



**Verified Carbon
Standard**

REDUCED EMISSIONS FROM IMPROVED AND EFFICIENT COOKING IN UGANDAN COMMUNITIES



PERSISTENTCLIMATE INDIA PRIVATE LIMITED

Project Title	Reduced Emissions from Improved and Efficient Cooking in Ugandan Communities
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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 334,229 tCO₂e (rounded down) with a total of 3,342,291 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, being a revision to the CDM small-scale methodology AMS-II.G., "Energy efficiency measures in thermal applications of non-renewable biomass": VMR0006 Methodology for Installation of High-Efficiency Firewood Cookstoves.

The proposed Project is not excluded from the scope of the VCS Program as per Table 1 of VCS-Standard, v4.3.

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 schemes outside of this project	- 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 instance are not part of any other CDM or Voluntary GHG trading scheme.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
			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 VMR0006.	The additionality demonstration as per the VMR0006 shall be established by each instance, the evidence of same shall be furnished to the VVB.
5.	Baseline	The new instance shall adhere the baseline requirements of the VMR0006.	Baseline scenario assessment shall be part of each instance and adhere the requirements of VMR0006. The baseline values shall be part of VVB validation.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
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 VMR0006.	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 VMR0006. Refer the subsequent section 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 stakeholder consultations and environmental impact analysis	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 social economic situations. The key stakeholders of the program both at group project activity and new	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 environmental impact assessment have been proven in the group PD.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
		project instance level are the same. No further actions needed at the new project instance level to satisfy the eligibility criteria.	
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 PD. 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 subsequent sections.
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.
11.	VER ownership	End users receiving ICSs under the specific new project instance contractually cede their rights to claim and own emission reductions under	A default distribution agreement for end users including the provision that emission reductions generated by the stove are owned by the project

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
		the VCS to the project proponent of the group 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 VMR0006.	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
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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 affect 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	
Large project	X ⁴

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.	91,579
2.	364,750
3.	363,168
4.	361,569
5.	359,954
6.	358,323
7.	356,675
8.	364,750
9.	361,569
10.	359,954
Total estimated ERs	3,342,291
Total number of crediting years	10
Average annual ERs	334,229 (Rounded down)

⁴ Values higher than 300,000 tCO₂e/year

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 passed 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

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:

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° 21' 54.6786" N	32° 18' 16.7418" 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
1° 01' 11.40" N	34° 22' 17.99" 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 policy⁵ 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.

⁵ <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
<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. $S_{\text{(less smoke)}} = S_{\text{install}} \times \left[\frac{HH}{HH} \right]_{\text{(less smoke,y)}} \times U_{\text{(p,y)}}$ $S_{\text{less smoke}}$ No of households with improved in-air quality	Mortality rate attributed to household and ambient air pollution
----	-----	---	--	---	--

				S_{install} Number of stoves installed	
				$HH_{\text{less smoke},y}$ Share of households confirming less smoke through improved stove	
				Up,y Usage rate in year y	

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 taken as a proxy contribution towards the SDG target.	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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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
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.

1.18 Additional Information Relevant to the Project

Leakage Management

Not applicable as the project adopts a net gross 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 Uganda 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, stipulating hours and overtime. Some of these issues have emerged due to the rapidly changing world of work. The employer should ensure that 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 aligned to the organisation's needs. In addition, the employer should take care of the job description provision "... any other duties that may be assigned to you (employee) from time to time to mean such duties and responsibilities that are essential to fulfilling the purpose of the position. The provisions of the job description should be reduced to key performance indicators that are quantifiable and measurable within the period within which they apply. The key

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, Masupia 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 Buyam@ezylife.com or Call 0787618792 / 0700198589 / 0774023239

Date: 6th June 2022
Time: 8:00am
Venue: MacKinnon Suites

Please contact us for more information:

Elzer Buyamughe
CEO EzyLife

Mobile: +256787618792
Email: Buyam@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: VMR0006- Methodology for Installation of High Efficiency Firewood Cookstoves
Version: 1.1

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.

VCS Methodology applicability condition	Project justification
Project activities must introduce efficiency improvements in thermal applications of non-renewable biomass in the following premises: households, community-based	The project activity instances are ICS designed to be used for cooking in domestic premises, or in community-based kitchens. PP would like to clarify that all the ICS under the group project shall be distributed to households,

kitchens., institutions (e.g., schools) or small and medium-sized enterprises (SMEs).	community-based kitchens., institutions (e.g., schools) or small and medium-sized enterprises (SMEs) only. The evidence of the same for the distributed ICS till this verification have been furnished to VVB and it can be evidenced that all users are HHS.								
The project stove shall have specified high-power thermal efficiency of at least 25% per the manufacturer's specifications and shall exclusively use woody biomass and can be single pot or multi-pot; in case of project stove replacing fossil fuel baseline stove, it shall exclusively use renewable biomass.	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 size I (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 border="1"> <thead> <tr> <th>Type of Stove</th><th>Average Tested Initial Efficiency</th></tr> </thead> <tbody> <tr> <td>Burn Jikokoa Model</td><td>53.7%</td></tr> <tr> <td>Masupa Model</td><td>38.0%</td></tr> <tr> <td>Kuniokoa Model</td><td>42.40%</td></tr> </tbody> </table>	Type of Stove	Average Tested Initial Efficiency	Burn Jikokoa Model	53.7%	Masupa Model	38.0%	Kuniokoa Model	42.40%
Type of Stove	Average Tested Initial Efficiency								
Burn Jikokoa Model	53.7%								
Masupa Model	38.0%								
Kuniokoa Model	42.40%								
Both 'Projects' and 'Large Projects' can use this methodology.	The Project is of 'Large Project' scale								
Non-renewable biomass has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports or statistics ⁵ .	In 1985, more than 90% of total non-commercial energy demand in Uganda was met through fuelwood and charcoal ⁶ . There has not been significant change in the non- commercial energy scenario since 1980 and the majority of household energy demand was met through charcoal and fuelwood even in year most recent years (2019) in Uganda.								

⁶ https://eprints.utas.edu.au/20247/1/whole_KahangireBaturaine1985_thesis.pdf

	According to Uganda-Wood Fuel Overview by Waves published in June 2019⁷, total demand of wood fuel in Uganda was 53.1 million MT and wood fuels accounts 88% of all energy need in Uganda. The bulk of wood fuels (87% in fuelwood equivalent) are consumed by households, while industry and the commercial sector account for the balance (UBOS, 2018) It can therefore be concluded that non-renewable biomass has been used in Uganda since long back before 31st December 1989.
<i>For the specific case of biomass residues processed as a fuel (e.g. briquettes, wood chips), it shall be demonstrated that: (a) It is produced using exclusively renewable biomass (more than one type of biomass may be used). (b) The consumption of the fuel should be monitored during the crediting period and (c) Energy use for renewable biomass processing (e.g. shredding and compacting in the case of briquetting) may be considered as equivalent to the upstream emissions associated with the processing of the displaced fossil fuel and hence disregarded.</i>	This is not applicable as no processed biomass will be used under this group project activity.
<i>Additionally, applicability criteria numbers 8 and 9 set out in Section 2.2 of AMS II.G, version 11.1, later reflected under para 7 and 8 of AMS II.G, version 12 are demonstrated as below</i>	
<i>The Project Description shall explain the proposed method for distribution of project devices including the method to avoid double counting of emission reductions such as unique identifications of product and end-user locations (e.g. programme logo).</i>	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.

⁷<https://www.wavespartnership.org/sites/waves/files/kc/WAVES-Woodfuel%20Overview%20Technical%20Report%20Design%20Layout%20Final%20October.pdf>

<i>The Project Description shall also explain how the proposed procedures prevent double counting of emission reductions, for example to avoid that project stove manufacturers, wholesale providers or others claim credit for emission reductions from the project devices.</i>	Stove manufacturers, wholesale providers and any other entity involved with the manufacturing, sale and/or distribution of the ICS shall enter into a contractual agreement with the PP that the ICS' under the Project are not included in any other GHG reduction certification scheme. The PP shall continuously monitor other developments of ICS distribution schemes in the region and shall perform regular cross-checks to ensure itself that any new projects/programmes are not including the ICS' under the proposed Project.
Tool 30: 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.

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:



	Source	Gas	Included?	Justification/Explanation
Baseline	Emission from use of non-renewable biomass/Fossil fuel	CO ₂	Yes	Major source
		CH ₄	Yes	Major source
		N ₂ O	Yes	Major source
		Other	No	No other source identified
	Production & Transport of Fuel	CO ₂	Yes	Not considered (Same practices are applied in baseline and project therefore the emissions can be ignored)
		CH ₄	Yes	Not considered (Same practices are applied in baseline and project therefore the emissions can be ignored)
		N ₂ O	Yes	Not considered (Same practices are applied in baseline and project therefore the emissions can be ignored)
		Other	No	No other source identified
Project	Emission from use of non-renewable biomass	CO ₂	Yes	Major source
		CH ₄	Yes	Major source
		N ₂ O	Yes	Major source
		Other	No	No other source identified
	Production & Transport of Fuel	CO ₂	Yes	Not considered (Same practices are applied in baseline and project therefore the emissions can be ignored)
		CH ₄	Yes	Not considered (Same practices are applied in baseline and project therefore the emissions can be ignored)
		N ₂ O	Yes	Not considered (Same practices are applied in baseline and project therefore the emissions can be ignored)

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

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 80% population is still using the inefficient firewood cooking practices. Assumptions are described in the section 5 of joint VCS PD/MR.

3.5 Additionality

Activity Method

Step 1: Regulatory Surplus

There is no mandatory legal requirement for installation of cookstoves in households/institutions of Uganda. The evidence to substantiate the same shall be furnished to VVB.

Step 2: Positive List

Criteria:

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 applicability conditions of this methodology represent the positive list. The project must demonstrate that it meets all of the applicability conditions of the methodology as well as the below condition. In so doing, the project is deemed as complying with the positive list.

1. Where the project activity installs or distributes stoves at zero cost to the end-user and has no other source of revenue other than the sale of GHG credits, the project activity shall be deemed additional.

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

2. Project activities that are implemented as part of government schemes or are supported by multilateral funds cannot be considered additional even if the stoves are distributed free of cost or at a highly subsidized rate and hence are not eligible to use this methodology.

Justification: The project activity is voluntary activity and is not part of any government scheme therefore the criteria met. the PP is charging a minimal amount of around 3.9 US\$ as administrative cost from the households. The cost is charged just to avoid misuse of ICS, which is potentially possible if the ICS are distributed at zero cost. People can just collect and do not use it. Notwithstanding, PP has used the project method too to demonstrate the additionality of project below.

Step 3: Project Method

The "Tool for demonstration and assessment of additionality" Version-7.0.0 EB 70 Annex-08 is applied to demonstrate additionality

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

include:

Step 0- Demonstration whether the proposed project activity is the first-of-its-kind

Step 1- Identification of alternatives to the project activity consistent with current laws and Regulations

Step 2. Investment analysis

Step 3: Barrier analysis

Step 4: Common practice analysis

Step 0- Demonstration whether the proposed project activity is the first-of-its-kind

The proposed project activity is not first of its kind in host country.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity:

The project activity is to distribute improved cookstove to individual households to traditional stoves, the alternatives to the project activity are

- a) *The proposed project activity undertaken without being registered as a VCS project activity.*

b) Continuation of the current situation.

Outcome of Step 1a: Identified realistic and credible alternative scenario(s) to the project activity

The alternative identified are

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

(c) Continuation of the current situation wherein the 94% population is using the non-renewable 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)”.

It is demonstrated in baseline section that 90% users uses in the inefficient cooking practices.

Sub-step 1b: Consistency with mandatory laws and regulations:

There are no policies in host country to regulate fuel usage for cooking at household level and both the alternative identified above are in compliance in host country rule and regulations.

Outcome of Step 1b: Identified realistic and credible alternative scenario(s) to the project activity that are in compliance with mandatory legislation and regulations taking into account the enforcement in the region or country and EB decisions on national and/or sectoral policies and regulations

Both the alternative identified above are in compliance with host country regulation.

Step 2: Investment analysis

To conduct the investment analysis, use the following Sub-steps:

Sub-step 2a: Determine appropriate analysis method

As the project proponent will sale ICS at a significantly lower price than purchase cost of ICS and there is no other economic benefit than sale of VCUs, hence a simple cost analysis is chosen by PP. The project is not generating any profit as it is clearly demonstrated in the following step and making loss without the carbon revenue.

Sub-step 2b: Option I. Apply simple cost analysis

The proposed grouped project intends to distribute the ICS at a reasonable subsidy to users i.e., households and substitutions; hence financial return from the programme will be less than the cost incurred in ICS purchase and distribution cost to the end-users, further the project proponent will hire a team for supply chain and maintenance and repair. As each ICS has certain costs associated with the production/purchase, distribution, data

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

management, monitoring and verification etc., the programme will not occur in absence of the carbon revenue. The action is not financially viable without the support of revenues from the sale of VCU's (carbon credits). As the end-user does not benefit from a direct financial return and procuring ICSs requires capital, which is a barrier to rural/semi-urban consumers due to difficulties in accessing capital, wide dissemination of ICSs in the Host Country is highly unlikely. The actions under the project will alleviate these barriers by promoting the distribution of improved cookstoves (ICSs) to the end-users at an affordable price (subsidised). Hence, the project faces an investment barrier and is demonstrated to be additional. The simple cost analysis is substantiated below:

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	19.00	Masupa	3.9
Kuniokoa	26	1.5.2-5	Kuniokoa	19.00	Burn Jikokoa	11.00
					Kuniokoa	09.00
Based on the Invoice of Manufacturers and End Users			As per the framework of group VCS project			

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

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

Step 3: Barrier analysis:

Not chosen by PP.

Step 4: Common Practice Analysis:

As per information available in the public domain^{11,12} the penetration level of ICS is very low in 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.

3.6 Methodology Deviations

Following deviation requested:

For charcoal baseline efficiency, please note that the survey was not possible before project implementation (as per the methodology section 9.2) due to the peak COVID-19 scenario prior to the implementation and therefore a survey was undertaken by PP clubbing it with the first monitoring survey. It was observed during the survey that the HHs are using the traditional charcoal stoves in baseline without the chimney or grate. The efficiency of such stoves was sourced from the research paper. The research paper 'Development of bioenergy technologies in Uganda: A review of progress under section 2.1.1' states, "Traditional charcoal stoves, on the other hand, are locally made using scrap metal materials such as roofing sheets and oil drums, but do not have insulation lining; therefore, leading to excessive heat loss during operation. The efficiency of these stoves is reported to be less than 10%).

PP conservatively considered the efficiency as 15%.

¹¹ <https://www.myclimate.org/information/carbon-offset-projects/detail-carbon-offset-projects/uganda-efficient-cook-stoves-7245/>

¹² <https://mecs.org.uk/wp-content/uploads/2022/06/Ugandas-cooking-energy-sector-a-review.pdf>

4 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The improved cookstove is introduced as energy efficiency measure in the project, therefore equations 1 and 2 of the methodology will be applied to calculate the net GHG emission reductions.

$$ER_y = \sum_i \sum_j ER_{y,i,j} \quad \text{Equation (1)}$$

Where:

- i = Indices for the situation where more than one type/model of improved cookstove is introduced to replace three-stone fire
- j = Indices for the situation where there is more than one batch of improved cookstove of type i
- ER_y = Emission reductions during year y in t CO₂e
- $ER_{y,i,j}$ = Emission reductions by improved cookstove of type i and batch j during year y in t CO₂e

$$ER_{y,i,j} = B_{y,savings,i,j} \times NCV_{wood\ fuel} \times f_{NRB,y} \times (EF_{wf,CO_2} + EF_{wf,non\ CO_2}) \times N_{y,i,j} \times 0.95 \quad \text{Equation (2)}$$

Where:

- $B_{y,savings,i,j}$ = Quantity of woody biomass that is saved in tonnes per improved cookstove of type i and batch j during year y
- $f_{NRB,y}$ = Fraction of woody biomass that can be established as non-renewable biomass (f_{NRB})
- $NCV_{wood\ fuel}$ = Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonne)¹³

¹³ 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 1 Introduction

EF_{wf,CO_2}	=	CO ₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO ₂ /TJ) ¹⁴
$EF_{wf,non\ CO_2}$	=	Non-CO ₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO ₂ /TJ) ¹⁵
$N_{y,i,j}$	=	Number of improved cookstoves of type i and batch j operating during year y
0.95	=	Discount factor to account for leakage

To calculate $B_{y,savings}$, we use Option 1 of the applied methodology¹⁶

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

Where:

B_{old}	Quantity of wood fuel used in the absence of the project activity in tonnes
η_{old}	A default value of 0.10 may be optionally used if the replaced system is a three stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e., without a grate or a chimney.
$\eta_{new,i,j}$	Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol.

As some of the project households continue to use baseline cookstoves along with improved cookstoves, B_{old} has been adjusted ex-post based on the percentage of project households found to continue such practice according to the Equation 6 of applied methodology as follows:

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

¹⁴ 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion

¹⁵ 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion

¹⁶ Equation 3 of methodology VMR 0006

Where:

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

For ex-ante estimates:

Calculation of f_{nrb} . Has been undertaken by using the CDM tool 30, the detailed calculation shall be furnished to VVB.

f_{nrb} value comes as 97.90%

Sample Calculation for the 1st year of operation

$$B_{y,savings,i,j} \quad (\text{For the first year}) = 5.2 \times (1 - 0.125/0.420)$$

- ERs will be claimed from the start date of crediting period i.e. 02/01/2021 but only the ICS which has been distributed on 02/01/2021 will claim from date, rest all ICSs will claim the ERs from the date of actual distribution and the rationale of calculating the average age is to account the actual number of days or year crediting of each stove in the monitoring period.
- It is assumed for the ex-ante calculation that PP will distribute the 50% firewood and 50% charcoal stoves therefore the weighted average of 50:50 for baseline fuel consumption has been considered. For ex-post the actual distribution numbers for each type of project stoves in terms of firewood and charcoal will be monitored. The calculation of arriving at weighted value i.e. $(6.02 \times 50\% + 4.38 \times 50\%) = 5.2$ Tonnes/annum) is demonstrated in ex-ante ER spreadsheet.
- Regarding the efficiency also the same assumption of 50% three stones stoves for the firewood baseline and the 50% inefficient charcoal stoves with 15% efficiency has been considered for ex-ante calculation and the weighted average 12.5% efficiency has been considered for calculation. For ex-post calculation the actual ratio was factored in the calculation.
- Average depreciated efficiency of all three models (42%) at the end of first year of stoves has been accounted for the ex-ante calculation on conservative grounds.

$$= 3.653 \text{ Tones/Year/Stove}$$

$$ER_{y,i,j} \quad (\text{For the first year})$$

$$= 3.653 \times 12,500 \times 0.979 \times 0.0156 \times (112 + 26.23) \times 0.95$$

$$= 91,579 \text{ tCO}_2 \text{ (Rounded down value)}$$

$ER_{y,i,j}$ (For the Second year)

$$= 3.637 \times 50,000 \times 0.9790 \times 0.0156 \times (112 + 26.23) \times 0.95$$

$$= 364,750 \text{ tCO}_2 \text{ (Rounded down value)}$$

4.2 Project Emissions

The methodology does not account for baseline emissions separately, but instead quantifies net emission reductions achieved by the project.

4.3 Leakage

Leakage is already accounted in calculation of emission reduction by adjusting with default value of 0.95.

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) ¹⁷	Estimated net GHG emission reductions or removals (tCO ₂ e)
2021-22	91,579	0	0	91,579
2022-23	364,750	0	0	364,750
2023-24	363,168	0	0	363,168
2024-25	361,569	0	0	361,569
2025-26	359,954	0	0	359,954
2026-27	358,323	0	0	358,323
2027-28	356,675	0	0	356,675

¹⁷ 5% leakage is already deducted and considered in the baseline calculation as per the methodology.

2028-29	364,750 ¹⁸	0	0	364,750 ¹⁹
2029-30	361,569	0	0	361,569
2030-31	359,954	0	0	359,954
Total	3,342,291	0	0	3,342,291

5 MONITORING

5.1 Data and Parameters Available at Validation

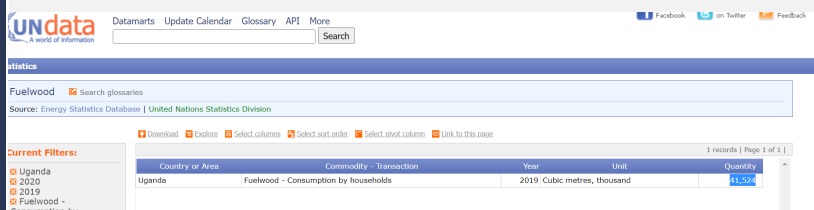
Data / Parameter	Bold
Data unit	Tonnes/ year
Description	Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices.
Source of data	UN Data for household fuelwood and charcoal consumption
Value applied	4.38 tonnes wood-eq/HH-yr (For Firewood baseline) 6.023 Tonnes/HH (For charcoal baseline)
Justification of choice of data or description of measurement methods and procedures applied	Historical fuel consumption in Uganda by using the UN data and the analysis is shown below. In 2019 the household firewood consumption in Uganda as per the UN data is: $41524 \times 1000 \text{ Meter}^3 = 41524000 \text{ Meter}^3$

¹⁸ It is based on the assumption that after 7 years the stoves will be redistributed after the completion of lifetime

¹⁹ It is based on the assumption that after 7 years the stoves will be redistributed after the completion of lifetime

Conversion Factor²⁰ = 1.38 Meter³/Tonne

Total consumption in Tonnes= 41524000/1.38²¹
=30089855.07 Tonnes



The screenshot shows the UNdata website interface. The search results for 'Fuelwood' in Uganda for 2019 are displayed. The table shows a quantity of 41,524,000 cubic metres for fuelwood consumption by households in 2019.

Country or Area	Commodity - Transaction	Year	Unit	Quantity
Uganda	Fuelwood - Consumption by households	2019	Cubic metres, thousand	41,524

The population of Uganda in 2019 was = 41000000²²

Family size of Uganda=4.6 (Same source as above)

Population of Uganda using firewood as fuel=77%²³

The firewood consumption per HHs comes out as= 30089855.07 Tonnes/(41000000/4.6)*0.77 HH
=4.38Tonnes/Year

Similarly for Charcoal:

In 2019 the household firewood consumption in Uganda as per the UN data is:

1,870,000 MT

The population of Uganda in 2019 was = 41000000 (Same source as above)

²⁰ (<https://www.forestresearch.gov.uk/tools-and-resources/statistics/forestry-statistics/forestry-statistics-2018/sources/timber-2/conversion-factors/>)

²¹

(<https://www.forestresearch.gov.uk/tools-and-resources/statistics/forestry-statistics/forestry-statistics-2018/sources/timber-2/conversion-factors/>)

²² https://www.ubos.org/wp-content/uploads/publications/09_2021Uganda-National-Survey-Report-2019-2020.pdf

²³ <https://sun-connect.org/fact-check-do-7-out-of-10-ugandans-use-firewood-for-cooking/>

	Family size of Uganda=4.6 (Same source as above) Population of Uganda using charcoal as fuel=20.9%²⁴ The charcoal consumption per HHs comes out as= 1,870,000 Tonnes/(41000000/4.6)*0.209 HH =1.004 Tonnes/HH Charcoal to wood conversion factor: 6 Therefore, the corresponding value for charcoal baseline in terms of wood as: =1.004*6 Tonnes/HH*HH (In terms of charcoal) 6.023 Tonnes/Year (In terms of firewood)
Purpose of Data	Baseline Emissions
Comments	The value is fixed ex-ante Where charcoal is used by baseline devices, a default wood to charcoal conversion factor of 6 Kg of firewood per kg of charcoal may be used in line with paragraph 35 of AMS II.G, version 12. The value for the charcoal stoves shall be calculated in line with the methodology before including the instances in the group project.

²⁴ <https://sun-connect.org/fact-check-do-7-out-of-10-ugandans-use-firewood-for-cooking/>

Data / Parameter	NCV _{woodfuel}
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted or reduced
Source of data	Default as per applied approved methodology VMR0006, v1.1
Value applied	0.0156
Justification of choice of data or description of measurement methods and procedures applied	Default value as per applied approved methodology
Purpose of Data	Calculation of baseline emissions
Comments	The value is fixed ex-ante

Data / Parameter	EF _{wf,CO2}
Data unit	tCO ₂ /TJ
Description	CO ₂ emission factor for the use of wood fuel in baseline scenario
Source of data	Default as per applied approved methodology VMR0006, v1.1
Value applied	112
Justification of choice of data or description of measurement methods and procedures applied	Default as per applied approved methodology VMR0006, v1.1
Purpose of Data	Calculation of baseline emissions
Comments	The value is fixed ex-ante

Data / Parameter	EF _{wf,non CO2}
Data unit	tCO ₂ /TJ

Description	The non-CO ₂ emission factor for the use of wood fuel in baseline scenario
Source of data	Default as per applied approved methodology VMR0006, v1.1
Value applied	26.23
Justification of choice of data or description of measurement methods and procedures applied	Default as per applied approved methodology VMR0006, v1.1
Purpose of Data	Calculation of baseline emissions
Comments	The value is fixed ex-ante

Data / Parameter	$f_{NRB,y}$
Data unit	Fraction
Description	Fraction of non-renewable biomass saved by the project activity
Source of data	CDM Tool
Value applied:	0.9790
Justification of choice of data or description of measurement methods and procedures applied	This parameter shall be determined ex-ante by using the CDM tool
Purpose of the data	Calculation of baseline and project emissions
Comments	The report of f_{NRB} will be made available to VVB during the validation.

Data / Parameter	η_{old}
Data unit	Fraction
Description	Efficiency of baseline cookstove
Source of data	Methodological default value
Value applied	0.1 (For firewood stoves)

	<i>0.15²⁵ (For conventional charcoal stoves)</i> (The research paper as linked in footnote 26 states under section 2.1.1, “Traditional charcoal stoves, on the other hand, are locally made using scrap metal materials such as roofing sheets and oil drums, but do not have insulation lining; therefore, leading to excessive heat loss during operation. The efficiency of these stoves is reported to be less than 10%). PP has conservatively considered the efficiency as 15%.
Justification of choice of data or description of measurement methods and procedures applied	A default value of 0.1 shall be used if baseline device is a three-stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney. 0.15 has been opted for charcoal stoves.
Purpose of Data	Calculation of baseline emissions
Comments	The value is fixed ex-ante

Data / Parameter	η_P			
Data unit	Fraction			
Description	Efficiency of project stove at the start of project activity			
Source of data	Manufacturer Appointed Third Party			
Value applied	Burn Jikokoa Model			
	Masupa Model			
	Kuniokoa Model			
	0.537	0.382	0.424	
	For this instance and firewood/charcoal stoves. All tests were undertaken by third parties as per the latest standards allowed by ASMIIG.			
Justification of choice of data or description of measurement methods and procedures applied	The parameter has been sourced from the efficiency tested in laboratory. Testing results shall be submitted to VVB for validation.			
Purpose of Data	Baseline Emissions			

²⁵ Development of bioenergy technologies in Uganda: A review of progress

Comments	For charcoal/other firewood models of improved stoves in future instances shall use the manufacturer's efficiency or efficiency tested in lab as per the WBT protocol.
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Data / Parameter	Life span
Data unit	Years
Description	The operating lifetime of the project device. The life span should be reported if the methodology equation 5 is adopted to determine the project stove efficiency
Source of data	Manufacturer specification
Value applied	7 ²⁶
Justification of choice of data or description of measurement methods and procedures applied	Manufacturer specification as per the methodology.
Purpose of data	Calculation of baseline emission
Comments	For charcoal/other models of firewood stoves in future instances shall use the manufacturer's life time for respective models.

5.2 Data and Parameters Monitored

Data / Parameter	$N_{y,i,j}$
Data unit	Number

²⁶ This is applicable for this instance only. For charcoal/other models of firewood stoves in future instances shall use the manufacturer's life time for respective models.

Description	Number of project devices of type I and batch j operating during year y
Source of data	Monitoring
Description of measurement methods and procedures to be applied	Measured directly or based on a representative sample. Sampling standard shall be used for determining the sample size to achieve 95/10 confidence precision according to the latest version of Standard for sampling and surveys for CDM project activities and programme of activities for biennial survey and 90/10 for annual survey.
Frequency of monitoring/recording	At least once every two years
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). <i>In first phase it is planned to be distributed 12,500 stoves and in 2nd phase it will be remaining 37,500 stoves distributions.</i>
Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	The project implementor shall maintain a distribution record to calculate this parameter.
Purpose of data	Calculation of baseline emissions
Calculation method	Proportion of operational stoves obtained from the survey is multiplied by the total commissioned stoves to arrive at this value
Comments	For the calculation of ex-ante ERs, 100% value is considered however in ex-post case the drop down will be considered into account.

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	μ_y
Data unit	Fraction
Description	Adjustment to account for any continued use of pre-project devices during the year y
Source of data	Monitoring survey
Description of measurement methods	This parameter should be monitored using one of the following methods: If the baseline cookstoves are decommissioned and no longer

and procedures to be applied	used, as determined by the monitoring survey its value is 0 and Bold, adjusted is equal to Bold. If both the improved cookstove and baseline cookstoves are used together then surveys shall be conducted to record the average continued operation of baseline cookstoves in a sample of households. The surveys should be designed to capture the cooking habits and stove usage of households in the region, including quantification of use of baseline cookstoves, by formulating questions and/or collecting evidences to determine the frequency of usage of both the improved cookstoves and baseline cookstoves.
Frequency of monitoring/recording	At least once in 2 years
Value applied	0
Monitoring equipment	Monitoring survey, for ex-ante 0 is assumed and for ex-post the actual value will be monitored and accordingly discount factor will be applied as per the provisions of methodology.
QA/QC procedures to be applied	A 95 /10 confidence / margin of error shall be achieved for the sampling parameter irrespective of annual / biennial monitoring frequency as per para 22 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 09.0. In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of stoves.
Purpose of data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	--

Data / Parameter	$\eta_{new,i,j}$
Data unit	Fraction
Description	Efficiency of the device of each type i and batch j implemented as part of the project activity
Source of data	Manufacturer specification or <i>Certification by a national standards body or an appropriate certifying agent recognized by that body</i>

Description of measurement methods and procedures to be applied	To adopt Option V given in the methodology: “Efficiency of the improved cookstoves to be estimated using equation 5 of applied approved methodology where loss in efficiency per year is calculated, and therefore this parameter does not need to be monitored”			
Frequency of monitoring/recording	Annual			
Value applied	Depreciated Efficiencies as per VMR0006	Burn Jikokoa Model	Masupa Model	Kuniokoa Model
	Initial ICS efficiency (η_P)	0.537	0.382	0.424
	Year End	Stove efficiency	Stove efficiency	Stove efficiency
	1	0.505	0.359	0.399
	2	0.500	0.355	0.395
	3	0.495	0.352	0.391
	4	0.490	0.348	0.387
	5	0.485	0.345	0.383
	6	0.480	0.341	0.379
	7	0.475	0.338	0.375
Monitoring equipment	Not applicable			
QA/QC procedures to be applied	Not applicable			
Purpose of data	Calculation of baseline emissions			
Calculation method	As per equation 5 of VMR0006, version 1.1 i.e. $\eta_{new,i,j} = \eta_P \times (DF_n)^{y-1} \times 0.94$			
Comments	For charcoal/other firewood models of improved stoves in future instances shall use the manufacturer’s efficiency or efficiency tested in lab as per the WBT protocol.			

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.

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.

(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. As per CDM Methodology AMS-II.G, 90/10 confidence/precision shall be applied for annual sampling requirement and 95/10 for biennial sampling inspection. As per Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities, 90/10 confidence/precision to be adopted for small-scale project and 95/10 for large-scale project. Given that the size of the project is under the category of large projects, hence 95/10 confidence/precision shall be adopted for all parameters unless the average annual emission reductions of the project below the threshold:

Monitored Parameter:

Parameter	Description	Parameter type/Frequency
$N_{y,i,j}$	Number of project devices of type i and batch j operating during year y	Proportion/Biennially
$\mu_{y,i,j}$	Adjustment to account for any continued use of pre-pre-project devices during the year y	Proportion/Biennially

(ii) Target Populations:

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

(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 ICS in operation ($N_{y,i,j}$)

The sample frame refers to all the information sources on the Database. There are two primary mechanisms for data collection: the Registration Process for newly distributed/installed ICS and the Monitoring Survey (which includes a household questionnaire and visual inspection of ICSs) that will be used throughout the lifetime of the 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 (on 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:

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

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

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

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

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

As mentioned above the either separate sampling can be done for this parameter or can be clubbed with sampling of above parameters, wherein interview question to be included to determine the average fuel wood used by the project device.

(iv) Sampling Method

Representative sampling will be undertaken as part of a cross-instance Sampling Plan that is designed in line with the requirements of the methodology applied and the Standard: Sampling

and surveys for CDM project activities and programmes of activities, version 9.0 Sample sizes will be sufficient to ensure that the precision of the sample means/proportions are in accordance with the methodological / standard requirements. In cases where survey results indicate that desired precision is not achieved, the lower bound value of corresponding confidence interval of the parameter value may be used as an alternative to repeating the survey. Alternatively, the survey may be expanded to reach the required confidence/precision. The sampling methodology will be in accordance with the representative sampling methods provided by the methodology AMS-II.G. and other CDM sampling guidelines and standards as indicated along this section, with the applicable methodology having precedence. The Standard (paragraph 22) mandates application of 95/10 confidence/precision for CPAs solely composed of micro-scale CDM units hence the same shall be applied as a conservative measure despite the methodology taking precedence.

(v) Sampling Methodology

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

Sampling Objective – The sampling objective for each parameter is to determine, via sampling survey / test, a statistically significant parameter value for the emission reduction calculations. These parameters are as listed in monitoring section above. Field Measurement Objective and data to be collected – As listed in monitoring section. Target population and sampling frame – The target population is the total population served under the PoA, and the sampling frame consists of aggregated data of end-users of the ICS as recorded in the CPA Databases. The sampling frame will be kept for 2 years following the crediting period or the last issuance of the VERs of the project activity. Sample method – Sampling will be conducted using stratified random sampling techniques over the sampling frame, and detailed calculations are provided below as per CDM guidelines “Sampling and surveys for CDM project activities and programmes of activities” 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 Standard “Sampling and surveys for CDM project activities and programmes of activities” and Guideline for Sampling and Surveys for CDM Project Activities and Programme of Activities, when sampling techniques or statistical analysis necessitates it.

The sample size shall be determined using the following formula:

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

Where,

n = number of ICS to be sampled

N = Total number of ICS in the population

Z = Constant referring to level of confidence (1.96 for 95 % confidence)

Precision = Required precision (e.g. 10% = 0.1)

For Proportion based parameters

$$V = \frac{SD^2}{p^2} \text{ Where:}$$

$$SD^2 = \frac{\sum_{i=1}^k g_i * p_i * (1 - p_i)}{N}$$

$$\bar{p} = \frac{\sum_{i=1}^k g_i * p_i}{N}$$

Where,

g_i = weight of strata i in the population

p_i = expected proportion of strata i in the population

k = total number of strata in the population

For Mean based parameters

$$V = \left(\frac{SD}{Mean} \right)^2$$

Where

$$SD^2 = \frac{\sum_{i=1}^k g_i * SD_i^2}{N}$$

$$Mean = \frac{\sum_{i=1}^k g_i * m_i}{N}$$

Where

SD_i = expected standard deviation of strata i in the population

m_i = expected mean of strata i in the population

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 12 of Standard).

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

Data / Parameter	$N_{y,i,j}$			
Data unit	Number			
Description	Number of project devices of type i and batch j operating during year y			
Value applied:	Number of Stoves Models	Unit	Count Before Discount (Refer the Installation Summary in ER Sheet)	Count after discount (Refer the C16, C17 & C18 cells in tab "ER Calculation")
	$N_{y,1Masupa}$	Number	982	832
	$N_{y,2 Burn Jikokoa}$	Number	12559	10640
	$N_{y,3Kuniokoa}$	Number	547	463
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 the 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	$\mu_{y,i,j}$												
Data unit	Fraction												
Description	Adjustment to account for any continued use of pre-project devices during the year y												
Value applied:	<table><tr><td>$1-\mu_{y,1Masupa}$</td><td>fraction</td><td>1.0000</td></tr><tr><td>$1-\mu_{y,2,BURN\ Jikokoa}$</td><td>fraction</td><td>0.9711</td></tr><tr><td>$1-\mu_{y,3Kuniokoa}$</td><td>fraction</td><td>1.0000</td></tr></table>	$1-\mu_{y,1Masupa}$	fraction	1.0000	$1-\mu_{y,2,BURN\ Jikokoa}$	fraction	0.9711	$1-\mu_{y,3Kuniokoa}$	fraction	1.0000			
$1-\mu_{y,1Masupa}$	fraction	1.0000											
$1-\mu_{y,2,BURN\ Jikokoa}$	fraction	0.9711											
$1-\mu_{y,3Kuniokoa}$	fraction	1.0000											
Comments	The methodology used for monitoring of continuous use of baseline is in accordance with Data / Parameter table 9 of the §6.1 of the methodology AMS-II.G, version 12. 95 /10 confidence / margin of error is achieved for the sampling parameter as per para 22 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 09.0												

Data / Parameter	$\eta_{new,i,j}$				
Data unit	Fraction				
Description	Efficiency of the device of each type i and batch j implemented as part of the project activity To adopt equation V given in the methodology: “Efficiency of the improved cookstoves to be estimated using equation 5 of applied approved methodology where loss in efficiency per year is calculated, and therefore this parameter does not need to be monitored”				
Frequency of monitoring/recording	Annual <i>Depreciation as per the methodology</i>				
Value applied	Depreciated Efficiencies as per VMR0006	Burn Jikokoa Model	Masupa Model	Kuniokoa Model	

	ICS efficiency (η_p)	0.537	0.382	0.424
	Year	Stove efficiency	Stove efficiency	Stove efficiency
	1 (applied Efficiencies)	0.505	0.357	0.399
Comments	For charcoal/other firewood models of improved stoves in future instances shall use the manufacturer's efficiency or efficiency tested in lab as per the WBT protocol. As per equation 5 of VMR0006, version 1.1 i.e. $\eta_{new,ij} = \eta_P \times (DF_n)^{y-1} \times 0.94$			

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.

Due to the large number of ICS installed under the projects it was not economically feasible to monitor each individual ICS unit installed, therefore, a representative sampling was undertaken as part of grouped project Sampling Plan. The Sampling Standard version 07.0 (paragraph 22) mandates application of 95/10 confidence/precision for project instances solely composed of micro-scale CDM units hence the same was applied as a conservative measure despite the methodology taking precedence.

The objective of the sampling was to obtain an unbiased and reliable estimate of the proportion or mean value of the following parameters over the course of the monitoring period, and with 95/10 confidence/precision. The sampling plan consist of monitoring the following parameters as mentioned below:

S. No.	Monitoring Parameter	Description of Monitoring Parameter
1.	$N_{y,i,j}$	Number of project devices of type i and batch j operating during year y for each stove type (wood & charcoal)
2.	μ_y	Adjustment to account for any continued use of pre-project devices during the year y (for each stove type)

The target population is the total ICS population served under the grouped project (and covered under the monitoring report), and the sampling frame consists of aggregated data of end-users of the ICS as recorded in the project Databases.

The sampling was conducted using simple random sampling technique over the sampling frame for each project instance. The ICS in the sampling frame were stratified by ICS model i (woody biomass and charcoal) and batch j (year of installation). The sample size was calculated as per the CDM. The expected parameter values (mean, standard deviation and proportion) have been determined based on project developer's knowledge and experience as per para 12(b) and 12(c) of the Sampling and surveys for CDM project activities and programmes of activities, Version 09.0. The summary is provided below:

Sampling Constants	Values
Monitoring period start	02-01-2021
Monitoring period end	31-07-2022
Level of Sampling	Across Group Project
Confidence (%) (90 or 95)	95%
Margin of Error (%)	10%
Z value	1.960

The sample size is determined using the following formulas:

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

Monitoring parameter(s)				
Sampling frame(s)				
Sampling approach				
Sampling Population (i)	Model	Sampling frame size	Expected operational proportion (SoF)	
Charcoal Stove	Burn Jikakao	12559	0.95	
wood Stove	Masupa	982	0.95	
	Kuniokoa	547	0.95	
Estimated SOF (p)				
Estimated Standard Deviation of SOF (SD)				
$V_{SOF} = (SD/p)^2$				
Sample Size required (SOF)				
Sampling Population (Batch)	Model	Sampling frame size	Monitored Sample Size (n _{i,j,total})	Operational Sample (n _{i,j,operational})
Charcoal Stove	Burn Jikokao	12559	28	28
wood Stove	Masupa	982		18
	Kuniokoa	547		15
Reliability Check				
Samples Monitored				61

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
Monitoring parameter(s)			Utilization of Project stoves - μ_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)
Charcoal Stove	Burn Jikakao	12559	0.98	9
wood Stove	Masupa	982	0.95	1
	Kuniokoa	547	0.95	1
Estimated results based sample size determination				
Estimated utilization (p)				0.98
$V_{Utilization}= p(1-p)/p^2$				0.02
Minimum Sample Size required (days of utilization)				9
Monitoring results				
Sampling Population		Sampling frame size	Monitored Sample Size	Monitored Utilization
Charcoal Stove	Burn Jikakao	12559	28	0.97
wood Stove	Masupa	982	18	1.00
	Kuniokoa	547	15	1.00
Reliability Check				
Samples Monitored				61
Utilization Measured				0.97
Standard Error of Utilization				2.82%
Relative precision (Margin of error)				5.67%

Result	Ok, reliability level met
Lower Bound confidence value	Not applicable

6.2 Baseline Emissions

The improved cookstove is introduced as energy efficiency measure in the project, therefore equations 1 and 2 of the methodology will be applied to calculate the net GHG emission reductions.

$$ER_y = \sum_i \sum_j ER_{y,i,j} \quad \text{Equation (2)}$$

Where:

- i = Indices for the situation where more than one type/model of improved cookstove is introduced to replace three-stone fire
- j = Indices for the situation where there is more than one batch of improved cookstove of type i
- ER_y = Emission reductions during year y in t CO₂e
- ER_{y,i,j} = Emission reductions by improved cookstove of type i and batch j during year y in t CO₂e

$$ER_{y,i,j} = B_{y,savings,i,j} \times NCV_{wood\ fuel} \times f_{NRB,y} \times (EF_{wf,CO_2} + EF_{wf,non\ CO_2}) \times N_{y,i,j} \times 0.95 \quad \text{Equation (2)}$$

Where:

- B_{y,savings,i,j} = Quantity of woody biomass that is saved in tonnes per improved cookstove of type i and batch j during year y
- f_{NRB,y} = Fraction of woody biomass that can be established as non-renewable biomass (f_{NRB})
- NCV_{wood fuel} = Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonne)²⁷

²⁷ 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 1 Introduction

EF_{wf,CO_2}	=	CO ₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO ₂ /TJ) ²⁸
$EF_{wf,non\ CO_2}$	=	Non-CO ₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO ₂ /TJ) ²⁹
$N_{y,i,j}$	=	Number of improved cookstoves of type i and batch j operating during year y
0.95	=	Discount factor to account for leakage

To calculate $B_{y,savings}$, we use Option 1 of the applied methodology³⁰

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

Where:

B_{old}	Quantity of wood fuel used in the absence of the project activity in tonnes
η_{old}	A default value of 0.10 may be optionally used if the replaced system is a three stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e., without a grate or a chimney.
$\eta_{new,i,j}$	Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol.

As some of the project households continue to use baseline cookstoves along with improved cookstoves, B_{old} has been adjusted ex-post based on the percentage of project households found to continue such practice according to the Equation 6 of applied methodology as follows:

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

²⁸ 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion

²⁹ 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion

³⁰ Equation 3 of methodology VMR 0006

Where:

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

For ex-ante estimates:

Calculation of f_{nrb} . Has been undertaken by using the CDM tool 30, the detailed calculation is furnished to VVB.

f_{nrb} value comes as 97.90%

Calculation for the Baseline Emissions:

Data Ex Ante	Unit	Value	Source
$B_{old,wood,i,j} = B_{oldwood,HH}$	tonnes/HH/year	4.38	Refer PD (Ex-ante Section)
$B_{old,charcoal} = B_{oldcharcoal,HH}$	tonnes/HH/year	6.02	Refer PD (Ex-ante Section)
$f_{nrb,y}$	Fraction	0.9790	Refer f_{nrb} calculation
$E_{fwf,nonCo2} + E_{fwf,Co2}$	tCO _{2e} /TJ	138.23	Refer PD (Ex-ante Section)
LAF_y	Fraction	0.95	Refer PD (Ex-ante Section)
$NCV_{biomass}$	TJ/tonne	0.016	Refer PD (Ex-ante Section)
$\eta_{old,i,charcoal}$	Percentage	15.00%	Refer PD (Ex-ante Section)
$\eta_{old,i,jfirewood}$	Percentage	10.00%	Default as per meth
Data Ex Post	Unit	Value	Source
$N_{y,1Masupa}$	Number	832	ICS Installation database
$N_{y,2 Burn Jikokoa}$	Number	10640	ICS Installation Database
$N_{y,3Kuniokoa}$	Number	463	ICS Installation Database
$B_{old,1Masupa}$	Tonnes/HH/year	6.02	Calculated

B _{old,2} BURN Jikokoa	Tonne s/HH/ year	6.02	Calculated
B _{old,3} Kuniokoa	Tonne s/HH/ year	4.38	Calculated
η _{new 1} Masupa	Perce ntage	36%	Efficiency test records and results and degradation factor consideration for year 1.
η _{new 2} BURN Jikokoa	Perce ntage	50.5%	Efficiency test records and results and degradation factor consideration for year 1.
η _{new 3} Kuniokoa	Perce ntage	39.9%	Efficiency test records and results and degradation factor consideration for year 1.
B _{y,saving, 1} Masupa	Tonne s/year	3.51	Calculated as per the formula by using the above input values for Masupa Model. $B_{y,savings,i,j} = B_{old} \times \left(1 - \frac{\eta_{old}}{\eta_{new,i,j}}\right)$ Equation (3)
B _{y,saving, 2} BURN Jikokoa	Tonne s/year	4.23	Calculated as per the formula by using the above input values for Jikokoa Model. $B_{y,savings,i,j} = B_{old} \times \left(1 - \frac{\eta_{old}}{\eta_{new,i,j}}\right)$ Equation (3)
B _{y,saving, 3} Kuniokoa	Tonne s/year	5.79	Calculated as per the formula by using the above input values for Kuniokoa Model. $B_{y,savings,i,j} = B_{old} \times \left(1 - \frac{\eta_{old}}{\eta_{new,i,j}}\right)$ Equation (3)
Stove _{year} (Weighted Average)	fractio n	1.413	Calculated for each stove from date of distribution to the end of monitoring period. Then average age for each model is considered and weighted average is considered for final calculation.
μ _{y,1} Masupa	fractio n	1.0000	Monitoring survey records
μ _{y,2} ,BURN Jikokoa	fractio n	0.9711	Monitoring survey records
μ _{y,3} Kuniokoa	fractio n	1.0000	Monitoring survey records
N _{y1,1} Musapa	Numb er	832	Sales database and monitoring survey records and after considering the discount for multiple stoves per user.
N _{y,2,1} ,BURN Jikokoa	Numb er	10640	Sales database and monitoring survey records and after considering the discount for multiple stoves per user.
N _{y,3,1} Kuniokao	Numb er	463	Sales database and monitoring survey records and after considering the discount for multiple stoves per user.

ER _{y1} (Project1wood)	tCO ₂	7,998	Calculated As per the equation (2) of methodology. $ER_{y,i,j} = B_{y,savings,i,j} \times f_{NRB,y} \times NCV_{wood\ fuel} \times (EF_{wf,CO_2} + EF_{wf,non\ CO_2}) \times N_{y,i,j} \times 0.95 \quad \text{Equation (2)}$
ER _{y2} (Project2_Charcoal)	tCO ₂	139,139	Calculated As per the equation (2) of methodology. $ER_{y,i,j} = B_{y,savings,i,j} \times f_{NRB,y} \times NCV_{wood\ fuel} \times (EF_{wf,CO_2} + EF_{wf,non\ CO_2}) \times N_{y,i,j} \times 0.95 \quad \text{Equation (2)}$
Emission Reduction (ER)	tCO _{2e}	147,136	

6.3 Project Emissions

N/A

6.4 Leakage

N/A (Leakage is already accounted in baseline emission as 5% in accordance with the methodology)

6.5 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO _{2e})	Project emissions or removals (tCO _{2e})	Leakage emissions (tCO _{2e})	Net GHG emission reductions or removals (tCO _{2e})
2021	92,888	0	0	92,888
2022	54,248	0	0	54,248
Total	147,136			147,136

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, environmentally 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

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. $S_{\text{(less smoke)}} = S_{\text{install}} \times \left[\frac{HH_{\text{(less smoke,y)}}}{U_{\text{(p,y)}}} \right]$	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>1.67</td><td>0.85</td><td>0.83</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	1.67	0.85	0.83
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1.67	0.85	0.83									

			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.	<table><tr><td colspan="2">GHG Emissions measured in tons CO₂</td></tr><tr><td>Vintage wise ERs</td><td>Amount achieved during this monitoring period tCO₂e</td></tr><tr><td>2021</td><td>92,148</td></tr><tr><td>2022</td><td>53,816</td></tr><tr><td>Total</td><td>145,964</td></tr></table>	GHG Emissions measured in tons CO ₂		Vintage wise ERs	Amount achieved during this monitoring period tCO ₂ e	2021	92,148	2022	53,816	Total	145,964
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Vintage wise ERs	Amount achieved during this monitoring period tCO ₂ e														
2021	92,148														
2022	53,816														
Total	145,964														
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 21,746</td><td>37%</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 21,746	37%
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The Sustainable Development Contributions are tabulated as above.

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