandas-cooking-energy-sector-a-review.pdf>

The applicable capacity/output range used for the common-practice analysis is 25,000 – 75,000 ICS ($\pm 50\%$ of design capacity)."

A review of publicly available information was conducted to identify projects of a similar scale, technology, fuel type, and applicable geographic area of Uganda that began operation prior to the proposed project activity's start date (02-January-2021).

Identification of projects of a similar nature was conducted considering the requirements of VT0008 (Section 5.5.2(2)), namely:

- a) Located in the applicable geographic area (Uganda),
- b) Applying the same measure (ICS replacing inefficient cookstoves),
- c) Using the same fuel (Firewood and charcoal),
- d) Delivering comparable quality and service (household cooking),
- e) Having started commercial operation prior to the start date of this project (02-January-2021)
- f) Within the applicable capacity range (25,000 – 75,000 ICS),

Two projects²⁵ were identified similar in the VCS registry, out of these two VCS project, one project (VCS ID 3371) meet the conditions from (a) to (e) mentioned above, however this project does not meet the condition (f) mentioned above. and therefore, not considered "similar projects" as per VT0008 V1.0. So only one similar project (VCS ID 2982) is identified.

In line with Section 5.5.2(3) of VT0008 V1.0, projects that are not registered, submitted for registration, or undergoing validation under the VCS Program are counted as N_{all} . only if they represent pipeline projects relative to the proposed project. Since the one identified project were already operational before the start date of this project, they are not pipeline projects but existing activities in the host country. Therefore, they are included in N_{all} . Accordingly, $N_{all} = 1$.

As per clause 5.5.2(4), projects are considered essentially distinct if they differ in at least one of the following: Energy source/fuel, Feedstock, Investment climate at the time of decision, or Technology/activities with costs at least 20% lower. Thus, there are one project in N_{all} that are similar to this project activity. Based on 5.5.2(4), the one identified project is essentially distinct; therefore $N_{diff} = 1$.

²⁵ VCS ID 3371 and VCS ID 2982

Factor F is defined as: $F = 1 - N_{diff} / N_{all}$, as per clause 5.5.2(5) of VT008 V1.0,

In accordance with VT0008 Section 5.5.2, a project is considered **common practice** if:

- a. $F > 20\%$, **and**
- b. $N_{all} - N_{diff} > 3$.

F is 0%, and $N_{all} - N_{diff} = 0$, which is ≤ 3 , *both below the threshold*. Therefore, the proposed project activity is **not a common practice** as per VT0008 V1.0.

3.6 Methodology Deviations

Current: Not applicable, as no methodology deviations took place.

4 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline emissions are calculated as follows:

$$BE_y = \sum_{i,j,k} EC_{i,y} \times N_{j,k,y} \times n_{j,k,y} \times (EF_{b,i,CO2} \times f_{NRB,y} + EF_{b,i,nonCO2}) \quad (1)$$

Where,

BE_y	Baseline emissions during year y (t CO ₂ e)
$EC_{i,y}$	Average energy consumption of baseline device type i in year y (TJ)
$N_{j,k,y}$	Number of commissioned project devices of type j from batch k in year y
$n_{j,k,y}$	Proportion of commissioned project devices of type j from batch k that remain operating in year y (fraction)
$EF_{b,i,CO2}$	CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario (t CO ₂ /TJ)

$f_{NRB,y}$	Fraction of woody biomass that is established to be non-renewable used by baseline device in year y ; this variable is not considered for fossil fuels (fraction)
$EF_{b,i,nonCO2}$	Non-CO2 emission factor for fuel used by baseline device type i in the baseline scenario (t CO2e/TJ)
i	Baseline device type and its respective fuel type
j	Project device type and its respective fuel type

The average energy consumption of baseline device type i is calculated as follows:

$$EC_{i,y} = BC_{b,i,y} \times NCV_{b,i} \quad (2)$$

Where,

$BC_{b,i,y}$	Fuel used per baseline device type i during year y (tonnes) ²⁶
$NCV_{b,i}$	Net calorific value of baseline fuel for baseline device type i (TJ/tonne)

Cross-check of $EC_{i,y}$ to address stove stacking as per section 8.1.1 of the VM0050 V1.0:

Baseline consumption from the back calculation is calculated as follows:

$$EC_{est,y} = EC_{p,y} \times \frac{\eta_{new,avg,y}}{\eta_{old,avg}} \quad (3)$$

$EC_{est,y}$	Back-calculated energy consumption of the potential mix of devices and fuels in the baseline in year y (TJ)
$EC_{p,y}$	Energy used in project scenario by project devices during year y (TJ)
$\eta_{new,avg,,y}$	Weighted average efficiency of project devices in year y (fraction)
$\eta_{old,avg}$	Weighted average efficiency of baseline devices that are replaced by project devices (fraction)

²⁶ This parameter corresponds to $BC_{ex-ante,b,i}$ for the first two years and where the follow-up baseline survey campaign shows that there are no significant changes in baseline fuel consumption. Otherwise, it corresponds to $BC_{b,i,y}$

Note: Where the results indicate that baseline consumption ($EC_{i,y}$) is higher than that indicated by back-calculation from the project scenario ($EC_{est,y}$) then the back-calculation results ($EC_{est,y}$) will be applied in Equation (1) as a conservative cap.

$EC_{p,y}$ must be determined as follows:

$$EC_{p,y} = \sum_{j,k} BC_{p,j,k,y} \times NCV_{p,j} \quad (4)$$

$BC_{p,j,k,y}$ Average quantity of fuel used by project device type j from batch k during year y (tonnes or m3)

$NCV_{p,j}$ Net calorific value of project fuel used in project device type j (TJ/tonne or TJ/m3)

For ex-ante calculations, it is assumed that no cookstove stacking is taking place; therefore, $EC_{i,y}$ is equal to $EC_{p,y}$. The fraction of Non-Renewable Biomass (fNRB) has been calculated using CDM Tool 30, "Calculation of the fraction of non-renewable biomass" Version 4.0. The detailed fNRB_y estimation has been submitted.

The fNRB for Uganda is calculated to be 88.24% using the CDM Tool 30, V4.0. As per section 9.2 of VM0050 V1.0, upon applying an uncertainty discount of 26% to this estimated value, the fNRB_y considered for the emission reduction calculation is 65%. Determination of Baseline Emissions (BE_y) is as follows:

Parameter	Value	Unit	Description	Source
BE _y	5.00	tCO ₂ e	Baseline emissions during year y	Calculated
EC _{i,y}	0.067	TJ	Average energy consumption of baseline device type i in year y	Calculated
N _y	1	Number	Number of commissioned project devices of type j from batch k in year y	BE _y calculated for 1 ICS here.
n _{j,k,y}	0.90	fraction	Proportion of commissioned project devices of type j from batch k that remain operating in year y	Assumption (Capped value of usage rate)
EF _{b,i,CO₂}	112	tCO ₂ /TJ	CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario	IPCC Guidelines for National Greenhouse Gas Inventories

fNRB,y	0.653	Fraction	Fraction of woody biomass that is established to be non-renewable used by baseline device in year y; this variable is not considered for fossil fuels	CDM Tool 30 Version 4.0
EF _{b,j,non CO₂}	9.46	tCO ₂ e/TJ	Non-CO ₂ emission factor for wood used by baseline device type i in the baseline scenario	IPCC Guidelines for National Greenhouse Gas Inventories
BC _{b,i,y}	4.31	Tonnes /Yr	Wood used per baseline device type i during year y	Baseline KPT
NCV _{b,i}	0.0156	TJ/tonne	Net calorific value of baseline fuel for baseline device type i	IPCC Guidelines for National Greenhouse Gas Inventories

4.2 Project Emissions

Project emissions are calculated as follows:

$$PE_y = PE_{energy,y} + PE_{others,y} \quad (6)$$

Where,

PE _y	Project emissions during year y (t CO ₂ e)
PE _{energy,y}	Project emissions from energy consumption of project devices in year y (t CO ₂ e)
PE _{others,y}	Project emissions from other sources in year y (t CO ₂ e)

PE_{energy,y} from Biomass, Fossil Fuels, or Bioethanol

$$PE_{energy,y} = \sum_j \sum_k BC_{p,j,k,y} \times N_{j,k,y} \times NCV_{p,j} \times n_{j,k,y} \times (EF_{p,j,CO_2} \times f_{NRB,y} + EF_{p,j,nonCO_2}) \quad (7)$$

Where,

EF _{p,j,CO₂}	CO ₂ emission factor for fuel used by project device type j in the project scenario (t CO ₂ /TJ)
EF _{p,j,nonCO₂}	Non-CO ₂ emission factor for fuel used by project device type j (t CO ₂ e/TJ)

Given that the grouped project involves the distribution of biomass-based improved cookstoves exclusively to the target end-users, equations (8), (9), and (10) of the applied methodology are not applicable. The beneficiaries procure the biomass fuelwood either from nearby fields or the market. Therefore, equation (9) is not applicable. Therefore, PE_{others} is equal to zero.

Determination of Project emission (PE_y) as per equation (7) of VM0050 V1.0 is as follows:

Parameter	Value	Unit	Description	Source
$PE_{energy,y}$	2.15	tCO ₂ e	Project emissions during year y	Calculated
EF_{p,j,CO_2}	112	tCO ₂ /TJ	CO ₂ emission factor for fuel used by project device type i in the project scenario	IPCC Guidelines for National Greenhouse Gas Inventories
$EF_{p,j,nonCO_2}$	9.46	tCO ₂ e/TJ	Non-CO ₂ emission factor for wood used by project device type i in the project scenario	IPCC Guidelines for National Greenhouse Gas Inventories
$NCV_{p,j}$	0.0156	TJ/tonne	Net calorific value of project fuel for project device type i	IPCC Guidelines for National Greenhouse Gas Inventories
η_{old}	17.90%	Percentage	Weighted average efficiency of baseline stoves	Calculated
η_{new}	41.7%	Percentage	Weighted average efficiency of project ICSSs	Calculated
$BC_{p,j,k,y}$	1.85	Tonnes/HH/Yr	Average quantity of fuel used by project device type j from batch k during year y	Calculated

The calculation of η_{old} , η_{new} , and $BC_{p,j,k,y}$ has been demonstrated in the Ex-Ante ER calculation sheet.

4.3 Leakage

An adjustment factor of 0.95 is applied to the GHG emission reductions in Equation (11) (i.e., $0.95 \times (BE_y - PE_y)$).

4.4 Estimated Net GHG Emission Reductions and Removals

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e) ²⁷	Estimated net GHG emission reductions or removals (tCO ₂ e)
2021-22	70,442	30,263	0	38,169
2022-23	229,901	98,771	0	124,574
2023-24	293,973	126,298	0	159,291
2024-25	293,973	126,298	0	159,291
2025-26	293,973	126,298	0	159,291
2026-27	293,973	126,298	0	159,291
2027-28	293,973	126,298	0	159,291
2028-29	293,973	126,298	0	159,291
2029-30	293,973	126,298	0	159,291
2030-31	293,973	126,298	0	159,291
Total	2,652,124	1,139,415	0	1,437,074
Annual average ER (tCO ₂ e)				143,707
Round down value of ER (tCO ₂ e/yr)				143,707

5 MONITORING

5.1 Data and Parameters Available at Validation

²⁷ 5% leakage is already deducted and considered in the baseline calculation as per the methodology.

Data / Parameter	EF_{b,i,CO_2}
Data unit	t CO ₂ /TJ
Description	CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario
Source of data	Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories (Volume 2, table 2.5, 2006 IPCC Guidelines for National Greenhouse Gas Inventories ²⁸)
Value applied:	112 t CO ₂ /TJ
Justification of choice of data or description of measurement methods and procedures applied	3) Use of default values from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories
Purpose of data	Calculation of baseline and project emissions
Comments	N/A

Data / Parameter	EF_{p,j,CO_2}
Data unit	t CO ₂ /TJ
Description	CO ₂ emission factor for fuel used by project device type j in the project scenario
Source of data	Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories (Volume 2,

²⁸ https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

	table 2.5, 2006 IPCC Guidelines for National Greenhouse Gas Inventories) ²⁹
Value applied:	112 t CO ₂ /TJ
Justification of choice of data or description of measurement methods and procedures applied	3) Use of default values from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories
Purpose of data	Calculation of baseline and project emissions
Comments	N/A

Data / Parameter	EF _{b,i,nonCO2}
Data unit	t CO ₂ e/TJ
Description	Non-CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario
Source of data	Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories (Volume 2, table 2.5, 2006 IPCC Guidelines for National Greenhouse Gas Inventories)
Value applied:	9.46 t CO ₂ e/TJ (AR5 GWP)
Justification of choice of data or description of measurement methods and procedures applied	The values must be determined ex ante by using one of the following means: 1) Testing in accredited/recognized laboratories: Measurements must be undertaken in line with national or international fuel standards

²⁹ https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

	2) Use of national default values 3) Use of default values from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories Wood: 9.46 t CO₂e/TJ (AR5 GWP) Charcoal: 5.865 t CO₂e/TJ (combustion only, AR5 GWP) 44.83 t CO₂e/TJ (includes charcoal production)
Purpose of data	Calculation of baseline emissions
Comments	-

Data / Parameter	EF _{p,j,nonCO2}
Data unit	t CO ₂ e/TJ
Description	Non-CO ₂ emission factor for fuel used by project device type j in the project scenario
Source of data	Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories (Volume 2, table 2.5, 2006 IPCC Guidelines for National Greenhouse Gas Inventories)
Value applied:	9.46 t CO ₂ e/TJ (AR5 GWP)
Justification of choice of data or description of measurement methods and procedures applied	3) Use of default values from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories
Purpose of data	Calculation of emissions reduction
Comments	-

Data / Parameter	CF
Data unit	unitless
Description	Wood-to-charcoal conversion factor
Source of data	CDM TOOL33 Version 3.0 default value
Value applied:	4 tonnes of dry wood input per tonne of charcoal output
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of baseline emissions
Comments	Only applicable where charcoal is used as the fuel by baseline and/or project devices and the project proponent chooses to apply the CF method instead of the charcoal emission factors method included in the equations. Where the CF method is used, the wood-to-charcoal conversion factor must be applied (in Equations (1 and (7), as applicable) in the following manner: 1) For CO₂ emissions, the conversion factor is multiplied by the EFCO₂ term, which is the CO₂ emission factor for wood. 2) For non-CO₂ emissions, the EFnonCO₂ term is the non-CO₂ emission factor for charcoal combustion. Where applying CF, the non-CO₂ emission factor for the production of charcoal may only be included where Option 1 or 2 (in parameter table for EFnonCO₂) is used.

Data / Parameter	NCV _{b,i} NCV _{p,j}
Data unit	TJ/tonne
Description	Net calorific value of baseline fuel used by baseline device type i

	Net calorific value of project fuel used by project device type j
Source of data	Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories (Volume 2, table 2.5, 2006 IPCC Guidelines for National Greenhouse Gas Inventories) ³⁰ . (IPCC volume 2, chapter 1, table 1.2)
Value applied:	• Wood: 0.0156 TJ/tonne • Charcoal: 0.0295 TJ/tonne
Justification of choice of data or description of measurement methods and procedures applied	The values must be determined ex ante by using one of the following means: 1) Testing using standardized methods (e.g., ASTM D5865-12, ISO 1928) 2) Use of regional or national default values 3) Use of default values from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories The values for wood and charcoal in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories are: • Wood: 0.0156 TJ/tonne • Charcoal: 0.0295 TJ/tonne
Purpose of data	Calculation of baseline emissions
Comments	Where the factor CF is applied (see parameter table for CF), the net calorific value for charcoal must be derived using Option 1 or 2, consistent with the option for determining the non-CO2 emission factor for production of charcoal.
Data / Parameter	$\eta_{old,avg}$

³⁰ https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

Data unit	Fraction
Description	Weighted average efficiency of baseline devices that are replaced by project devices
Source of data	Methodology default value
Value applied:	17.90% 1) For three-stone fire using firewood or a cookstove with no improved combustion air supply or flue gas ventilation, default value of 15% 2) For other baseline devices: 25% (For Others types- CDM TOOL 33).
Justification of choice of data or description of measurement methods and procedures applied	These methods and sources are recognized by the VCS Program
Purpose of data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	Hhi
Data unit	Equivalent standard male adults
Description	Average household size of the target population using device type i
Source of data	Baseline survey
Value applied:	4,54

Justification of choice of data or description of measurement methods and procedures applied	Recognized survey methods based on the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities
Purpose of data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	BCex-ante,b,i
Data unit	tonnes
Description	Ex-ante annual average quantity of fuel used per baseline device type i
Source of data	Baseline survey
Value applied:	4.31
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of data	Calculation of baseline emissions
Comments	Energy consumption must be determined once prior to validation.

5.2 Data and Parameters Monitored

Data / Parameter	Nj,k,y
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Data unit	Number
Description	Number of commissioned project devices of type j from batch k in year y
Source of data	Monitoring
Description of measurement methods and procedures applied	The following data must be recorded during project activity implementation: 1) Number of new devices distributed under the project activity, identified by the type of device and date of commissioning; and 2) Identification information of the recipient of the device distributed under the project activity (e.g., name, address, phone number). Data management and reporting of this information must adhere to both data privacy requirements and good practice.
Frequency of monitoring/recording	Every time that new project devices are distributed
Value applied:	For ex-ante emission reduction calculation, it is assumed that the project will distribute up to 50,000 ICS in phased manner (In year 1 and 2). In first phase it is planned to distribute 12,500 stoves and in 2nd phase it will distribute remaining 37,500 stoves.
Monitoring equipment	Number of new devices distributed under the project activity, identified by the type of device and date of sale and commissioning
QA/QC procedures applied	N/A.
Purpose of data	Calculation of baseline and project emissions
Calculation method	N/A

Comments	The number of project devices must be recorded in a database, sales record, or similar to ensure transparency.
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Data / Parameter	nj,k,y
Data unit	Fraction
Description	Proportion of commissioned project devices of type j from batch k that are still being used regularly in year y
Source of data	Monitoring survey
Description of measurement methods and procedures applied	Option 2 (surveys): Based on an adoption rate determined by a survey according to the most recent version of the CDM Standard for Sampling and Surveys for Project Activities and Programmes of Activities and achieving 90/10 confidence precision for the proportion of devices in operation. The lower end of the 90% confidence interval must be used to ensure conservativeness. The adoption survey must include: a) Kitchen observation (which includes visual and physical checks of the stove and its components), including photographic evidence; and b) Interview with the primary cook. As per clarification 2 in CORRECTION AND CLARIFICATIONS TO VM0050 ENERGY EFFICIENCY AND FUELSWITCH MEASURES IN COOKSTOVES, V1.0" dated 03 February 2025, For projects employing surveys, the usage rate is capped at 90% where all of the following customer support actions are undertaken across the entire target population and demonstrated at verification: 1) Selection of technologies and fuels that fully meet the cooking needs of the target population, demonstrated by citing robust research or conducting an investigation of cooking practices and attitudes

	2) Implementation of support activities to assist the target population in effectively operating and maintaining their cookstoves. These may include providing materials (print, in-person, or video) on how to operate the cookstove to prepare common local foods, how to troubleshoot common operational issues, and how to make minor repairs (including obtaining necessary replacement parts). All such communications and materials must be provided in local language(s) commonly used in the project area. 3) Provision of a commonly used, toll-free communications channel through which the target population can contact the project proponent to access support (e.g., maintenance and repair services) For projects employing surveys and that do not implement all of these customer support actions across the entire target population, the usage rate is capped at 75%.
Frequency of monitoring/recording	Option 2 (surveys): annually
Value applied:	For ex-ante emission reduction calculation, it is assumed that the project device is 0.9% operational.
Monitoring equipment	Monitoring survey
QA/QC procedures applied	The date on which a sample project device stopped being used should be taken as follows: Option 2 (surveys): Where the project device is not working or not being used at the time of conducting the survey, it should be conservatively assumed that the project device has not been active since the date on which the last adoption survey was conducted.
Purpose of data	Calculation of baseline and project emissions
Calculation method	N/A
Comments	N/A

Data / Parameter	$f_{NRB,y}$
Data unit	Fraction
Description	Fraction of non-renewable biomass saved by the project activity
Source of data	One of the following sources must be used: 1) The most recent national default value(s) published by UNFCCC 2) Calculated based on CDM TOOL30 and applying an uncertainty discount of 26% 3) Default value of the most recent version of CDM TOOL33 Calculated based on CDM TOOL30,v4.0 and applying an uncertainty discount of 26%
Description of measurement methods and procedures applied	CDM TOOL30 Version 4.0 $f_{NRB} = NRB / (NRB + RB) = 0.8824$ The f_{NRB} applied to emission reduction calculations is $0.8824 \times (1 - 0.26) = 0.65$.
Frequency of monitoring/recording	Ex-ante for each crediting period Proponents applying draft UNFCCC national default values must apply updated approved default values in any verification requests submitted after UNFCCC approval of the default values.
Value applied:	0.65
Monitoring equipment	N/A
QA/QC procedures applied	Where using the UNFCCC f_{NRB} value(s), the project proponent must report the related uncertainties along with the value in the project description.
Purpose of data	Calculation of baseline and project emissions

Calculation method	N/A												
Comments	As required under Paragraph 6(b) of the CDM Tool 30, the comparison was made between the fNRB values calculated using Tool 30 and the fNRB values reported in the literature. Bailis et al³¹ estimated the national fNRB value for Uganda to be 61.5%. Numerous assumptions by Bailis et al. diverge from the CDM Tool 30 methodology, and that explains the difference in fNRB estimates. These include: (i) a significant under-estimation of wood consumption based on 2013 report; (ii) a different definition of mean annual increment (MAI) that has been updated under CDM Tool 30 since v1.0 and that differs from the default IPCC growth rates, resulting in an over-estimation of renewable biomass (RB); (iii) an overly-generous definition of accessibility that assumes that wood is evenly harvested within a 12-hour travel distance (24-hour round trip) and therefore assumes an average of 76% of the country is accessible; and (iv) making adjustments and assumptions about plantations and the fraction of the country's forested area under formal management that is incongruent with the latest CDM Tool 30 version. Also, fNRB value of other VCS Projects: <table border="1"> <thead> <tr> <th>Project ID</th><th>fNRB value</th></tr> </thead> <tbody> <tr> <td>Verra VCS 3205³²</td><td>0.89</td></tr> <tr> <td>Verra VCS 2838³³</td><td>0.90</td></tr> <tr> <td>Verra VCS 2789³⁴</td><td>0.89</td></tr> <tr> <td>Verra VCS 4997³⁵</td><td>0.89</td></tr> <tr> <td>Verra VCS 5114³⁶</td><td>0.885</td></tr> </tbody> </table>	Project ID	fNRB value	Verra VCS 3205 ³²	0.89	Verra VCS 2838 ³³	0.90	Verra VCS 2789 ³⁴	0.89	Verra VCS 4997 ³⁵	0.89	Verra VCS 5114 ³⁶	0.885
Project ID	fNRB value												
Verra VCS 3205 ³²	0.89												
Verra VCS 2838 ³³	0.90												
Verra VCS 2789 ³⁴	0.89												
Verra VCS 4997 ³⁵	0.89												
Verra VCS 5114 ³⁶	0.885												

³¹ Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266-272

³² <https://registry.verra.org/app/projectDetail/VCS/3205>

³³ <https://registry.verra.org/app/projectDetail/VCS/2838>

³⁴ <https://registry.verra.org/app/projectDetail/VCS/2789>

³⁵ <https://registry.verra.org/app/projectDetail/VCS/4997>

³⁶ <https://registry.verra.org/app/projectDetail/VCS/5114>

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	Project database
Description of measurement methods and procedures to be applied	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch
Frequency of monitoring/recording	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch
Value applied	02/01/2021 (<i>The first cookstove distributed under batch 1</i>)
Monitoring equipment	Not applicable
QA/QC procedures to be applied	Not applicable
Purpose of data	Calculation of emission reduction
Calculation method	Not applicable
Comments	--

Data / Parameter	$BC_{b,i,y}$
Data unit	tonnes
Description	Fuel used per baseline device type i during year y
Source of data	Measurement from Baseline surveys Option 1: A measurement campaign following the Kitchen Performance Test Protocol in control households that do not participate in the project, established prior to validation as

	statistically equivalent to the pre-project conditions of project households regarding baseline fuel consumption.
Description of measurement methods and procedures applied	Option 1: Follow-up baseline surveys must be conducted at most every five years from the date of last survey in control households that do not participate in the project, established prior to validation as statistically equivalent to the preproject conditions of project households regarding baseline fuel consumption. Measurement campaign must be updated where follow-up baseline surveys show that the fuels, fuel sources, or technologies used by the control group are no longer statistically equivalent to the pre-project conditions of project households. The measurement campaign must be designed, carried out, and analyzed in compliance with the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities. The result must be scaled appropriately using the average household size to obtain the value of $BC_{b,i,y}$.
Frequency of monitoring/recording	Every five years
Value applied:	4.31
Monitoring equipment	Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.
QA/QC procedures applied	The campaign must achieve a confidence and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. Where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per Section 4 of the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities.
Purpose of data	Calculation of baseline emissions
Calculation method	N/A

Comments	N/A
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Data / Parameter	$\eta_{\text{new,avg},y}$
Data unit	Fraction
Description	Weighted average efficiency of project devices in year y
Source of data	Monitoring
Description of measurement methods and procedures applied	The efficiency must be established using one of the following methods, and the corresponding documentation must be presented: 1) Water Boiling Test campaigns achieving 90/10 confidence and precision levels as per the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities; 2) Manufacturer-certified value that is determined via Water Boiling Test; or 3) Certification from the host country's national standards body or certifying agency. The decrease in thermal efficiency of project device j from batch k due to aging must be accounted for during the monitoring period, as presented below. For devices using biomass or fossil fuel, one of the following options must be selected, listed in descending order of preference: b) A linear decrease approach, applying a default schedule of linearly decreasing efficiency up to the terminal efficiency (assumed to be 25%) through the lifespan of the project device. The weighted average efficiency is calculated by multiplying the energy consumption $EC_{p,j,k,y}$ of the project device j of batch k by its thermal efficiency $\eta_{\text{new},j,k,y}$ and then summing these values for all project devices. The resulting sum is divided by the total energy consumption of all project devices to determine the weighted average efficiency.

Frequency of monitoring/recording	Annually			
Value applied:	Option 2; Manufacturer-certified value that is determined via Water Boiling Test is applied			
	Depreciated Efficiencies as per AMS-II.G	Burn Jikokoa Model	Masupa Model	Kuniokoa Model
	ICS efficiency (η_p)	0.537	0.382	0.424
	Vintage	Stove efficiency	Stove efficiency	Stove efficiency
	1	0.496	0.363	0.399
	2	0.455	0.344	0.374
	3	0.414	0.325	0.349
	4	0.373	0.307	0.325
	5	0.332	0.288	0.300
	6	0.291	0.269	0.275
	7	0.250	0.250	0.250
	Monitoring equipment	Not applicable		
QA/QC procedures applied	N/A			
Purpose of data	Calculation of baseline and project emissions			
Calculation method	N/A			
Comments	N/A			

Data / Parameter	BC _{p,j,k,y}
Data unit	tonnes
Description	Average quantity of fuel used by project device type j from batch k during year y
Source of data	Monitoring

Description of measurement methods and procedures applied	Option 1: Kitchen Performance Test (KPT) A measurement campaign following the Kitchen Performance Test protocol must be designed, carried out, and analyzed in compliance with the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities. The campaign must achieve confidence and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. The result must be scaled appropriately using the average household size to obtain the value of BC_{p,j,k,y}. Project activities applying KPTs must also measure the quantity of fuel used by pre-project devices that are still operational and provide it in the calculation sheet and monitoring reports (this is a reporting-only requirement). Option 2: Direct measurement Apply continuous direct measurement using equipment calibrated in accordance with national/international requirements. A sample of project devices may be measured in such a way that confidence and precision of 90/10 is achieved for the target parameter of total annual fuel use. The sampling must comply with the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities. Option 3: Fuel purchase monitoring (only for project devices using fossil fuels or bioethanol) Under this option, the project developer must: 1) keep continuous records of all fuel purchases (e.g., fuel purchase invoices from the supplier). 2) ensure fuel is used only for thermal energy generation by the project device (e.g., by using a fuel cylinder design that may only be attached to the project device).
Frequency of monitoring/recording	Biennial for Option 1 Continuous and aggregated annually for Options 2 and 3
Value applied:	1.85
Monitoring equipment	N/A

QA/QC procedures applied	As a crosscheck, compare results to government publications, peer reviewed literature, third party assessments, and/or official data or statistics.
Purpose of data	Calculation of baseline and project emissions
Calculation method	N/A
Comments	N/A

5.3 Monitoring Plan

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 project activity 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 PP will be responsible for conducting the sampling surveys and maintaining a database with all operating stoves. The sampling plan is intended to enable the discovery of unbiased and reliable estimates of monitored parameter values used in the GHG emission reduction calculations. The sampling plan design is based on the CDM Guideline: Sampling and surveys for CDM project activities and programmes of activities, version 9.0.

No monitoring for leakage through competitive uses of biomass is required, as the parameter wood usage 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 project activity, it is not economically feasible to monitor each individual ICS unit distributed. Therefore, a representative sampling survey will be undertaken as part of a project instance-wide Sampling Plan (by grouping and sampling across project activities) that is designed in line with the requirements of the “Sampling and surveys for CDM project activities and programme of activities”, version 04.

The sampling methodology will be in accordance with the representative sampling methods provided by the sampling guidelines and standards as indicated in this section.

Sampling Methodology:

Sampling Objective – The sampling objective for each parameter is to determine, via sampling survey, a statistically significant parameter value for the emission reduction calculations.

(i) Objective and Reliability Requirements:

The objective is to obtain an unbiased and reliable estimate of the proportion or mean value of the following key variables over the course of the crediting period and with 90/10 confidence/precision (as per applied methodology VM0050: version 1.0): Sampling activities are defined at the Grouped Project-level and the sampling plan presented here will apply to assess parameter values in Project Instances to be included in the Grouped Project, either individually or in groups.

Monitored Parameter:

Sl.no.	Monitoring Parameters	Parameter Type	Monitoring Frequency
1	N _{j,k,y} Number of commissioned project devices of type j from batch k in year y	Mean	Annually
2	n _{j,k,y} Proportion of commissioned project devices of type j from batch k that remain operating in year y (fraction)	Proportion	Annually
3	BC _{b,i,y} Fuel used per baseline device type i during year y	Mean	Every five years
4	BC _{p,j,k,y} Average quantity of fuel used by project device type j from batch k during year y	Mean	Biennial

The fuel used per baseline device is monitored every five years, based on the Baseline Kitchen Performance Test (KPT). The quantity of fuel used by the project device is monitored biennially and will be calculated based on the Project KPT.

These parameters are as listed in monitoring section above.

Sample method

The ICS in the sampling frame shall be stratified by ICS model type i and batch j. Stratified Random Sampling will be used to select samples from the Project Database for monitoring parameters. Optionally, other sampling approaches may be used in accordance with applied methodology when sampling techniques or statistical analysis necessitates it.

Sample Size:

The sample size for each monitoring activity will be the total number of ICS distributed and included in the monitoring database. The minimum sample size for each sample frame must achieve the 90/10 confidence/precision. The procedure to determine the sample of households will ensure that they adequately represent the broader project population, minimizing sampling error.

The sample size shall be determined using the following formula:

Total sample size determination for proportion parameter

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

$$V = \frac{SD^2}{\bar{p}^2}$$

Where:

n	=	Sample size for households
N	=	Total number of households
V	=	Overall variance
1.645	=	Represents the 90% confidence required
0.1	=	Represents the 10% relative precision
SD	=	Standard deviation
$\bar{p}$	=	Overall proportion

Then, standard deviation is based on g_d and proportion p_d .

$$SD = \sum_d \frac{g_d \times p_d(1 - p_d)}{N}$$

Where:

SD	=	Standard deviation
g_d	=	Number of households with cookstoves in district d
$p_d(1 - p_d)$	=	Variance of a proportion
N	=	Total number of households

The overall proportion is based on the number of households in a district and the proportion with cookstoves.

$$\bar{p} = \sum_d \frac{(g_d + p_d)}{N}$$

Where:

$\bar{p}$	=	Overall proportion
g_d	=	Number of households with cookstoves in district d
p_d	=	Proportion of households with cookstoves in district d
N	=	Total number of households

To decide on the number of households in the sample that come from each district, proportional allocation can be used, where the proportion from different districts is the same as the proportion of that district in the population.

$$n_d = \frac{g_d}{N} \times n$$

Where:

n_d	=	Sample size for district d
g_d	=	Number of households with cookstoves in district d
N	=	Total number of households
n	=	Total sample size

Sample size determination for mean parameter

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

$$V = \left(\frac{SD_{overall}}{mean} \right)^2$$

Where:

$SD_{overall}$ = Weighted overall standard deviation
 $mean$ = Weighted overall mean

The overall standard deviation is:

$$SD_{overall} = \sqrt{\frac{\sum_{d=1}^D g_d \times SD_d^2}{N}}$$

Where:

$SD_{overall}$ = Weighted overall standard deviation
 SD_d = Standard deviation for district d

g_d = Number of households with cookstoves in district d
 N = Total number of households

The overall mean is:

$$mean = \sum_{d=1}^D \frac{(g_d + m_d)}{N}$$

Where:

$mean$ = Weighted overall mean
 g_d = Number of households with cookstoves in district d
 m_d = Mean cookstoves in district d
 N = Total number of households

(ii) Target Populations:

- The target population for the proportion of ICS still in operation ($N_{y,i,j}$ and $n_{j,k,y}$) of this project are all households in the project database which are using fuel wood and charcoal in ICS distributed under the project for cooking.

The target population for fuel used per baseline device ($BC_{b,i,y}$) is set in control households that do not participate in the project, established prior to validation as statistically equivalent to the pre project conditions of project households regarding baseline fuel consumption.

The target population for average quantity of fuel consumed by the project device ($BC_{p,j,k,y}$) are all households in the project database which are using fuel wood in ICSs distributed under the project for cooking.

(iii) Sampling Frame

To ensure the homogeneity of the project instances included for a single sampling plan, two sampling frames shall be defined. Overall, all project instances will have same group of end users which is from households from rural/semi-urban areas. The projects are to be implemented in rural/semi-urban 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 commissioned project devices of type j from batch k that are still being used regularly in year y ($n_{j,k,y}$)

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 ICS. The detailed information collected from Registration Process is used to populate the stoves Database and the Monitoring Survey follows “Sampling and Surveys for CDM Project Activities and Programme of Activities”, version 04.

As explained below (in section “Sampling Method”), to take the different characteristics of different project instances implemented and ICS models into consideration, Project instances 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 projects, 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 biennial sampling.

The first step is to identify the Primary Sampling Units. Primary sampling units are project instances, which have the same ICS models.

That is project with the same ICS model can therefore be grouped together and form a Primary Sampling Unit. In case project has two different ICS models being implemented – this will form two Primary Sampling Units. This is justified by the fact that project might vary in terms of performance and it is important for the PP to collect and monitor accurate data for each stove model.

2) Quantity of fuel used by Baseline and project devices in tonnes per household

Similarly, for fuel measurement campaigns, sample sizes may be alternatively determined as per the valid KPT protocols.

The value of Parameter BCp,j,k,y, will vary depending on the ICS model and vintage. Hence for this parameter, the Primary Sampling Unit shall be defined as the group of ICSs of the same model and vintage. If two different ICS models being implemented in the same project, this will form two Primary Sampling Units. Under this project, three ICS Stove models but not limited to Jikokoa, Masupa, and Kuniokoa, will be distributed within the project boundary, Uganda, for the current project activity instances. Therefore, fuelwood and charcoal consumed for each project stove model and baseline stove in household can be distinguished clearly. BCb,i,y: A measurement campaign following the Kitchen Performance Test Protocol in control households that do not participate in the project, established prior to validation as statistically equivalent to the pre-project conditions of project households regarding baseline fuel consumption.

Roles and responsibilities of different participators are proposed to be as follows:

Entity/Person	Roles & Responsibilities
PersistentClimate India Private Limited	• VCS documentation development • Communicate with VERRA for all VCS related matters • Communicate with DOEs for validation & verification • Engage consultant or any entity for CDM process (if required) • Identify local partners for local representation and support • Identity suitable ICS manufacturers (both local & for import)

	• Design the installation plan for on ground implementation of ICS • Design the monitoring system (including data collection using digital tool & too collate in an electronic database) • Training and development of local resources (as may be required) • Regular Monitoring and quality assurance of data • Monitor & supervise on-ground installation, etc. • Annual Review meeting with Local Teams and other associated entities in order to ensure continuous improvements of the project activity
Local Representative	• To support & assist PP in achieving the stated goal of the project activity • Assist and facilitate PP in baseline data collection, efficiency testing, etc. • To be the local representative and communicate, act and engage in implementation activities of project activity • To identify and deploy suitable local team and resources for ICS installation, data collection, • Assist and facilitate PP during training of the Operational Team and capacity building across the end users. • To bridge any gap in between end users of ICS and PP in order to ensure smooth operation of the program to achieve overall objective of the project activity.

To ensure a random stratified sample selection, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its Serial 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 stratified 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. During sampling, there may be non-response from the target population. Over-sampling may be used to avoid non-response, however, sampling may be cease once required confidence/precision is met. In the case of parameters monitored for the first time the expected variation for that measure in the sample may be based on results from similar studies, pilot studies, or from the project planner's own knowledge / experience of the data (as per para 13 of Standard³⁷).

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

Data / Parameter	Nj,k,y			
Data unit	Number			
Description	Number of commissioned project devices of type j from batch k in year y			
Value applied:	Number of Stoves Models	Unit	Count Before Discount (Refer the Installation Summary in ER Sheet)	Count after discount
	Ny,1Masupa	Number	45,217	43,621
	Ny,2 Burn Jikkoa	Number	13,027	12,567

³⁷ https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20210531160756223/Meth_Stan05.pdf

	Ny,3Kuniokoa	Number	549	530
Comments	The number of units is determined at the time of verification for households with complete and unique registration records. Each record shall represent one ICS. It was observed during the survey that the persons bought multiple stoves and then resold to others. In all such cases PP has conservatively applied the discount so that each household with more than one stove is count as 1 stove only. The multiple stoves were discounted for the entire population on conservative grounds. Sampling Frame: Project Database (or combined group projects database in case of group level sampling) as defined by distribution date, appliance type, serial number, and end-user information. 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 and age a found operational in the sampling survey multiplied by total number of stoves of type i and age a in the project database			

Data / Parameter	nj,k,y		
Data unit	Fraction		
Description	Proportion of commissioned project devices of type j from batch k that are still being used regularly in year y		
Value applied:	Stoves Models	nj,k,y	
	Masupa	0.9	
	Burn Jikokoa	0.9	
	Kuniokoa	0.9	
Comments	-		

Data / Parameter	BC _{b,i,y}
Data unit	Tonnes
Description	Fuel used per baseline device type i during year y
Value applied:	4.31
Comments	-

Data / Parameter	$\eta_{\text{new,avg},y}$		
Data unit	Fraction		
Description	Weighted average efficiency of project devices in year y		
Value applied:	Stoves Models	Average thermal efficiency	Weighted average thermal efficiency
	Masupa	34.90%	36.41%
	Burn Jikokoa	41.69%	
	Kuniokoa	34.96%	
Comments	-		

Data / Parameter	BC _{p,j,k,y}
Data unit	tonnes or m ³
Description	Average quantity of fuel used by project device type j from batch k during year y

Value applied:	BCp,j,k,y	1.89	
Comments	N/A		

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	Project database
Description of measurement methods and procedures to be applied	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch
Frequency of monitoring/recording	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch
Value applied	02/01/2021 (<i>The first cookstove distributed under batch 1</i>)
Comments	--

The first monitoring period for the project is 01/01/2021 to 31/07/2021.

The second monitoring period for the project is 01-August-2022 to 31-December-2023

(a) Sampling Design

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

The sampling methodology is in accordance with the representative sampling methods provided by the sampling guidelines and standards as indicated in this section.

Sampling Methodology:

Sampling Objective – The sampling objective for each parameter is to determine, via sampling survey, a statistically significant parameter value for the emission reduction calculations.

(i) Objective and Reliability Requirements:

The objective is to obtain an unbiased and reliable estimate of the proportion or mean value of the following key variables over the course of the crediting period and with 90/10 confidence/precision (as per applied methodology VM0050: version 1.0):

Monitored Parameter:

S. No.	Monitoring Parameter	Description of Monitoring Parameter
1	$N_{j,k,y}$	Number of commissioned project devices of type j from batch k in year y
2.	$n_{j,k,y}$	Proportion of commissioned project devices of type j from batch k that remain operating in year y (fraction)

3.	BC _{b,i,y}	Fuel used per baseline device type i during year y
4.	BC _{p,j,k,y}	Average quantity of fuel used by project device type j from batch k during year y

Sample Plan: The monitoring plan designed to monitor the parameters listed in Section above, which are required for calculation of the actual GHG emission reduction achieved by the project activity using ex post sampling survey. The proportion of operating ICSs and the continued use of pre-project devices is determined based on sampling procedures as outlined below. The PP conducted the sampling surveys and is responsible for maintaining database with all operating stoves.

Physical visits to the end-user's premises were conducted to perform the ex-post sampling survey to monitor the proportion of operating stoves, the continued use of pre-project devices and the SDG impacts due to the implementation of the project. No monitoring for leakage through competitive uses of biomass is required, as the parameter charcoal/wood usage 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:

Sampling Frame

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

Sample method

Sampling was conducted using random sampling techniques³⁸ over the sampling frame, and detailed calculations are provided below as per CDM guidelines "Sampling and surveys for CDM

³⁸ Other Sampling approaches may be applied during the course of crediting period, in case needed.

project activities and programmes of activities”. Random Sampling will be used to select samples from the Project Database for monitoring parameters.

Sampling Constants	Values
Monitoring period start	01-August-2022
Monitoring period end	31- December-2023
Level of Sampling	Across Group Project
Confidence (%) (90 or 95)	90%
Margin of Error (%)	10%
Z value	1.645

The sample size is determined using the following formulas:

Monitoring parameter(s)			Number of commissioned project devices Nj,k,y		
Sampling frame(s)			Given stove model and vintage population		
Sampling approach			Stratified random sampling across stove model and vintage		
Sampling Population (i)	Model		Sampling frame size	Expected operational proportion (SoF)	Calculated Sample Size (n)
Charcol Stove	Burn Jikokoa		13027	0.95	7
	Masupa		45217	0.95	24
Wood Stove	Kuniokoa		549	0.95	1
Sample size determination					
Estimated SOF (p)					0.95
Estimated Standard Deviation of SOF (SD)					0.218
$V_{SOF} = (SD/p)^2$					0.053
Sample Size required (SOF)					30
Monitoring results					
Sampling Population (Batch)	Model	Sampling frame size	Monitored Sample Size (n _{i,j,total})	Operational Sample (n _{i,j,operational})	Monitored Operating Fraction (n _{i,j,operational} /n _{i,j,total})
Charcol Stove	Burn Jikokoa	13027	32	32	1.00
	Masupa	45217		36	1.00
Wood Stove	Kuniokoa	549	14	14	1.00
Reliability Check					
Samples Monitored				82	
SoF Measured				1.00	

Standard Error of SoF	0.0%	
Relative precision (Margin of error)	0.0%	
Result	Ok, reliability level met	
Lower Bound confidence value	Not applicable	

$$n \geq \frac{z^2 * N * V}{(N-1) * precision^2 + z^2 * V}$$

Monitoring parameter(s)	Proportion of commissioned project devices - n,j,k,y			
Sampling frame(s)	Given stove model population			
Sampling approach	Stratified random sampling across stove models			
Sampling Population (i)	Stove population	Expected value	Calculated Sample Size (n)	
Charcol Stove	Burn Jikokoa	13027	0.98	3
	Masupa	45217	0.95	10
Wood Stove	Kuniokoa	549	0.95	1
Estimated results based sample size determination				
Estimated utilization (p)				0.96
V _{Utilization} = p(1-p)/p ²				0.05
Minimum Sample Size required				13
Monitoring results				
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored Utilization	
Charcol Stove	Burn Jikokoa	13027	32	1.00
	Masupa	45217	36	1.00
Wood Stove	Kuniokoa	549	14	1.00
Reliability Check				
Samples Monitored				82
Utilization Measured				1.00
Standard Error of Utilization				0.00%
Relative precision (Margin of error)				0.00%
Result				Ok, reliability level met

Lower Bound confidence value	Not applicable
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6.2 Baseline Emissions

Baseline emissions are calculated as follows:

$$BE_y = \sum_{i,j,k} EC_{i,y} \times N_{j,k,y} \times n_{j,k,y} \times (EF_{b,i,CO2} \times f_{NRB,y} + EF_{b,i,nonCO2}) \quad (1)$$

Where,

BE_y	Baseline emissions during year y (t CO ₂ e)
$EC_{i,y}$	Average energy consumption of baseline device type i in year y (TJ)
$N_{j,k,y}$	Number of commissioned project devices of type j from batch k in year y
$n_{j,k,y}$	Proportion of commissioned project devices of type j from batch k that remain operating in year y (fraction)
$EF_{b,i,CO2}$	CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario (t CO ₂ /TJ)
$f_{NRB,y}$	Fraction of woody biomass that is established to be non-renewable used by baseline device in year y; this variable is not considered for fossil fuels (fraction)
$EF_{b,i,nonCO2}$	Non-CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario (t CO ₂ e/TJ)
i	Baseline device type and its respective fuel type
j	Project device type and its respective fuel type

The average energy consumption of baseline device type i is calculated as follows:

$$EC_{i,y} = BC_{b,i,y} \times NCV_{b,i} \quad (2)$$

Where,

BC_{b,i,y} Fuel used per baseline device type i during year y (tonnes)³⁹

NCV_{b,i} Net calorific value of baseline fuel for baseline device type i (TJ/tonne)

Baseline Emission:

Parameter	Value	Unit
BE _y	280344	t CO ₂ e
EF _{b,i,CO2}	112	t CO ₂ /TJ
f _{NRB,y}	0.65	fraction
EF _{b,i,nonCO2 wood}	9.46	t CO ₂ e/TJ
N _{y,1Masupa}	43,621	Number
N _{y,2 Burn Jikokoa}	12,567	Number
N _{y,3Kuniokoa}	530	Number
N _{y,Total ICS}	56,718	Number
n _{j,k,y}	0.90	Proportion
EC _{i,y}	0.060	TJ
Stove _{year} (Weighted Average)	1.11	year

³⁹ This parameter corresponds to BC_{ex-ante,b,i} for the first two years and where the follow-up baseline survey campaign shows that there are no significant changes in baseline fuel consumption. Otherwise, it corresponds to BC_{b,i,y}

The fraction of Non-Renewable Biomass (fNRB) has been calculated using CDM Tool 30, “Calculation of the fraction of non-renewable biomass” Version 4.0. The detailed fNRB,y estimation has been submitted. The fNRB for Uganda is calculated to be 88.24% using the CDM Tool 30, V4.0. As per section 9.2 of VM0050 V1.0, upon applying an uncertainty discount of 26% to this estimated value, the fNRB,y considered for the emission reduction calculation is 65%.

6.3 Project Emissions

Project emissions are calculated as follows:

$$PE_y = PE_{energy,y} + PE_{others,y} \quad (6)$$

Where,

PE _y	Project emissions during year y (t CO ₂ e)
PE _{energy,y}	Project emissions from energy consumption of project devices in year y (t CO ₂ e)
PE _{others,y}	Project emissions from other sources in year y (t CO ₂ e)

PE_{energy,y} from Biomass, Fossil Fuels, or Bioethanol

$$PE_{energy,y} = \sum_j \sum_k BC_{p,j,k,y} \times N_{j,k,y} \times NCV_{p,j} \times n_{j,k,y} \times (EF_{p,j,CO_2} \times f_{NRB,y} + EF_{p,j,nonCO_2}) \quad (7)$$

Where,

EF _{p,j,CO₂}	CO ₂ emission factor for fuel used by project device type j in the project scenario (t CO ₂ /TJ)
EF _{p,j,nonCO₂}	Non-CO ₂ emission factor for fuel used by project device type j (t CO ₂ e/TJ)

Project Emission

PE others= 0 tCO₂

Below are the values used for calculation of PE_{energy, y}

Parameter	Value	Unit
BC _{p,j,k,y}	1.89	tonnes/hh/yr
EF _{p,i,CO2}	112	tCO ₂ /TJ
EF _{p,i,nonCO2}	9.46	tCO ₂ e/TJ
NCV _{p,j}	0.0156	TJ/tonne
PE energyy	137,861	tCO ₂ e

PE_y =137,861 tCO₂e

6.4 Leakage

An adjustment factor of 0.95 is applied to the GHG emission reductions in Equation (11) (i.e., 0.95 × (BE_y – PE_y)).

6.5 Net GHG Emission Reductions and Removals

Net GHG emission reductions are calculated as follows:

$$ER_y = (BE_y - PE_y) \times 0.95 - LE_{RB,y} \quad (11)$$

ER_y Emission reductions during year y (t CO₂e)

$LE_{RB,y}$ Leakage emissions associated with use of renewable biomass during year y (t CO₂e)

$$ER_y = (280,344 - 137,861) * 0.95 - 0 = 135,359 \text{ tCO}_2\text{e}$$

Rounded down value of ER= 135,358 tCO₂e

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2022	82,804	40,720	-	39,980
2023	197,540	97,142	-	95,378
Total	280,344	137,861		135,358

Appendix 1: Details of Local Stakeholder Consultation

Photographs:





MINUTES TAKEN FROM THE LOCAL STAKEHOLDERS CONSULTATION ON VOLUNTARY CARBON EMISSIONS REDUCTION SCHEDULED ON THE 6TH OF JUNE 2022 AT KOLPING HOTEL KAMPALA

Theme: Reduced Emission from Improved and Efficient Cooking in Ugandan Communities

AGENDA

1. MINUTE 1: Opening remarks from Fred Barasa and breakfast
 - Recognizes partners present and presentative from Permanent Secretary's office ministry of Energy.
2. MINUTE 2: Communication from Lister Byamugisha MD Ezylife Holdings Ltd.
 - Welcomes guests to the breakfast meeting on reduction of emissions from improved and efficient cook stoves in Ugandan communities.
 - Provides a brief introduction into the project description and its background.
 - Highlights on the negative effects caused by the continued use of the 3 stones fire and traditional jiko such as the increased emission of carbon into the environment, damage to people's health leading to death from continued inhaling of the dangerous GHG and increased deforestation to provide the wood fuel used in cooking.
 - Introduces and showcases the Masupa stoves.
 - Reduction of biomass, conservation of natural resources due to reduced usage of fuel due to the energy saving features of the introduced cook stove.
 - Persistent climate India will take the lead role in managing the project while Ezylife will implement the distribution of the stoves to households in Uganda.
 - Collection of customer information and household data will be done and the information shared with patrons accordingly.
 - Shares the profile of Mr. Prakash Mishra who possesses over 17years in the industry.
3. Minute 3: Communication from Mr. Prakash Mishra, founder and MD Persistent Climate India Pvt. Ltd
 - Welcomes guests and stakeholders for the breakfast meeting and apologies for not having been able to make it in person.
 - Offers brief insight into his 2 decades work experience in Africa and presence in Uganda.
 - The experience of Covid-19 from which most businesses and activities came to a standstill except for food and cooking partly explains the hike in fuel prices such as petroleum, kerosene and LPG, gave rise to the need to come up with more efficient ways to offer a technology to the needy communities of Uganda that use efficient cookstoves.
 - 2021 January the project was fostered and goals set for piloting of over 8000 cookstoves but was hampered by Covid19 lockdown
 - The project is meant to help communities reduce expenditure on inefficient cook stoves that cause harm to their health.
 - Direct benefits of the cookstoves were also discussed such as the introduction of highly effective cook stoves and efficient technology by local people and for the local people, produced in the country and directly giving to the beneficiaries highly subsidized cookstoves.

- High tariffs and money related benefits.
 - Indirect benefits: consumption of less fuel such as firewood or charcoal, less pollution, less time spent on cooking and improved quality of life.
 - Direct benefit on money saving and less expenses on trouble cooking avoided.
 - The project targets an implementation of 50,000 stove. Presents opportunity to partners and invites them to offer learning points to the project at hand.
4. MINUTE 5: Communication from Madam Margaret Kabayambi E.D MASUPA and founder.
- Introduces some colleagues from MASUPA.
 - Provides brief background into MASUPA that was established in 2012, is a woman led partnership with production in line with cookstoves and briquettes and a section for training youth in stoves and production of briquettes.
 - The quality of their stoves and efficiency was tested by UNBS as well which led them to receive recommendation and referrals from both GIZ and ministry of Energy.
 - Introduces the head of finance MASUPA to offer more insights into the project details and some statistics.
5. MINUTE 5: Communication from Sylvia Nakandi MASUPA Head of Finance
- Introduction to MASUPA AND its 10 Years of existence.
 - Impact through skilling over 1500 people across the different sections of MASUPA mostly women and youth.
 - Economic impact through creation of employment opportunities for over 30 people with 5 people on full time and contract basis for the other 25 individuals.
 - In this project they hope to employ more people across the different stages of the project and across the entire production chain with a target production capacity of 2500 stoves a week.
 - MASUPA being among one of the first stove producers in Uganda to be certified by UNBS, priority is placed on the doing things the right way.
 - Ezylife is partnering with MASUPA as a distributor.
 - MASUPA generated a revenue of 29M UGX last year and expectation for growth to 288M UGX when the project is implemented
 - Expect to mitigate carbon emissions on a larger scale and improve on health standards of the people.
 - Calls on more suppliers to revise their prices so that they can get into the project together top have greater impact on the community.
 - Employment creation objectives from all the implementation impacts.
 - Increased household savings from an efficient cookstove from saving at least 50% of the charcoal.
 - Recycling of waste materials into briquettes and scrap into efficient energy saving cookstoves to provide the market with high quality efficient cook stoves.
 - Project focus is on mitigation of carbon emissions to reduce the negative impact of negative effects of climate change such as the deforestation, mudslides and soil erosion.
 - Prosed Impact of the project includes saving on finance, fuel and improving safe cooking.

6. MINUTE 6: DISCUSSIONS, Q&A session.

- Question on sustainability of the project: Nampijja Zainah
- Suggestion on training to be included in the different areas to avoid supply shocks that may prompt people to go back to the inefficient cooking practices. MASUPA should expand training facilities to other parts of the country to promote sustainability of the product.
- Raises question on calculation method used to determine the 3M tonnes of carbon emissions reduction that will be done by the project.
- Addresses the gap for training in the value chain in line with handling the raw materials used in order to be able to make efficient cook stoves and how to utilize them even with daily usage of the product.
- Proposes the idea of bringing MUK students on board to bridge the perception gap and stories on cook stoves. Collecting data and understanding the people and reasons behind why they dropped off for those who did and calculating the units say of the level of cut forest and quantifying carbon emissions.

7. Communication from Mr. Prakash Mishra

- VCS unit of measuring carbon emissions.
- Target of 50,000 stoves to reduce emission of GHG with consideration of 6 major GHG is the focus as concern is raised by the drastically rising and changing climate levels such as the 50°C.
- Experienced in validating and quantifying cookstove projects. That is why he believes attaching a value to the cookstove will make people appreciate it rather than if it is provided for free.
- With standards compliance in place, positive validation will be provided to the project. It will undergo rigorous reviews and adjustments will be made as recommended until the carbon credits are received.
- The stove is subsidized so people can afford it on the market.
- Exact amount of carbon emission reduced and how to calculate it. They calculate the input fuel used on baseline devices. The saving capacity from the 3 stone fire or the traditional jiko in comparison to the efficient cook stove. The measure is on the fuel saved in comparison to the baseline stove. Feedback from the customers will also be used to record the fuel saved (at least 50% has been saved as recorded from MASUPA clients) to show carbon emissions saved.
- Target market is the really needy people outside central Uganda's communities. People using the 3 stone fire to cook or the traditional jiko but can be converted to the efficient cook stove
- Suggested that as part of project training and design, when a survey is to be conducted on monitoring and implementation, then students at the university can be included so they can get training every year.
- Target focus will be the students in agricultural so they can be impacted on through capacity building.
- Stove design should be intact because stove efficiency can do down by just one design mistake.

- Basic idea of calculation between design and is a device with fuel saving capacity, highly carbon efficient in terms of the baseline case. Input fuel reduction is measured in terms of charcoal usage by the end user say reduction in charcoal used by 50%.
 - Provides formula for measurement of carbon emissions saved by the efficient fuel saving cook stove.
 - Advocates for changing mindsets about the usage of the different modes of cooking fuels i.e., wood fuel and informs the guests that they are in the process of developing a duo cook stove that can use both wood and charcoal fuel efficiently. They
8. MINUTE 10: Communication from Annet Sempala Endev. GIZ
- Shares insight into what GIZ inline with businesses to increase access to clean cooking energy and technologies.
 - GIZ improves distribution mechanisms by increasing stores upcountry, increase sales teams so that their products are brought upcountry.
 - GIZ improves production capacity of business entrepreneurs say from using manual hand mixers to using machine mixers.
 - Ensuring training on what SMEs need to improve the quality of products used and supplied.
 - Business support from SMEs to partners.
9. MINUTE 11: Communication from Muyanja Hatimu
- Energy Officer from Ministry of Energy and Mineral development
 - Offers statistical insights into how much bio mass contributes coming to about 1.6G Watts in the country.
 - Explains the role of government in creating and facilitating the existing government policies, opportunities for the cookstoves sector.
 - Conducive environment and policies to facilitate the work of companies/ businesses in the cookstove line, establish and promote the rationale and exploitation of renewable energy resources in the country.
 - 91.1% contribution of bio mass according to the 2020 statistics showing the high level of importance of bio mass in the country.
 - 89% contribution to the mix of what is being consumed in terms of energy.
 - To ensure reliable, equitable, efficient and environmentally sustainable development, management and utilization of energy resources and services.
 - Presents the key challenges faced in the renewable energy resources sector including financing mechanisms, limited awareness of availability, benefits and opportunities of renewable energy, inefficient utilization of bio mass energy resources.
 - Communicates on the opportunities available in the cookstove sector such as the dissemination of efficient technologies, capacity building, training of artisans in construction of improved cookstoves, tree plantation to provide wood fuel, credit financing under UECCC and awareness creation on sustainable bio mass.
 - Participation of government in the project
 - Provision of supportive documents towards the project development.
 - Supervision and monitoring project activities

- Awareness creation and sensitization
 - Developed standard for the HH cook stoves and for the institution are under development.
- The proposed project of reduced emissions from improved and efficient cooking in Uganda is vital for the country and the ministry pledges its support.
- Appreciates the field partners MASUPA and Ezylife holdings Ltd.
10. Discussion session, Q&A session.
- I. How can we scientifically highlight and point out the challenges faced in distribution of efficient cook stoves? Sylvia Aarakit MUBS
- Through addressing issues of trust, contact numbers have been attached on each stove bearing the direct contacts of the directors the stove comes with a 1 year's warranty such that if anything happens within that 1 year (not fault/caused by the customer) the company will repair the stove.
- Receipts are also issued for each purchased stove which carries a unique serial number for authenticity.
- Stoves can be used for up to 1 year.
- Stoves come in different sizes with the target market being the average of 4 to 5.5 in the family size cooking for up to at least 12 people.
- II. What are some of the lessons learnt during the pandemic in line with supply management? Jessica Sendagire
- Failure to make timely collection, to avoid a high default rate the business shifted from a high-cost stove to a low-cost stove.
- Delivery and supply channel delays, the business shifted from the imported BURN cook stove to the locally produced MASUPA cook stove.
- Shifted from their own agents to village entrepreneurs-based agents to facilitate data collection, trained them on usage and maintenance of the stoves and incentivized them with commissions to promote sales.
- The village vendor model where the village-based vendors are picked and used to promote the sales since they are more trusted than the new non local vendors.
- III. Social sustainability, environmental sustainability: question raised by Vincent Nturawabe MD Water for people.
- If it is not a limitation by resources, why can't we front both briquettes and cook stoves with the same energy? Why is the business model focused only on the eastern part of the country?

Focus on the East is to be able to spring board off it into the other areas and efficiently serve them. However, we have a presence in Western Uganda in Mbarara from which we have reached Ntungamo and Isingiro and other parts of the country as well.

As far as the briquettes are concerned, there have been efforts taken to promote the briquettes for example provision of a free kg of briquettes when someone buys a stove. But as awareness grows the briquettes project can be scaled as well.

Social sustainability and environmental sustainability of the project, the project is targeting small entrepreneurs and households, SMEs that might need more than one cook stove. About maximum stove size the Ugandan household survey the target is to provide the households with a family size of 4 to 5.5 people. Different sizes are also being developed to provide for larger family sizes allowing them to have more access.

Sustainable development goals include carbon emissions reduction which is the key goal of the project through reduction of input fuel used in cooking such charcoal and firewood.

Social sustainability of the project, they have partnered with MASUPA which is a woman led enterprise and as such promoting gender balance and reducing the gender inequality gap.

More than 4 to 5 of the SDGs are covered by the project.

- IV. GHG considered mainly 2 carbon and methane that are mostly visibly emitted through firewood burning, reduction of charcoal usage shows a reduction in the emissions of the GHG emitted into the environment.

The need for data aggregation and sharing has been raised. Focus on the eastern region has been questioned and the participants encouraged to expand the reach to other regions to share the technology.

Urges the ministry of energy to share the variables they would want collected in the data collected by the project.

- V. GAVA JOB Principal Quality Control Officer NWSC
Appreciates the MASUPA for the effort and strides taken in line with energy usage. Policies in place are not robust enough. What are the viable sustainable substitutes government is putting in place for the for the Bio mass as its increased consumption poses a threat to the environment?
What kind of policies is government coming up with or the renewable resources government can come use to provide as an alternative to Bio mass? Can fecal sludge be used as an alternative source of fuel?

Proposed substitutes for the Bio Mass

- Bio gas at household level.
- Bio gas at institutional level such as in schools where fecal matter can go through the _____ process so that some gas can be produced.
- Proposed development of a biogas system.
- Liquified petroleum gas promotion to be used.
- E cooking is a subsidy when cooking is done using electricity. However, this is at a large-scale cooking.
- Briquettes at large scale (loose bio mass)
- Ethanol cooking using ethanol stove.

- VI. How are we planning to solve the waste problem after the stove has been used in its 8 years? What is the project waste management policy after the stove lifetime has been reached? Bosco Amerit Researcher MUBS

- VII. How can we utilize volcanic rock?

Volcanic stores do not provide fuel for cooking. However, they increase surface area for cooking and the moment you provide the fire and it starts running you are able to increase the surface area from which you are cooking.

Funding will be needed to venture into volcanic rocks as a fuel source in the MASUPA stoves.

The receipts should be kept to enable the MASUPA team to be able to offer maintenance and repairs.

- VIII. What processes /ways have you put in place to mitigate the pa go credit risks involved.

Trying to increase the carbon market by having already subsidized cook stoves on the market.

The time for project implementation will enable the project cushion the changing market prices over the entire period.

- IX. MINUTE 11: Closing remarks

Thanks, the guests for attending the breakfast meeting and sharing their perspectives and allowing the project team to learn from them from the early stages on wards and on the different levels.

Recommends that they start manufacturing the cookstoves as early as possible to allow the project to start.

We should have more collaboration with local people especially self-help groups at local levels or village levels.

Appendix 2: Details of SDGs Monitored

Table 2: Sustainable Development Contributions : for the monitoring period of MP2, starting from 01-08-2022 to 31-12-2023.

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Monitoring Period
<i>Sequential row number</i>	<i>SDG Target number</i>	<i>Number and text of SDG indicator or, if no official SDG indicator is applicable, user-defined indicator</i>	<i>Indicate the project's contribution to the SDG Indicator (implemented activities to increase or decrease)</i>	<i>Brief description of the quantifiable impact of the project's activities related to the SDG indicator, during the monitoring period.</i>	<i>Brief description of the cumulative quantifiable impact of the project's activities related to the SDG indicator, over the project lifetime.</i>

1)	3.9	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	The efficient cook stove leads to a reduction in fuel consumption and as a consequence to an improvement in indoor air quality. This has positive impacts on decreasing in health-related issues like respiratory problems, eye and throat irritations. The relevant indicator is: Mortality rate attributed to household and ambient air pollution.	The contribution to SDG 3 is calculated as the number of households confirming improvement in air quality. To collect information on the improvement of air quality, the Monitoring Kitchen Survey includes 2 questions related to that topic: Do you think there is any difference in how much smoke is produced by the improved stove compared to the 3-stone fire? Do you think the improved stove produces more or less smoke than the 3-stone? The share of households confirming less smoke by the improved stove in the Monitoring Kitchen Survey will be multiplied with the number of stoves disseminated under the specific VPA and will result in the number of households confirming improvement in air quality. $S_{\text{(less smoke)}} = S_{\text{install}} \times \left[\frac{HH}{HH} \right]_{\text{(less smoke,y)}} \times U_{\text{(p,y)}}$	Mortality rate attributed to household and ambient air pollution The project has achieved the reduction in smoke and thus prevented the mortality rate in the households. Reduction of 100% smoke as results itchy eyes. PP has undertaken a monitoring survey clubbed with the other survey as part of SDG#13.
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				less smoke No of households with improved in-air quality Sinstall Number of stoves installed HHless smoke,y Share of households confirming less smoke through improved stove Up,y Usage rate in year y	
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2)	5.4	Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate	Women and girls perform the majority of unpaid domestic work. This leaves them with less time to rest, study and realise their economic potential, leaving them in time poverty. In regards to time, women are poorer than men as unpaid domestic duties, such as collecting firewood, must be added to their market productive work, making time much scarcer. Women are widely recognized as being principally responsible for natural resource collection. These trends demonstrate that reducing the amount of firewood required by households has the potential to reduce the time poverty of women, because the time burden of collecting firewood, which falls disproportionately on women, will be reduced. The average % decrease per household in time spent gathering firewood will be	The overall reduction in time spent collecting firewood by the project activity are then calculated as follows: $TR_y = (T_{b,y} - T_{p,y}) / T_{b,y}$ Where: TR_y = Total reduction time spent collecting firewood for project activity in year y (%) $T_{b,y}$ = Baseline time spent collecting firewood per household per day (hours) $T_{p,y}$ = Project time spent collecting firewood per household per day (hours)	Reduction in time spent collecting fuelwood from the forests or charcoal from market. PP has undertaken a monitoring survey clubbed with the other survey as part of SDG#13, the survey was designed in such a manner to capture the per week hours' time before project stove implementation and after. The time saving is calculated as below: <table><tr><th>Time spent in fuel collection per week before ICS Purchase (Hrs)</th><th>Time spent in fuel collection per week after ICS Purchase (Hrs)</th><th>Time saved for collecting fuel after purchasing Project ICS</th></tr><tr><td>1.683</td><td>0.840</td><td>0.843</td></tr></table>	Time spent in fuel collection per week before ICS Purchase (Hrs)	Time spent in fuel collection per week after ICS Purchase (Hrs)	Time saved for collecting fuel after purchasing Project ICS	1.683	0.840	0.843
Time spent in fuel collection per week before ICS Purchase (Hrs)	Time spent in fuel collection per week after ICS Purchase (Hrs)	Time saved for collecting fuel after purchasing Project ICS									
1.683	0.840	0.843									

			taken as a proxy contribution towards the SDG target.										
3)	13.3.	Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	Implemented activities to increase	The emission reductions will be quantified as per the methodology applied.	GHG Emissions measured in tons CO₂ <table><tr><th>Vintage wise ERs</th><th>Amount achieved during this monitoring period tCO2e</th></tr><tr><td>2022</td><td>39,980</td></tr><tr><td>2023</td><td>95,378</td></tr><tr><td>Total</td><td>135,358</td></tr></table>	Vintage wise ERs	Amount achieved during this monitoring period tCO2e	2022	39,980	2023	95,378	Total	135,358
Vintage wise ERs	Amount achieved during this monitoring period tCO2e												
2022	39,980												
2023	95,378												
Total	135,358												
4)	7.3:	By 2030, double the global rate of improvement in energy efficiency	For this project, the baseline scenario is the number of households using traditional cook stoves. This project increases the adoption rate of efficient cookstoves.	The outcome of SDG 7 will be measured by the number of efficient cookstoves distributed during the project.	Number of project households predominantly using clean cooking devices such as Improved Cook Stoves.								

5	8.1	Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries.	The survey will be undertaken to arrive the figure of monitory saving after implementing energy efficient stove.	The outcome of SDG 7 will be measured by survey.	Monitory saving will be monitored through the project survey. PP has undertaken a monitoring survey clubbed with the other survey as part of SDG#13, the survey was designed in such a manner to capture the monitory saving as a result of ICS purchase. The saving is calculated as below: <table><tr><th>(If the fuel consumption has decreased), How much money is being saved each month after using the ICS?</th><th>How much money is being saved each month after using the ICS? (Percentage)</th></tr><tr><td>UGX 21,646</td><td>36.54%</td></tr></table>	(If the fuel consumption has decreased), How much money is being saved each month after using the ICS?	How much money is being saved each month after using the ICS? (Percentage)	UGX 21,646	36.54%
(If the fuel consumption has decreased), How much money is being saved each month after using the ICS?	How much money is being saved each month after using the ICS? (Percentage)								
UGX 21,646	36.54%								

The Sustainable Development Contributions are tabulated above.=X=