LIVELIHOODS CHITETEZO MBAULA PROJECT

Document Prepared by CO2logic on behalf of Livelihoods Fund SICAV SIF

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1 PROJECT DETAILS

1.1 Summary Description of the Project

Summary of technologies/ measures

The present project promotes the distribution and utilization of clay made Chitetezo Mbaula (CM) stove to 120,000 households in Malawi.

The CM stove is significantly more efficient than the traditional three stone open fire cooking method. The adoption of the CM stove will thus help reducing wood consumption by more than half, therefore preserving local forests as well as reducing greenhouse gas (GHG) emissions resulting from unsustainably sourced wood.

The CM stove has further benefits such as avoiding hazardous open flame and reducing the quantity of harmful smoke produced during cooking. Households also benefit from a significant reduction in time spent and distance walked for wood collection.

The end users are well informed that the use of CM stoves generates carbon credits which is used to subsidize CM stoves production costs and recover project implementation costs.

The project does not consist of a fuel switch as locally available wood is still being used.

Location of the project

The project will be implemented in two districts (Machinga and Zomba) located in the Southern Region of Malawi. Details are provided in section 1.12.

Generation of GHG emission reductions/ removals

The CM stove substitutes the widespread traditional three stone open fire used for cooking. The improved thermal efficiency translates into fuel savings and reduction of GHG emissions.

Scenario existing prior to project implementation

The baseline scenario is the continued use of non-renewable wood fuel by the target population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity.

Annual average and total GHG emission reductions and removals estimates

It is estimated that the project will reduce an average 262,431 tCO2e per year. Over the 10 year life span of the project, this project is expected to reduce a total of 2,624,313 tCO2e.

Audit Type	Period	Program	VVB Name	Number of years
Joint validation and verification	15-11-2022 – 18-11-2022	Field visit in Malawi, interviews	CarbonCheck (CCIPL)	1 year, 6 months and 4 days

Total	-	-	-	-

1.2 Sectoral Scope and Project Type

The project is categorized under type/category as below:

a) Sectoral scope : 03 Energy demand

b) Type: II Energy efficiency improvement projects

The project is not a grouped project.

1.3 Project Eligibility

The project involves energy efficient cookstove distribution which falls under the category of energy efficiency improvements in thermal applications. Therefore it is eligible under the scope of VCS Program.

The project activity does not fall under the excluded list of projects as prescribed under the table 1 of section 2.1.1. of the VCS Standard version 4.4[1].

1.4 Project Design

The project includes multiple locations but is not being developed as a grouped project

Eligibility Criteria

N/A since the project is not a grouped project

1.5 Project Proponent

Organization name	Livelihoods Fund SICAV SIF
Contact person	Bernard GIRAUD
Title	Co-Founder and President
Address	226 Boulevard Voltaire, Paris 75011 France

[1] VCS standard v4.4, 22.06.2022, https://verra.org/project/vcs-program/rules-and-requirements/

Telephone	+33 (0) 1 44 35 33 66
Email	contact@livelihoods.eu

1.6 Other Entities Involved in the Project

Organization name	United Purpose
Role in the project	Local Project Participant
Contact person	Patrick Banda
Title	Project Manager
Address	14 Cathedral Road, Cardiff, Wales, CF11 9LJ, United Kingdom
Telephone	+ 44 (0) 2920 220066
Email	Up.uk@united-purpose.org

Organization name	CO2logic
Role in the project	Carbon project development support
Contact person	Herman Noppen
Title	Climate Projects Director
Address	Cantersteen 47, 1000 Brussels, Belgium
Telephone	+ 32 (0) 497 05 31 36
Email	herman@CO2logic.com

1.7 Ownership

Livelihoods Fund SICAV SIF owns the project.

In line with clause 5 section 3.6.1 of VCS Standard version 4.4[1], during the registration of the ICS the participating household will sign a carbon waiver transferring the ownership rights of the carbon assets generated from this project to the project proponent.

1.8 Project Start Date

26 March 2021 (Date of commissioning first ICS)[2]

1.9 Project Crediting Period

26 March 2021 to 25 March 2031, ten years fixed crediting period (date stove is taken in use)

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	X
Large project	

Year	Estimated GHG emission reductions or removals (tCO_2e)
Year 1	30,014
Year 2	102,269
Year 3	190,441
Year 4	306,459
Year 5	362,037
Year 6	361,441
Year 7	386,383
Year 8	362,037
Year 9	308,917
Year 10	214,317
Total estimated ERs	2,624,313

[2] See carbon waiver, document "VCS3262_LV_CarbonWaiver_CM_First Stove Sold"

Total number of crediting years	10
Average annual ERs	262,431

1.11 Description of the Project Activity

The CM stove is a portable cookstove that is produced locally mostly by women. It is made of clay with a hole fashioned in the side to allow air and fuel entry and has fixed pot rests on the top. It is designed to burn fuelwood and crop residues.

The technical characteristics of the Chitetezo Mbaula stove are resumed in the table below.

Characteristics of the Chitetezo Mbaula stove	
Average Thermal Efficiency	31%[3]
Fuel	Wood/Crop residues
Stove Technology	Combustion
Materials	Clay
Single pot/multi pot	Single Pot
Portable/fixed model	Portable
Dimensions	300/300/265 mm
Weight	8.0 kg

These cookstoves are more efficient than the traditional cooking fires, reducing the amount of firewood needed by 30-60%[4]. They also reduce indoor air pollution, are safer since there is no open flame and they greatly benefit women and children since they can reduce their time collecting firewood by half.

[3] Average value of WBT results publicly available in the Catalog of Clean Cookstoves: http://catalog.cleancookstoves.org/stove_details.html?stove_id=stove_VROU4NT

[4] Kululeko Mpofu, 2015, An Analysis of Value Chain of Chitetezo Mbaula Cookstove in Dedza District, Malawi, page 14 (see document 'An Analysis of Value Chain of Chitetezo Mbaula Cookstove in Dedza District')



Figure 1: Woman cooking on her CM cookstove

To date, the CM stoves have had the most success in rural Malawi due to its affordability, accessibility and appropriateness considering local preferences for energy needs. The stove is now in its third decade and has evolved from its embryonic start incorporating feedbacks from its many users. The optimal design has been agreed and is currently being standardized. The project does not consist of a fuel switch as locally available wood is still being used.

The project is implemented using three main approaches:

- The first approach involves targeting existing beneficiaries of the Social Cash Transfer Program (SCTP) in order to prioritize the most vulnerable households. As an independent top up to the SCTP benefits, 30,000 SCTP households were provided with free stoves by the project. For this purpose, the project uses SCTP beneficiaries lists for targeting, although the project is not linked to the SCTP program itself. The SCTP is a bi-monthly, unconditional cash transfers from the Government to 10% of Malawian households identified as ultra-poor and labour-constrained across each of the 28 Districts. Currently, the project's average transfer value per household amounts to MWK 9,000 per month from the Government[5].
- The second approach, called the commercial model, seeks to reach out to people who are outside the SCTP by selling the CM at a - subsidized - market price of MWK 1,500, aiming at 70,000 customers. Various marketing activities have been lined up in this model to activate demand for the stoves, including cooking demonstrations, roadshows as well as school campaigns. Before launching the commercial model, community meetings were held with local leaders in order to get their buy in and leverage their position of influence.
- A third category –marginal in terms of numbers compared to the SCTP and commercial approach– is composed of people actively supporting the project and which receive a free CM stove :

[5] SCTP webpage, Ministry of Gender, Children and Community Development, https://mtukula.com/index.php

- People conducting KPT's which have chosen a CM stove among the 3 possible incentives (CM stove, bucket or 500ml of cooking oil)
- Members of the Community Social Support Committees (CSSC's) whose role is to oversee the SCTP program at village level

At the time of sale, the person responsible for the sale hands out an information leaflet in the local language and records all necessary data in a database (for more details see the monitoring plan). For the commercial model, the ICS can be paid at once or in three instalments. Once the stove is fully paid, customers in the commercial model receive both the stove and two kg of pigeon peas as an incentive. To further encourage communities to adopt the cookstoves in the commercial model, a number of water boreholes will be repaired and monitored based on the adoption rates at clusters level as follows:

- 30–40% adoption rate the project will repair and maintain 2 boreholes;
- 40-50% adoption rate the project will repair and maintain 5 boreholes;
- 50-60% adoption rate the project will repair and repair 10 boreholes.

The lifespan of this type of cookstove being about 4 years[6,7], if/when a cookstove is damaged, non-functioning or exceeding its lifespan, the project will replace it by a new one. The replacement stove remains free for SCTP beneficiaries and is available at a – subsidized – discounted price of MWK 1,000 for the commercial model customers.

1.12 Project Location

The project will be implemented in the Machinga (1) and Zomba (2) districts, located in the Southern Region of Malawi. The project location includes Zomba city as well.

The coordinates of each district can be found in the table below:

District	Coordinates
Machinga	S -14°56'44.99" E 35°34'25.21"
Zomba	S -15°25'48.25" E 35°25'5.84"

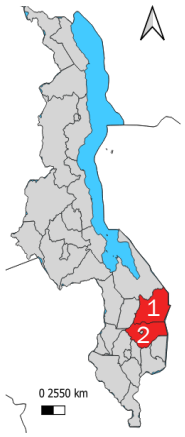


Figure 2: Location of Machinga and Zomba districts in Malawi

[6] Lifespan Survey for Chitetezo Mbaula Stoves, Lilongwe, Malawi, December 2020, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Energising Development (see document 'EnDev Malawi-Lifespan survey report for Chitetezo Mbaula')

[7] Average life span of Chitetezo Mbaula publicly available in the Catalog of Clean Cookstoves: http://catalog.cleancookstoves.org/stove_details.html?stove_id=stove_VROU4NT

1.13 Conditions Prior to Project Initiation

The 2018 census of the Malawian population[8] demonstrated 76% of the Southern region population uses firewood as their main fuel for cooking, and an additional 19% uses charcoal. In total, 95% of the population is dependent on wood fuel. This while the fraction of nonrenewable biomass (f_{NRB}) in Malawi is currently at 98%[9]. Malawi has been taking action and has distributed 2 million Chitetezo Mbaula cookstoves between 2013 and 2020[10]. However, a baseline study of 151 households in the project intervention area shows that people in the project area still use traditional three-stone stoves/ open fires, charcoal stoves and other traditional stoves[11].

The conditions prior to project initiation is therefore the use of non-renewable wood fuel (firewood) by the target population to meet similar thermal energy needs as provided by project cookstoves.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

There are no laws and regulations governing the use of improved cookstoves in Malawi households.

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 under any other GHG programs.

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The project is not 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 environmental credit.

[8] See document "2018 Malawi Population and Housing Census Main Report"

[9] N. Salonen, S Sunkur, M. Schleicher & K. Prayag, 2022, Calculation of the fraction of non-renewable biomass (fNRB), page 6 (see document 'Malawi_Chitetezo Cookstoves_fNRB Report_23 Feb 2022')

[10] Ireland congratulates Malawi on meeting 2 million clean cookstoves (2020), https://www.dfa.ie/irish-embassy/malawi/news-and-events/news-archive/ireland-congratulates-malawi-on-meeting-2-million-clean-cookstoves.html

[11] See document 'Baseline Survey_GS_UP_Malawi', question 12 and 18 highlighted in yellow.

1.16.3 Supply Chain (Scope 3) Emissions

As per VCS Website[12] tab "Introduction of requirements for VCS projects to help avoid double claiming in Scope 3 emissions inventories", "*Public statement requirements apply to GHG emission reductions or removals achieved on or after 1 July 2023*", therefore no public statement or email is provided.

1.17 Sustainable Development Contributions

1.17.1 Sustainable Development Contributions Activity Description

The project will contribute to the following SDG's :

- SDG 1 – No Poverty

  Poverty is fought by reducing households' expenses for wood fuel provision, both in terms of time necessary for wood collection or in terms of financial means necessary for purchase. The project also provides job creation and an extra source of income to the stove producer groups and the stove promoters.

  SDG 1 states in target 1.4 that basic services and access to natural resources should be available to all men and women. By providing the communities with functioning boreholes, access to one basic service is improved.

- SDG 3 – Good Health and Well-Being

  An improvement in health outcomes is accomplished since the improved cookstoves reduce the amount of harmful smoke emitted during cooking and other stove-related activities. It also reduces risks for small children since there is no open flame.

  The rehabilitation of boreholes participates to the improvement of domestic water quality which is of importance for public health.

- SDG 5 – Gender Equality

  Gender equality is promoted by reducing the time spent collecting firewood and cooking, freeing up time for other activities.

- SDG 7 – Affordable and Clean Energy

  By providing families with more efficient cookstoves, energy needs can be fulfilled in a more affordable and sustainable way.

- SDG 13 – Climate Action

  By reducing the amount of non-renewable firewood burned, this project significantly reduces the amount of GHG's emitted.

- SDG 15 – Life on Land

[12] https://verra.org/verra-releases-updates-to-verified-carbon-standard-program/

This project promotes the sustainable use of forests by reducing the amount of firewood needed and raising awareness on the consequences of deforestation, protecting natural forest eco-systems and wildlife habitats.

1.17.2 Sustainable Development Contributions Activity Monitoring

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	1.1	1.1.1 Proportion of population below the international poverty line	Reducing household expenses for wood fuel purchase	According to the monitoring survey[13], 16% of respondents buy their fuelwood partially or completely. The average expenditure reduction is estimated to be 39%. The saved money is then spent primarily on family (95%), income generating activities (25%) and education (10%)	According to the monitoring survey, 16% of respondents buy their fuelwood partially or completely. The average expenditure reduction is estimated to be 39%. The saved money is then spent primarily on family (95%), income generating activities (25%) and education (10%)
2)	1.1	1.1.1 Proportion of population below the international poverty line	Job creation for both the stove producer groups and the stove promotors	252 stove promotor jobs were created, earning 150 MWK per SCT commission and 350 MWK per commercial stove. Additionally, 9 stove production groups, each employing 20-30 members, are contracted to produce the project stoves, earning 750 MWK per stove.	252 stove promotor jobs were created, earning 150 MWK per SCT commission and 350 MWK per commercial stove. Additionally, 9 stove production groups, each employing 20-30 members, are contracted to produce the project stoves, earning 750 MWK per stove.
3)	1.4	1.4.1 Proportion of the rural population who have easy access to a safe water supply	Rehabilitation of water boreholes	100 communities are currently eligible for borehole repairs. So far, the rehabilitation of 32 boreholes is planned.	100 communities are currently eligible for borehole repairs. So far, the rehabilitation of 32 boreholes is planned.

[13] The SDG achievement calculations can be found in document "VCS3262_MalawiCookstovesLV_MS1_Analysis", tab "Results"

4)	2.1	Universal access to safe and nutritious food	Distribution of 2 kg of pigeon peas for every bought project stove.	12,000 kg of pigeon peas have been distributed to improved stove buyers. Distributions are made in bulk close to harvest season to promote planting of the peas (rather than consumption).	12,000 kg of pigeon peas have been distributed to improved stove buyers. Distributions are made in bulk close to harvest season to promote planting of the peas (rather than consumption).
5)	3.4	3.4.1 Mortality rate attributed to chronic respiratory disease	By providing improved cookstoves, exposure to harmful smoke emitted during cooking and other stove-related activities is reduced	98% of respondents indicate they experience less smoke with the CM stove. 80% of the 126 respondents also indicate they experience other health benefits like less coughing, less eye irritation and less headaches.	98% of respondents indicate they experience less smoke with the CM stove. 80% of the 126 respondents also indicate they experience other health benefits like less coughing, less eye irritation and less headaches.
6)	5.4	5.4.1 Time spent on unpaid domestic and care work	Because a reduced quantity of firewood is necessary to light the cookstoves, women need to spend less time collecting wood.	95% of surveyed households indicate they now spent less time on wood collection, spending the gained time on the following activities: Household tasks: 62% Field work: 31% Income generating activities: 27% Relaxation: 26% Religious activities: 5% Education: 2%	95% of surveyed households indicate they now spent less time on wood collection, spending the gained time on the following activities: Household tasks: 62% Field work: 31% Income generating activities: 27% Relaxation: 26% Religious activities: 5% Education: 2%
8)	7.A	7.A.1 Access and investments in clean energy	The provision of improved cookstoves decreases the use of non-renewable wood	The project has distributed 41,447 stoves to households in Machinga and Zomba, not including replacement stoves.	The project has distributed 41,447 stoves to households in Machinga and Zomba, not including replacement stoves.

9)	13	Climate action	By reducing the quantity of non-renewable firewood burned, carbon dioxide emissions are reduced	By reducing the amount of non-renewable firewood, this project has reduced 100,959 tonnes of CO_{2e} during the first monitoring period.	By reducing the amount of non-renewable firewood, this project has reduced 100,959 tonnes of CO_{2e} during the first monitoring period.
10)	15	15.2.1 Sustainable forest management	By reducing the amount of firewood required for cooking, forest degradation is reduced	This project has reduced 50,288 tonnes during this monitoring period.	This project has reduced 50,288 tonnes during the first monitoring period.

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

No further information is required to be mentioned in this section.

2 SAFEGUARDS

2.1 No Net Harm

No potential negative environmental or socio-economic impacts have been identified for the project.

2.2 Local Stakeholder Consultation

Invitations

Invitation methods were adapted according to the type of stakeholder. International NGO's, local authorities, local NGO's and DNAs of Malawi were invited by email a month before the stakeholder consultation took place.

Beneficiaries of the project - i.e. stove producers, local leaders, community social support committee members and stove promoters - were invited by means of a public invitation (a banner placed in the town of the two districts as well as posters at the two district councils), mobile phones and word of mouth. The chiefs were informed by word of mouth since it is deemed the most appropriate way to traditionally communicate about the meeting whereas the rest of the local representatives were called.

People who were unable to come to the stakeholder consultation were invited to send their comments or queries on the non-technical summary by email to the project proponents. No such queries were received.

Report of the Local Stakeholder Consultation meeting

The two local stakeholder consultation meetings were held as follows:

- 23/09/2021 08:00 am in Annie's Lodge in Zomba
- 23/09.2021 1:30pm in Annie's Lodge in Machinga.

34 attendees came to the meeting in Zomba and 31 to the meeting in Machinga which is deemed high. The meeting was partially recorded and minutes of meetings were prepared.

The meeting was opened by the District Social Welfare Officer Mr Ned Nkumba in Zomba and the Human Resource Officer Mr Akimu Elias in Machinga. After introducing the topics of the cookstoves and their benefits to the local community, the project was presented by the project manager. This included an explanation about the carbon transfer process and how ICS buyers will be asked to sign a waiver when buying the stove, transferring their carbon rights to Livelihoods Fund SICAV SIF.

Remarks & Questions

At the end of the presentations, the participants were invited to feed the exchanges with comments, contributions, questions and answers in order to eliminate all blurred points and bring the necessary enlightenment for a proper understanding of the project.

A list of all remarks made during the meeting is provided in the table below :

Stakeholder comment	Was comment taken into account ?	Explanation
There is need to consider the use of Youth clubs as a source of promoters for the commercial model, keeping in mind their availability and commitment to the project as we scale up to other TAs	No	In each cluster the communities decided for themselves how the promoters should be chosen. This ensures community is widely engaged, rather than restricting the selection to promoters from youth clubs.
A clear plan has to be put in place if the drilling of boreholes will be considered, as requested for areas where there is need and they have no boreholes to repair based on funds available	Yes	There will be a survey to establish the status of boreholes in each cluster in areas where they have qualified for borehole rehabilitation. The actual rehabilitation will only happen if it's feasible in that particular cluster. In case it is not feasible the cost of doing the rehabilitation will be redirected to other development works as decided by the community.
Planting of trees is a good intervention, however it is not always sustainable due to substandard care by communities but it's worth considering if there is commitment and land to establish woodlots	Yes	This will have to be presented at the project steering committee meeting to decide how it should be incorporated in the project
Cooking demonstrations, roadshows to bridge the gap in community sensitization.	Yes	These are already being done in the project
Partnering with YONECO and their radio station as part of media outlet promoting the stoves is viable however the challenge may be the need for a separate budget.	Yes	It is a good platform to sensitize people about the Chitetezo Mbaula. A meeting will be set up with YONECO.

Uniformity of stove prices of a similar nature to the Chitetezo Mbaula is something to be looked at and discussed among the different partners.	Yes	Standard basic price is set by the NCSC but prices will still vary across project areas as the aim across the sector is to let the market forces dictate the price
The price of the stoves to be revised considering other ultra-poor people not in SCTP such as the elderly.	Yes	Discuss how other ultra-poor people may be considered in regards to pricing – mainstreaming the project in the public works program for example. To be discussed at the steering committee
Provision of Mbaula to other community members who are not on the list of those under the SCTP program but are considered ultra-poor as well	No	We don't want to make Chitetezo Mbaula seem like a product that has to be given freely.
Consider assisting with markets for the pigeon peas distributed after harvest	Yes	We can present the quantities that the project beneficiaries have at various platforms to facilitate market linkages
Consultation meetings like these should be two days. There was a lot that was shared in a few hours	No	The communities are already engaged at different levels of the project and the LSC was just to consolidate views of various stakeholders
Keep on guard of emergent environmental impacts	Yes	The impacts of the project discussed in the LSC are not exhaustive as such stakeholders were given means through which to express any grievances they encounter due to the project.
Building capacity of more production groups in Zomba	Yes	We will need to have a local supply of the stoves. However, there are no active SPGs in the district. There are plans to collaborate with other organizations
More sensitization to be done for communities to understand that the project is not only for SCTP households only	Yes	People need to know that those who are not in the SCTP program can also access the stove on the market.
Communication, Transportation and Identification (T-shirts, caps) of promoters to be considered	Yes	There is need for continuous improvement in the way we transport the stoves, communicate and select the promoters
Learning visits among Production groups to be considered	Yes	This will build capacity of the SPGs and improve the quality of stoves in general

Gender to be considered as a separate component on its own.	Yes	Gender is already mainstreamed in the project activities but it's a good point to consider it as stand-alone component
Can the entire aspect of WASH, not just water, be included?	No	This will increase the scope of the project – which would increase the budget of the project.
Replacement of the use of firewood find an alternative	No	A big percentage of people in the rural areas are using firewood for cooking and the trend is projected to continue so having a stove that reduces the firewood usage still makes sense in the short to medium term.

Evaluation forms were also distributed to all attendees to receive feedback. On top of this, a continuous input/grievance mechanism is put in place. People can contact the project proponent by calling the implemented hotline numbers if they wish for more information about the project, stoves, promoters or to report an issue of any description. Each district has a hotline number on each of the two mobile networks, and the field facilitators hold phones with these numbers at all times. These numbers are well known to the project promoters and shown on project promotional materials.

Any requests for information are immediately responded to, and any more serious issues are escalated through UP/SHA reporting procedures in line with the organization's policies.

Supporting documents

LSC-related supporting documents are provided in Appendix 1.

Ongoing communications with Local Stakeholders

The hotlines are kept open for comments with stakeholders. No specific comments are registered on the hotlines apart from the questions related to the points of sale and availability of stoves.

Regular contact is kept with national authorities. Meetings with District Committees are held at least once a year, during those meetings, the main components of the project are discussed and updates shared.

No substantial change in the project has been requested by stakeholders so far.

2.3 Environmental Impact

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

2.4 Public Comments

The project was open for public comments from 04/08/2022 until the 03/09/2022 and no comments were received.

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

VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves V1.1[14]

TOOL01. Tool for the demonstration and assessment of additionality V07.0.0[15]

Tool 30 Calculation of the fraction of non-renewable biomass EB 108 Annex 11 v3.0[16]

3.2 Applicability of Methodology

VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves V1.1

Applicability criterion	How the project complies
Project activities shall be implemented in domestic premises or in community based kitchen	The proposed project involves deployment of ICS only in households
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;	The CM stoves that are distributed under this project are single pot wood cookstoves that have an efficiency of 31% as per the Catalog of Clean Cookstoves (http://catalog.cleancookstoves.org/stove_details.html?stove_id=stove_VROU4NT)
Both 'Projects' and 'Large Projects' can use the methodology	This project will generate 262,431 credits per year, making this a "Project".
Non-renewable biomass has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports or statistics;	Non-renewable biomass has been used since 31 December 1989 in Malawi as demonstrated below.

[14] VMR0006 Methodology for Installation of High Efficiency Firewood Cookstoves, https://verra.org/methodology/vmr0006-methodology-for-installation-of-high-efficiency-firewood-cookstoves/

[15] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

[16] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v3.0.pdf

Applicability criterion	How the project complies
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.	Not applicable. The ICS is introduced as energy efficiency measure to replace baseline stoves and reduce the use of non-renewable biomass for combustion.
The project design 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)	To avoid double counting of cookstoves within the projects and possible other cookstoves outside of the current project, each stove receives a stove identification code that is stamped on the stove when it is produced. The code consists of a three letters indicating the stove producer group, followed by the year and month in which was produced and a serial number, eg. KAL/2202/00001, where KAL stands for the Kalata SPG, 2202 refers to the year (2022) and month (February) and 00001 is the stove count. These codes are stored in the database, linked to the household that bought the stove and checked when stove replacement campaigns are taking place.
The project design 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	All end users sign a carbon waiver, declaring that they relinquish their carbon rights to the project. All relevant stakeholders involved in the manufacturing, distribution or commercialization of the improved cookstoves will be communicated by contract or clear written assertion in the transaction paperwork about the entity claiming ownership rights on the credits and that they themselves cannot claim for emission reductions from the project.

TOOL01. Tool for the demonstration and assessment of additionality V07.0.0

Applicability criterion	How the project complies
The use of the “Tool for the demonstration and assessment of additionality” is not mandatory for project participants when proposing new methodologies. Project participants may	N/A

Applicability criterion	How the project complies
propose alternative methods to demonstrate additionality for consideration by the Executive Board. They may also submit revisions to approved methodologies using the additionality tool.	
Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	The tool is mentioned in VMR0006 in "step 3 project method" and is therefore applicable.

Tool 30 Calculation of the fraction of non-renewable biomass EB 108 Annex 11 v3.0

Applicability criterion	How the project complies
This tool may be used by: (a) DNAs to submit region- or country-specific default fNRB values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or (b) project participants[1] to calculate project- or PoA-specific fNRB values.	As a project participant, the use of this tool is permitted.

Evidence that the non-renewable biomass has been in use since 1989

Non-renewable biomass has been in use since December 31, 1989 as evidenced by various FAO statistical data. The Global Forest Resources Assessment 2020[17] (FAO) indicates that forest areas decline yearly, and that the total forest area declined by 36% from 1990 to 2020, as summarized in the following table :

Area (1000 hectares)				
	1990	2000	2010	2020
Forest	3,501	3,081	2,661	2,241

[17] FAO, Global Forest Resources Assessment 2020, Country Reports, Malawi p7 (see 'ForestReport_Malawi.pdf') https://www.fao.org/3/cb0032en/cb0032en.pdf

A recent study in 2022 done by C4 EcoSolutions (Pty) LTD calculated a current f_{NRB} of 98%[18].

In view of the combined evidence of declining forested areas since 1990 and presently such a high fraction of non-renewable biomass, it may be deducted that the majority of fuelwood used across Malawi since December 31, 1989 was from non-renewable sources.

3.3 Project Boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Emission from use of nonrenewable biomass/Fossil fuel	CO_2	Yes	Major Source
		CH_4	Yes	Major source
		N_2O	Yes	Major source
		Other	No	No other source identified
Project	Emission from use of nonrenewable biomass	CO_2	Yes	Major source
		CH_4	Yes	Major source
		N_2O	Yes	Major source
		Other	No	No other source identified

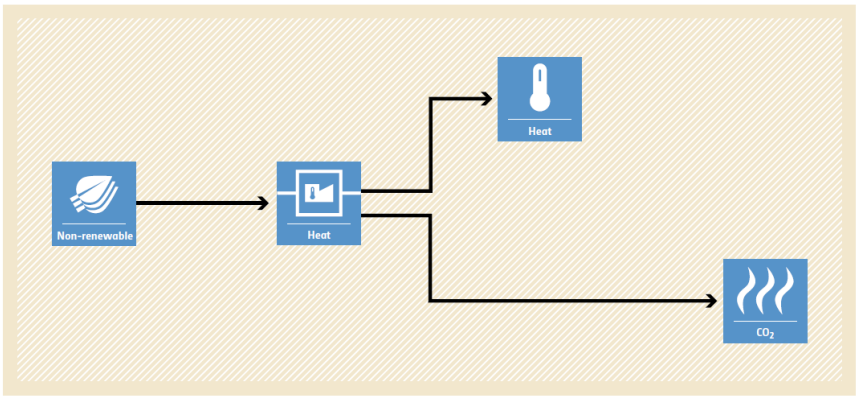
The physical location of the project is described in section 1.12.

The following diagram from the CDM Methodology Booklet[19] illustrates the equipment, systems and flows of mass and energy considered :

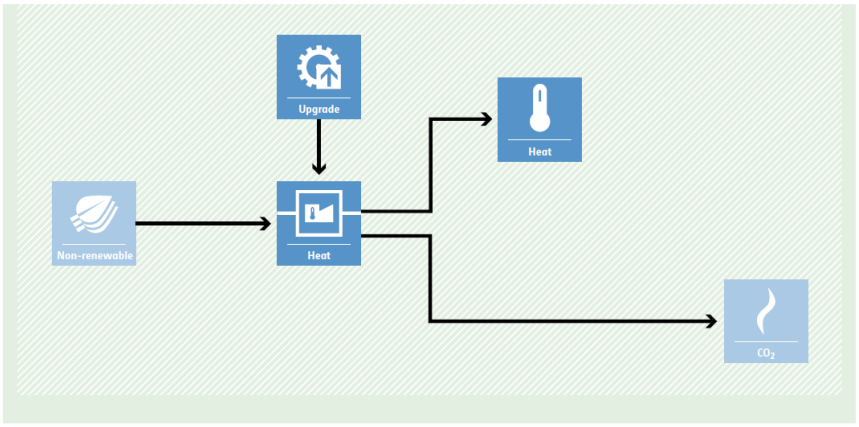
[18] Calculation of the fraction of non-renewable biomass (fNRB) Malawi (2022). N. Salonen, S. Sunkur, M. Schleicher & K. Prayag. C4 EcoSolutions (Pty) Ltd. p6 (see 'Malawi_Chitetezo Cookstoves_fNRB Report_23 Feb 2022.pdf')

[19] CDM Methodology Booklet, 13th Edition, December 2021, https://cdm.unfccc.int/methodologies/documentation/meth_booklet.pdf

BASELINE SCENARIO
Continuation of the current situation, i.e. use of non-renewable biomass as fuel for the existing, less-efficient thermal applications.



PROJECT SCENARIO
Installation of more-efficient thermal energy generation units utilizing non-renewable biomass and/or complete replacement of existing less-efficient thermal applications and/or retrofitting of existing thermal energy generating appliances reduces GHG emissions by saving non-renewable biomass.



3.4 Baseline Scenario

The baseline scenario is the continued use of non-renewable wood fuel (firewood) by the target population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity.

3.5 Additionality

As defined by the VMR0006, the activity method is used to demonstrate additionality

Step 1: Regulatory Surplus

There is no mandated government programme or policy in host country of this project ensuring the distribution of domestic fuel efficient cookstoves. The project is not mandated by any law, statute or other regulatory framework, or for UNFCCC non Annex I countries, any systematically enforced law, statute or other regulatory framework.

Households may only participate voluntarily in this project. It is hereby confirmed that the proposed project is a voluntary coordinated action by Livelihoods Fund SICAV SIF.

Step 2: Positive list

As per Section 3.2, the project meets the applicability conditions of the methodology which represent the positive list. In addition, the project is not implemented as part of a government scheme or supported by multilateral funds.

In order to continue assessing additionality, the cookstoves are divided in the SCTP approach and the commercial approach as stated in section 1.11 :

- SCTP beneficiaries : 30,000 cookstoves are distributed to existing beneficiaries of the SCTP at zero cost and therefore fall under the positive list since no other source of revenue exist other than the sale of GHG credits. Therefore, additionality is proved for cookstoves distributed in the SCTP approach
- Commercial approach : since 70,000 cookstoves are sold for a subsidized rate, step 3 and investment analysis is further required to demonstrate additionality.

Step 3: Project method – Investment Analysis "CDM tool for the demonstration and assessment of additionality" V07.0.0[20]

VMR0006 requires to conduct an investment analysis to "Determine whether the proposed project activity is not:

- *(a) The most economically or financially attractive; or*
- *(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs)."*

The PP selects option (b) to demonstrate that the proposed project activity is not economically or financially feasible without the revenue from the sale of certified emission reductions (CER's). Reference is made to applicable sections of the CDM tool for the demonstration and assessment of additionality V07.0.0 in grey text.

4.3 Step 2: Investment analysis

> *31. To conduct the investment analysis, use the following sub-steps :*

4.3.1 Sub-step 2a: Determine appropriate analysis method

> *32. Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis (Sub-step 2b). If the CDM project activity and the alternatives identified in Step 1 generate no financial or economic benefits other than CDM related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III).*

Since the project activity for commercial approach generates revenues other than CDM related income, the PP can select either "option 2 Investment Comparison Analysis" or "option 3 Benchmark Analysis".

4.3.3. Sub-step 2b: Option II. Apply investment comparison analysis

> *35. Identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service (e.g. levelized cost of electricity production in $/kWh or levelized cost of delivered heat in $/GJ) most suitable for the project type and decision-making context.*

[20] TOOL01. Tool for the demonstration and assessment of additionality V07.0.0, Clean Development Mechanism (see 'CDM_Tool01') https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

The PP selects option 2, Investment Comparison Analysis with NPV as the financial indicator. The NPV is chosen since it is a direct assessment of the profitability – and therefore a direct assessment of the financial and economic feasibility – of the project. Since VMR0006 only requests the application of the Investment analysis (step 2), no identification and comparison with alternatives to the project activity is produced (step 1).

The NPV is calculated in the absence of revenues from carbon finance to demonstrates that the project is not financially and economically viable in those conditions (NPV<<<0). The NPV is calculated with the following main parameters

- A discount rate set at 12% , which represents the usual cost of capital to finance this type of project[21]
- An average EUR/MK exchange rate of 930 (year 2021)[22,23]

The NPV is elaborated with the following income and expense sources to establish cash flows :

- Income sources
    - Included
        - Stoves sales
    - Excluded
        - Carbon revenues
- Expenses sources :
    - Included
        - stove production/distribution/replacement
        - boreholes rehabilitation
        - pigeon peas purchase
        - selected part of direct operational costs (transport and warehousing, stove promoters etc…)
    - Excluded (for simplicity purpose, leading to a conservative NPV analysis)
        - Selected part of operational costs (salaries, equipment, etc.…)
        - Support costs : logistics, administration etc…
        - Certification process costs
        - Consulting costs

[21] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8245630/

[22] https://www.xe.com/currencytables/?from=EUR&date=2021-01-01#table-section

[23] https://www.xe.com/currencycharts/?from=EUR&to=MWK&view=5Y

The NPV calculated is equal to -388,345EUR, clearly demonstrating economic unfeasibility without inflows from carbon revenues (see calculation table below).

An NPV analysis considering all expense sources excluded for simplicity purpose would show a project further unfeasible from a financial and economic point of view.

4.3.6. Sub-step 2d: Sensitivity analysis (only applicable to Options II and III)

> *43. Include a sensitivity analysis that shows whether the conclusion regarding the financial/economic attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially/economically attractive (as per Step 2c) or is unlikely to be financially/economically attractive (as per Step 2c).*

The below table presents the NPV calculated for different sets of discount rates and exchange rates in order to prove the robustness of the conclusion :

Discount rate	Exchange rate	NPV
12%	930	-388,345
14%	930	-360,137
16%	930	-334,969
18%	930	-312,429
20%	930	-292,172
20%	1100	-270,179
20%	1200	-260,153
20%	1300	-251,670
20%	1400	-244,398

For extreme variations in discount rate and exchange rate, the NPV clearly remains negative and therefore in favor of the above conclusion.

The calculations can be found in the table below as well as in the document “VCS3262_NPV_V1.1”.

		year 1				year 2				year 3				year 4				year 5				year 6				year 7				year 8				year 9				year 10			
Unit cost MK	Unit cost EUR	qty	MK	EUR	tot	qty	MK	EUR	tot	qty	MK	EUR	tot	qty	MK	EUR	tot	qty	MK	EUR	tot	qty	MK	EUR	tot	qty	MK	EUR	tot	qty	MK	EUR	tot	qty	MK	EUR	tot	qty	MK	EUR	tot
				65,915				**168,710**				**49,839**				**83,065**				**224,194**				**135,484**				**0**				**0**				**58,065**				**135,484**			
				8,065				104,839				0				0				0				0				0				0				0				0			
750		3,000	8,790,000	6,662		68,000	48,790,000	52,410																																	
400		5,000	2,000,000	2,155		65,000	26,000,000	27,957																																	
350		5,000	1,750,000	1,882		65,000	22,750,000	24,482																																	
				48,387				30,645				0				0				0				0				0				0				0				0			
750		30,000	22,500,000	24,194		19,000	14,250,000	15,325																																	
400		20,000	12,000,000	12,903		10,000	7,600,000	8,172																																	
350		30,000	10,500,000	11,290		10,000	6,650,000	7,151																																	
				1,613				0				0				0				0				0				0				0				0				0			
750		1,000	750,000	806																																					
400		1,000	400,000	430																																					
350		1,000	350,000	376																																					
				0				0				0				0				58,065				135,484				0				0				58,065				135,484			
750																		36,000	27,000,000	20,032		84,000	63,000,000	67,742										36,000	27,000,000	20,032		84,000	63,000,000	67,742			
400																		86,000	34,400,000	19,484		84,000	33,600,000	36,129										86,000	34,400,000	19,484		84,000	33,600,000	36,129			
350																		36,000	12,600,000	13,548		84,000	29,400,000	31,613										36,000	12,600,000	13,548		84,000	29,400,000	31,613			
				7,850				33,226				49,839				83,065				166,129				0				0				0				0				0			
	300,000					10%		50,000	60,000	15%		45,000	45,000	25%		75,000	75,000	50%		150,000	150,000																						
30,000,000						10%	5,000,000		5,276	15%	4,500,000		4,839	25%	7,500,000		8,065	50%	15,000,000		16,129																						
	50	157		7,850	7,850																																				
				8,065				**104,839**				**0**				**0**				**5,376**				**69,892**				**0**				**0**				**5,376**				**69,892**			
				8,065				104,839				0				0				0				0				0				0				0				0			
1,500		5,000	7,500,000	8,065		65,000	97,500,000	104,839																																	
				0				0				0				0				0				0				0				0				0				0			
0		30,000				30,000																																			
				0				0				0				0				0				0				0				0				0				0			
0		1,000																																							
				0				0				0				0				5,376				69,892				0				0				5,376				69,892			
1,000																		5,000	5,000,000	5,376		65,000	65,000,000	69,892										5,000	5,000,000	5,376		65,000	65,000,000	69,892			
0																		80,000				10,000												80,000				10,000							
0																		1,000																1,000											
				-57,850				**-63,871**				**-49,839**				**-83,065**				**-218,817**				**-65,591**				**0**				**0**				**-52,688**				**-65,591**			
				-51,652				**-50,918**				**-35,474**				**-52,789**				**-124,163**				**-33,231**				**0**				**0**				**-19,000**				**-21,119**			

930	
12%	
-388,345	

Additionality conclusion

The investment analysis was conducted with conservative hypothesis and clearly showed impracticability from an economical and financial point of view. It also resisted the sensitivity test. It is therefore concluded that the project activities for both SCTP and commercial approaches are additional.

3.6 Methodology Deviations

This project did not apply any methodology deviations.

4 IMPLEMENTATION STATUS

4.1 Implementation Status of the Project Activity

The project started operating on the 26.03.2021, date of first stove sale. Since then, the implementation of the project is continuous, as reflected in the project database which contains 41'447 instances.

The stoves have been distributed and sold between the different modalities as follows :

- SCTP beneficiaries : 28,232 stoves
- Commercial model : 12,337 stoves
- Third category : 878 stoves
    - Community Social Support Committees : 732 stoves
    - KPT and baseline survey respondents : 55 stoves
    - Promoters : 91 stoves
- Those numbers can be found in the file "VCS3262_StoveDataBase.xlsx", tab "Stoves database", with filtering column C "ID_No:
    - Commercial model have empty denomination in colum C (12'337 instances)
    - Third category beneficiaries have "CSSC", "Committee", "KPT respondent" or "Promoter" denominations in column C (878 instances)
    - SCTP beneficiaries have SCTP numbers in denomination in column C (28'232 instances)

The main tasks being continuously conducted are :

- Negotiating contracts for stoves purchase from SPG's
- Transporting stoves from SPG's to the promoters' network
- Training and review meetings with promoters on stove marketing and usage
- Identifying proper storage facilities for promoters

- Conducting review rounds with promoters for the replacement mechanisms
- Managing installment scheme for commercial model
- Conducting engagement meetings with local leaders
- Conducting promotional events and managing project marketing
- Conducting boreholes assessments, coordinating rehabilitation
- Managing pigeon peas supply and distribution
- Collecting, entering and cleaning data in the project database
- Conducting field trips to project zones
- Administrative management of the project
    - HR management
    - Finances management

The first VVB visit took place from the 15-11-2022 until the 18-11-2022 to audit the monitoring period covering the 26-03-2021 until the 30-09-2022.

5 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The methodology does not account for baseline emissions separately, but instead quantifies net emission reductions achieved by the project. Please refer to Section 3.4.

5.2 Project Emissions

The methodology does not account for project emissions separately, but instead quantifies net emission reductions achieved by the project. Please refer to Section 3.4.

5.3 Leakage

Leakage shall be considered as default 0.95 in accordance with methodology.

5.4 Estimated Net GHG Emission Reductions and Removals

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.

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

$$ER_{y,i,j} = B_{y,savings,i,j} \times f_{NRB,y} \times NCV_{wood\ fuel} \times \left(EF_{wf,CO2} + EF_{wf,non\ CO2}\right) \times N_{y,i,j} \times 0.95 \quad \text{Equation (2)}$$

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 (fNRB)[24]
$NCV_{wood\ fuel}$	Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonne)[25]
$EF_{wf,CO2}$	CO2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO2/TJ)[26]
$EF_{wf,non\ CO2}$	Non-CO2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO2/TJ)[27]
$N_{y,i,j}$	Number of improved cookstoves of type I and batch j operating during year y
0.95	Discount factor to account for leakage

The quantity of woody biomass saved due to implementation of the improved cookstoves will be estimated using the equation below:

[24] Default values endorsed by designated national authorities and approved by the Board are available at https://cdm.unfccc.int/DNA/fNRB/index.html

[25] 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 1 Introduction (https://www.ipcc-nggip.iges.or.jp/public/2006gl/)

[26] 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion (https://www.ipcc-nggip.iges.or.jp/public/2006gl/)

[27] 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion (https://www.ipcc-nggip.iges.or.jp/public/2006gl/)

$$B_{y,savings,i,j} = B_{old} \times \left(1 - \frac{\eta_{old}}{\eta_{new,i,j}}\right) \quad \text{Equation (3)}$$

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
B_{old}	Annual quantity of woody biomass that would have been used in the absence of the project activity (in tonnes per device) to generate useful thermal energy equivalent to that provided by the improved cook stove. Bold is based on a baseline survey.
η_{old}	Efficiency of baseline cookstove
$\eta_{new,i,y}$	Efficiency of the improved cook stove type i and batch j determined using Equation 5 of the methodology.

B_{old} is adjusted to account for continued baseline stove usage using the following equation:

$$B_{old,adjusted} = B_{old} \times \left(1 - \mu_y\right) \quad \text{Equation (6)}$$

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

Since the methodology uses different energy efficiencies and therefore emission reductions depending on the age of the stoves, this project uses the concept of "age groups" (AG) to differentiate between stoves that are distributed during different monitoring periods. Contrary to the batches, the installation date of each individual stove is used to calculate $N_{y,i,j}$ instead of the installation date of the last stove.

All stoves that are in use for less than one year at the time of monitoring are considered "AG 0-1". For this age group, $N_{y,i,}$will then be less than the number of operational stoves since these have not yet been in operation for a full year. Stoves that have been in operation for more than 365 days but less than 730 days (2 years), are in AG 1-2 and so on.

Different age groups have, as defined in the methodology, different stove efficiencies, and are also expected to have different user drop-off rates, since older cookstoves will function less and will therefore have higher loss rates (see ex-ante calculation below).

Ex-ante calculation

For ex-ante calculation purpose, the assumptions below are applied:

1. The project will install up to 120,000 ICS
2. ICS installation will be implemented in the first four years (20,000 in year 1, 30,000 in year 2 and 35,000 in both year 3 and year 4) and will be replaced after four years
3. The life span of the ICS is 4 years. For conservative estimate of ER, the annual stove loss rate is estimated at a progressively higher rate as the years progress :

Age group	Stove loss rate ($U_{y,j}$)
0-1	3%
1-2	7%
2-3	15%
3-4	25%

4. According to the kitchen performance test, B_{old} is calculated to be 2.47. This value is obtained by doing the weighted average of the woodfuel consumption of households using only the 3 stone fire (83% of households, 2.27 $t_{woodfuel}$/hh.year) and the households using both three stone fire and charcoal stoves (17% of households, 3.81 $t_{woodfuel}$/hh.year) :

   83%*2.27 + 17%*3.81 = 2.47 twoodfuel/hh.year

Details on % of households using only 3SF or 3SF + charcoal stoves, and details on the calculations of woodfuel consumptions for both scenario's are available in the files BFCT_UP_Malawi_LV_VCS3262_Consolidated result_v1.0.xlsx, BFCT_UP_Malawi_LV_VCS3262_Analysis_3-stones only_v1.0.xlsx and BFCT_UP_Malawi_LV_VCS3262_Analysis_3-stones and charcoal stoves_v1.0.xlsx

A baseline stove usage rate (μ_y) of 5% is assumed, so $B_{old,adjusted}$ is calculated 2.35 as described by equation 6 of the methodology

~~6.~~5. In the year of distribution, stoves are only accounted by half to account for the distribution happening during the whole year, so on average, stoves can only perform for half of the year.

Determination of number of ICS operating during year y

If y = 4, the number of usable[28] stoves is 20,000 (distributed in year 1) +30,000 (distributed in year 2) + 35,000 (distributed in year 3) + 35,0000 (distributed in year 4) + 20,0000 (replacement stoves for year 1, distributed during this year). The number of functioning[29] cookstoves is calculated as:

[28] Usable stoves is defined here as stoves that are within the defined life span of the CM stove, so less than 4 years old.

[29] Functional cookstoves are defined here as usable stoves where 2 extra calculations are performed. 1) In the year a group of stoves is distributed, the number of stoves distributed during that year is divided by two to account for stoves that are being distributed later on in the year. 2) the stove loss rate as mentioned under assumption nr. 3 is applied. If there are two different age groups in one year, the two age groups have a different stove loss rate applied.

N_4= 20,000*(1-0.25) + 30,000*(1-0.15) + 35,000 * (1- 0.07) + 35,000/2*(1-0.03) + 20,000/2 * (1-0.03)= 99,725 stoves

Details are provided in the ER calculation sheet[30].

Year	Number of cookstoves distributed	Number of functioning cookstoves
Year 1	20,000	9,700
Year 2	30,000	33,150
Year 3	35,000	61,875
Year 4	55,000	99,725
Year 5	30,000	117,950
Year 6	35,000	117,875
Year 7	55,000	116,275
Year 8	30,000	84,800
Year 9	0	56,000
Year 10	0	29,750

Determination of efficiency of ICS during year y

$$\eta_{new,y,i,j} = \eta_p \times (DF_n)^{y-1} \times 0.94$$

Where η_p = 31% and DF_n = 0.99

Age group	Stove efficiency ($\eta_{new,y,i,j}$)
0-1	29.14 %
1-2	28.85 %
2-3	28.56 %
3-4	28.27 %

Determination of fNRB

All details related to the fNRB evaluation are available in the files “Calculation of the fraction of non-renewable biomass (fNRB), Malawi, CDM Tool 30 EB 108 Annex 11 v3.0 2020” from which the below is extracted.

[30] See document “VCS3262_ER_Livelihoods Chitetezo Mbaula Project_ExAnte.xlsx”

"CAR_02 Malawi_Chitetezo Cookstoves_Calculation Sheet_23 Feb 2022.xlsx" presents all details of calculation.

The estimation of woody biomass consumption was derived from the UN Statistics Division wood consumption[31,32] and population statistics obtained from The World Bank Open Data[33] in combination with the CDM default per capita wood consumption rates and those reported in peer-reviewed literature[34]. Charcoal consumption converted to the equivalent wood biomass by the IPCC[35] default factor and the wood volume converted to metric tonnes using the FAO[36] default conversion factor.

Domestic woody biomass consumption (22,360,940 t/yr) was estimated by multiplying the per capita consumption of fuelwood and charcoal obtained from peer-reviewed literature[37], disaggregated by urban and rural household areas, by the 2020 urban and rural population numbers, and validated against UN Statistics Division data for 2020 (1,751,673 t/yr). The UN Statistics Division data does not transparently account for charcoal consumption and, therefore, the domestic woody biomass estimate derived from reported consumption statistics in the peer-reviewed literature were applied. These consumption statistics were provided for the northern, central and southern regions of Malawi for 5 wealth quintiles. Conservatively, the 3rd quintile's (median group) consumption statistics for fuelwood and charcoal disaggregated by rural and urban populations were applied. The domestic woody biomass was, therefore, estimated to be 22,360,940 t/yr.

The non-domestic woody biomass consumption estimates are provided by the UN Statistics Division[38],[39]. Non-domestic consumption for Malawi — discounting the deforestation likely occurring as

[31] UN Statistics Division. Energy Statistics Database: Charcoal. *Accessed on 29/11/2021 from* https://data.un.org/Data.aspx?q=charcoal&d=EDATA&f=cmID%3ACH.

[32] UN Statistics Division. Energy Statistics Database: Fuelwood. *Accessed on 29/11/2021 from* https://data.un.org/Data.aspx?q=fuelwood&d=EDATA&f=cmID%3AFW.

[33] The World Bank. Data: Malawi. *Accessed on 12/03/2021 from* https://data.worldbank.org/country/malawi (2021).

[34] Schuenemann, F., Msangi, S. & Zeller, M. Policies for a sustainable biomass energy sector in Malawi: Enhancing energy and food security simultaneously. *World Dev.* **103**, 14–26 (2018).

[35] IPCC. Forest Land. *2019 Refinement to 2006 IPCC Guid. Natl. Greenh. Gas Invent. Vol. 4 Agric. For. Other L. Use* **4**, 1–29 (2019).

[36] FAO. *The charcoal transition. Greening the charcoal value chain to mitigate climate change and improve local livelihoods.* (2017).

[37] Schuenemann, F., Msangi, S. & Zeller, M. Policies for a sustainable biomass energy sector in Malawi: Enhancing energy and food security simultaneously. *World Dev.* **103**, 14–26 (2018).

[38] UN Statistics Division. Energy Statistics Database: Charcoal. *Accessed on 29/11/2021 from* https://data.un.org/Data.aspx?q=charcoal&d=EDATA&f=cmID%3ACH.

[39] UN Statistics Division. Energy Statistics Database: Fuelwood. *Accessed on 29/11/2021 from* https://data.un.org/Data.aspx?q=fuelwood&d=EDATA&f=cmID%3AFW.

a result of shifting agriculture and from informal or illegal harvesting[40] given the limited data available for these activities — is reported as the quantity of fuelwood that is transformed into charcoal (2,627,509 t/yr). Wood that is transformed into charcoal has the potential of being double counted as domestic and non-domestic consumption and, therefore, non-domestic consumption has been conservatively excluded. The total woody biomass consumption for Malawi is, therefore, estimated to be 22,360,940 t/yr.

The resulting non-renewable biomass (NRB) was compared with the top-down product of average above-ground biomass (78.7 t/ha)[41] and the most recent annual deforestation data (42,000 ha/year)[42]. NRB, as calculated in this report according to the latest CDM Tool 30[43], was found to be 21,843,646 t/year, which is significantly greater than the cross-check results based on deforestation (3,305,400 t/year). It is expected that the cross-check estimate of biomass loss from deforestation would grossly under-estimate the actual extent of non-renewable biomass consumption as it only considers the average biomass stocks from areas that are completely deforested. Unsustainable wood harvesting resulting in forest degradation and significant reductions in biomass stocks, but not complete deforestation, are not considered in the cross-check. Conservatively, however, non-domestic consumption has been excluded.

Geospatial data products for Malawi were analysed in R21–25 to estimate Malawi's renewable biomass. The woody cover from all areas defined as "forest" (>10%) cover, "other wooded land" (5-10% cover) and "other land" (<5% cover), according to the FAO definitions[44], was estimated using Hansen/UMD/Google/USGS/NASA27 spatial data for 2000 and 2020, which is derived from Hansen et al.[45] As no woody cover was excluded from the analysis based on a threshold of minimum cover, disaggregation into the FAO forest categories is not applicable under this study. The woody cover was disaggregated according to the FAO global ecological zones[46] and the total woody cover extent was calculated for each ecological zone, within the protected areas and within areas that are either accessible or geographically remote. The woody cover is estimated as a percentage for the whole

[40] Ngwira, S. & Watanabe, T. An Analysis of the Causes of Deforestation in Malawi: A Case of Mwazisi. *Land* **8**, 48 (2019).

[41] FAO. *Global Forest Resources Assessment 2020: Report - Malawi*. https://www.fao.org/3/cb0032en/cb0032en.pdf (2020).

[42] FAO. *Global Forest Resources Assessment 2020: Report - Malawi*. https://www.fao.org/3/cb0032en/cb0032en.pdf (2020).

[43] CDM. Methodological tool 30: Calculation of the fraction of non-renewable biomass. Version 03.0. (2020).

[44] FAO. *Terms and Definitions. Forest Resources Assessment Working Paper 180*. *FAO report* (2015).

[45] Hansen, M. C. C. *et al.* High-resolution global maps of 21st-century forest cover change. *Science (80-.).* **342**, 850–854 (2013).

[46] FAO. *Global ecological zones for FAO forest reporting: 2010 Update*. *Forest resources Assessment Working Paper 179* (2012).

country within 30 x 30 m resolution grid cells. The woody cover extent for each cell is therefore calculated as the woody cover percentage multiplied its area (0.09 ha).

Geographically remote areas were determined to be areas beyond a harvestable distance from roads and settlements. Conservatively, it was assumed that forests and wooded areas adjacent to all roads within a distance of 2.5 km are harvestable, despite how geographically remote or inaccessible these roads may be. This threshold was determined based on the peer-reviewed literature on regional wood harvesting practices.

Banks et al.[47] found that woody biomass density increases significantly as a function of distance from the edge of a settled area. Beyond 450 m, the average biomass density in their study area was found to increase from 2.1 to 16.6 t/ha. Jumbe and Angelsen[48] modelled Miombo fuelwood choice from household survey data. They found that the most significant determinants of fuelwood choice are source attributes (size and species composition) and distance to the source. The mean harvesting distance for their study was found to be 0.95 km. Bandyopadhyay et al.[49] matched household survey and remote sensing data to investigate Miombo fuelwood use in relation to poverty levels. They concluded that the one-way walk duration to fuelwood source for both poor and non-poor households is 0.6 hours. Assuming an average walking speed of 4 km/hr over uneven terrain, the average one-way distance to fuelwood source can be conservatively estimated to be less than 2.5 km. Areas beyond the harvestable distance were, therefore, determined to be geographically remote. Accessible areas are those that are not protected and not geographically remote, from which the annual renewable biomass production is calculated (Equation 3).

[47] Banks, D. I., Griffin, N. J., Shackleton, C. M., Shackleton, S. E. & Mavrandonis, J. M. Wood supply and demand around two rural settlements in a semi-arid Savanna, South Africa. *Biomass and Bioenergy* **11**, 319–331 (1996).

[48] Jumbe, C. B. L. & Angelsen, A. Modeling choice of fuelwood source among rural households in Malawi: A multinomial probit analysis. *Energy Econ.* **33**, 732–738 (2011).

[49] Bandyopadhyay, S., Shyamsundar, P. & Baccini, A. Forests, biomass use and poverty in Malawi. *Ecol. Econ.* **70**, 2461–2471 (2011).

Box 1: Summary of the equations applied to estimate fNRB according to the latest version of CDM Tool 30 (EB 108 Annex 11 version 3.0 2020).

The fraction of harvested biomass that can be established as non-renewable biomass is the f_{NRB}. This fraction ranges between 0 and 1, where 0 indicates that 100% of harvested biomass is renewable (0% is non-renewable) and 1 indicates that 100% is non-renewable. The following equation is used to calculate f_{NRB}:

$$f_{NRB} = \frac{NRB}{NRB + RB} \quad (1)$$

Where:
f_{NRB} = Fraction of non-renewable biomass
NRB = Non-renewable biomass (t/yr)
RB = Renewable biomass (t/yr)

The quantity of non-renewable biomass (NRB) is the difference between the annual biomass consumption (H) and the quantity of renewable biomass (RB), calculated by the following equation:

$$NRB = H - RB \quad (2)$$

Where:
H = Total woody biomass consumption in the absence of project activity (t/yr)

Renewable biomass is the product of the mean annual increment of woody biomass growth and the total extent of the forest and other wooded areas of the country where wood extraction is not prohibited or geographically remote, calculated by the following equation:

$$RB = \sum \left(MAI_{forest,i} \times \left(F_{forest,i} - P_{forest,i}\right)\right) + \sum \left(MAI_{other,i} \times \left(F_{other,i} - P_{other,i}\right)\right) \quad (3)$$

Where:
MAI = Mean annual increment of woody biomass (t/ha/year)
F_{forest} = Extent of forest in the relevant period (ha)
F_{other} = Extent of other land in the relevant period (ha)
P_{forest} = Extent of non-accessible area within forest areas (ha)
P_{other} = Extent of non-accessible area within other land areas (ha)
i = Sub-category *i* of forest areas and other land areas.

The default age-weighted mean annual increment (MAI) estimates of each ecological zone, as reported by the IPCC17, were used for this study. The proportion of forest stand ages above and below 20 years old, including primary forests, were estimated for each ecological zone by extrapolating the observed forest gain extents between 2000 and 2012 to a 20-year period. The resulting average MAI estimates for Malawi are reported in Table 2.

An area of ~14% of Malawi is categorised by the FAO global ecological zones as covered by water, but this does not perfectly align with the water bodies in the country. There is, therefore, woody cover that is a potential source of fuelwood supply present on the land area which is currently incorrectly categorised as being in water. An average of the MAI estimate for the adjacent ecological zone (tropical moist forest) was, therefore, applied to the woody cover included in this category.

The difference between woody biomass consumption and renewable biomass is considered to be non-renewable (Equation 2). Non-renewable biomass utilisation in Malawi is, therefore, estimated to be 21,843,646 t/yr.

The fraction of non-renewable biomass is the quotient of the non-renewable and the total biomass (Equation 1). The fraction of non-renewable biomass for Malawi is, therefore, estimated to be 0.98.

Variable	Value	Source
Total woody biomass consumption (t/yr)	22,360,940	Table 1
Renewable biomass (t/yr)	517,294	Table 2
Non-renewable biomass (t/yr)	21,843,646	Calculated
Fraction of non-renewable biomass	**0.98**	**Calculated**

The calculated fNRB of 0.98 indicates that the consumption of woody biomass within Malawi is greater than the country's capacity to renewably, or sustainably, supply. This finding is supported by the consistent and widely reported deforestation rate and dynamics observed for the country[50,51,52,53,54,55,56,57]

Fuelwood savings and emission reductions

As per equation 3 and 6:

$B_{1,savings}$ = 2.47 x (1 – 0.05) x (1 – 0.10/0.2914) = 1.54125 ton wood/stove

$ER_1 = B_{1,savings} \times f_{NRB} \times NCV_{wood\ fuel} \times (EF_{wood,CO2} + EF_{wood,non\text{-}CO2}) \times N_{1,i,j} \times 0.95$

= 1.54125 x 0.98 x 0.0156 x (112+ 26.23) x 9,700 x 0.95 = 30,014

Year	Estimated baseline emissions or removals (tCO2e)	Estimated project emissions or removals (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
Year 1	30,014	0	0	30,014
Year 2	102,269	0	0	102,269
Year 3	190,441	0	0	190,441
Year 4	306,459	0	0	306,459
Year 5	362,037	0	0	362,037
Year 6	361,441	0	0	361,441
Year 7	386,383	0	0	386,383

[50] FAO. *Global Forest Resources Assessment 2020: Main report*. *Rome* https://doi.org/10.4060/ca9825en (2020).

[51] Mauambeta, D., Chitedze, D. & Mumba, R. *Status of Forests and Tree Management in Malawi*. (2010) doi:10.13140/2.1.3497.7926.

[52] Gowela, J. & Masamba, C. *State of Forest and Tree Genetic Resources in Malawi*. (2002).

[53] FAO. Forests and the Forestry Sector: Malawi. (2016).

[54] Pullanikkatil, D., Palamuleni, L. & Ruhiiga, T. Assessment of land use change in Likangala river catchment, Malawi: A remote sensing and DPSIR approach. Appl. Geogr. 71, 9–23 (2016).

[55] Owen, M., Openshaw, K., van der Plas, R., Matly, M. & Hankins, M. *Malawi Biomass Energy Strategy*. (2009).

[56] Schuenemann, F., Msangi, S. & Zeller, M. Policies for a sustainable biomass energy sector in Malawi: Enhancing energy and food security simultaneously. *World Dev.* 103, 14–26 (2018).

[57] Bandyopadhyay, S., Shyamsundar, P. & Baccini, A. Forests, biomass use and poverty in Malawi. *Ecol. Econ.* 70, 2461–2471 (2011).

Year 8	362,037	0	0	362,037
Year 9	308,917	0	0	308,917
Year 10	214,317	0	0	214,317
Total	**2,624,313**	0	0	**2,624,313**

6 MONITORING

6.1 Data and Parameters Available at Validation

Data / Parameter	B_{old}
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	VMR0006, section 8.4 option b : baseline survey of local usage For calculation of B_{old}, see documents "BFCT_UP_Malawi_LV_VCS3262_Analysis_3-stones and charcoal stoves_v1.0", "BFCT_UP_Malawi_LV_VCS3262_Analysis_3-stones only_v1.0" and "BFCT_UP_Malawi_LV_VCS3262_Consolidated result_v1.0" A conversion factor of 6 kg of firewood per kg of charcoal has been used for households using charcoal along firewood on baseline devices.
Value applied	2.47
Justification of choice of data or description of measurement methods and procedures applied	The kitchen performance test as promoted by the clean cooking alliance was used to calculate this value.
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	η_{old}
Data unit	Fraction

Description	Efficiency of baseline stove
Source of data	VMR0006 v1.1, section 9.2
Value applied	10%
Justification of choice of data or description of measurement methods and procedures applied	Provided as default value for conventional open fire
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	η_p
Data unit	Fraction
Description	Efficiency of project stove at the start of project activity
Source of data	Clean Cookstoves catalogue: http://catalog.cleancookstoves.org/stove_details.html?stove_id=stove_VROU4NT
Value applied	31%
Justification of choice of data or description of measurement methods and procedures applied	The adopted efficiency is the average of the two available test results
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	$\eta_{new,i}$
Data unit	Fraction

Description	Efficiency of the device of age group i implemented as part of the project activity
Source of data	VMR0006 v1.1, section 8.4
Value applied	$\eta_{new,AG0-1}$ 29.14 % $\eta_{new,AG1-2}$ 28.85 % $\eta_{new,AG2-3}$ 28.56 % $\eta_{new,AG3-4}$ 28.27 %
Justification of choice of data or description of measurement methods and procedures applied	Equation 5 : $\eta_{new,i,y} = \eta_p \times (DF)^{y-1} \times 0.94$
Purpose of Data	Calculation of emission reductions
Comments	Since all devices are the same type, there is no distinction based on stove type. However, since $\eta_{new,i}$ depends on the age of the project device, there will be made a distinction between stove age groups.

Data / Parameter	$f_{NRB,y}$
Data unit	Fraction
Description	Fraction of non-renewable biomass
Source of data	Calculation of f_{NRB} based on CDM Tool 30 EB 108 Annex 11 v3.0 2020
Value applied	98%
Justification of choice of data or description of measurement methods and procedures applied	C4 EcoSolutions (Pty) Ltd. was appointed as third party to estimate the fNRB value for Malawi[58]
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	$NCV_{biomass}$

[58] Calculation of the fraction of non-renewable biomass (f_{NRB}) Malawi (2022). N. Salonen, S. Sunkur, M. Schleicher & K. Prayag. C4 EcoSolutions (Pty) Ltd. p6 (see 'Malawi_Chitetezo Cookstoves_fNRB Report_23 Feb 2022.pdf')

Data unit	TJ/t
Description	Net calorific value of the non-renewable woody biomass that is substituted or reduced
Source of data	IPCC default for wood fuel
Value applied	0.0156 TJ/tonne
Justification of choice of data or description of measurement methods and procedures applied	Default value provided in VMR0006, version 1.1, section 9.2
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	$EF_{wf,CO2}$
Data unit	tCO2/TJ
Description	CO2 emission factor for the use of wood fuel in baseline scenario
Source of data	IPCC default for wood fuel
Value applied	112 tCO2/TJ
Justification of choice of data or description of measurement methods and procedures applied	Default value provided in VMR0006, version 1.1, section 8.4
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	$EF_{wf,non\ CO2}$
Data unit	tCO2/TJ
Description	Non-CO2 emission factor for the use of wood fuel in baseline scenario
Source of data	IPCC default for wood fuel

Value applied	26.23 tCO2/TJ
Justification of choice of data or description of measurement methods and procedures applied	Default value provided in VMR0006, version 1.1, section 8.4
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	L
Data unit	Fraction
Description	Discount factor to account for leakage
Source of data	VMR0006, version 1.1, section 8.3
Value applied	0.95
Justification of choice of data or description of measurement methods and procedures applied	A net to gross adjustment factor (0.95 default) is applied in order to adjust Bold to account for leakages as per paragraph 8.3 of the VMR 0006, version 1.1 methodology.
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	Life span
Data unit	Number of years
Description	The operating lifetime of the project device
Source of data	Lifespan Survey for Chitetezo Mbaula Stoves, Lilongwe, Malawi, December 2020, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Energising Development
Value applied	4
Justification of choice of data or description of measurement methods and procedures applied	Cookstoves beyond their theoretical lifespan (4 years) are automatically excluded from the project database for ER calculations. Cookstoves out of order during the monitoring surveys are counted as not generating ER's.
Purpose of data	Calculation of emission reductions

Comments	-

6.2 Data and Parameters Monitored

Data / Parameter	$N_{y,i}$
Data unit	Number
Description	Number of equivalent project devices of age group i, operating during year y.
Source of data	VMR0006, section 8.4 option b, baseline survey of local usage : project database and monitoring surveys
Description of measurement methods and procedures to be applied	The project database (recorded continuously) detailing per stove distributed the beneficiary with their current living location, telephone number and sales date and the monitoring survey to determine usage rate and number of stoves used per household.
Frequency of monitoring/recording	Biennially
Value applied	Ex-ante estimations:

Year	N
1	9,700
2	33,150
3	61,875
4	99,725
5	117,950
6	117,875
7	116,275
8	84,800
9	56,000
10	29,750

Ex-post :

The project database indicates the installation date of every individual stove (see file “VCS3262_StoveDataBase.xlsx”, tab “Stoves database”, column I for sales date), which is the parameter $n_{y,i,j}$. Based on this information and on the start and end date of the monitoring period, the number of days for which each stove has been active during the monitoring period is

	calculated and then split between calendar years (see file "VCS3262_StoveDataBase.xlsx", tab "Stoves database", columns S to AJ). In addition, the number of days on a certain year is split between days related to age group 0-1 (AG0-1) and to age group 1-2 (AG1-2) to be able to apply the correct efficiency in the calculation of ER's(see file "VCS3262_StoveDataBase.xlsx", tab "Calculations"), which constitutes the parameter $n_{y,i,j}$ for every age group and for every year. Uy (the usage rate) is attributed manually for every stove surveyed during the monitoring survey. It is either 0 or 100%. The attribution of the usage rate is based on multiple factors : 1) the presence of the project stove during monitoring survey, 2) the declaration of usage by the end user, 3) the use witnessed by the surveyros, 4) the pictures with the condition of the stove. The main reason for attribution of the usage rate is detailed in the file "VCS3262_MalawiCookstovesLV_MS1_Analysis_v1.0.xlsx", tab "Analysis", Column P. The final usage rate is then the average of all the usage rates on the sample.$DF_{stoves/HH,y}$ is based on the observation of the number of project stoves per household for the hpouseholds having a project stove. This is reported based on the information gathered during the monitoring survey. Details of attribution can be seen in the file "VCS3262_MalawiCookstovesLV_MS1_Analysis_v1.0.xlsx", tab "Analysis", Column M. A memory note is written as well in Column N. The final $DF_{stoves/HH,y}$ is therefore the average of all individual number of project stoves per households. Once
Monitoring equipment	Project database
QA/QC procedures to be applied	Data crosschecking will occur to ensure consistency of the data collected.
Purpose of data	Calculation of emission reductions
Calculation method	The following formula is applied with respect to the parameters defined above: $N_{y,i,} = n_{y,i,j} * U_y / DF_{stoves/HH,y}$ Where $n_{y,i,j}$ is the number of stove equivalents (number of days the stove was in use during the monitoring period divided by a year, 365) for year y and age group i, A correction is applied to account for the lag between the moment the stove is bought and first used. U_y is the usage rate, or the percentage of households that use their project device according to the monitoring survey $DF_{stoves/HH,y}$ is a correction factor for the usage of multiple stoves by the same household. It is the average number of stoves per household as determined by the monitoring survey.

	Details of calculation of all factors involved in calculating Ny,I are available in the files "VCS3262_MalawiCookstovesLV_MS1_Analysis_v1.0.xlsx" and "VCS3262_StoveDataBase.xlsx".
Comments	Since all cookstoves are the same cookstove type, there is no differentiation between cookstove types. The project does not work with batches, but does make a difference in age groups (stoves less than a year old, between 1-2 years old etc.) since $\eta_{new,i}$ is dependent on age.

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	VMR0006, section 8.4 option b, baseline survey of local usage : monitoring surveys
Description of measurement methods and procedures to be applied	The sampling plan is developed proportionally to age groups distribution to ensure representativity. Households included in the sampling plan will be interviewed with a questionnaire designed to capture information on the simultaneous use of pre project or other cooking devices.
Frequency of monitoring/recording	At least once every two years
Value applied	Ex-Ante estimation : 5%
Monitoring equipment	Monitoring surveys
QA/QC procedures to be applied	Data crosschecking will occur to ensure consistency of the data collected : consistency check of answers along the questionnaire, pictures cross check, visual inspection and narrative cross check. Data for this parameter will be collected using the same survey for the fraction of $N_{y,j}$.
Purpose of data	Calculation of emission reductions
Calculation method	The adjustment factor for baseline stove usage shall be determined based on the number of meals cooked using the baseline/ pre-project stove divided by the total number of meals cooked. The impact of seasonal variation on the use of the baseline stove is also taken into account. The required information shall be captured through sample surveys carried out following a random sampling approach. The number of households for each age-group will be proportionate

	to the fraction of stoves from that age-group compared to the total amount of stoves. Details of calculations are available in the file
Comments	-

Data / Parameter	$B_{old,adjusted}$
Data unit	Tonnes/year
Description	Adjusted baseline fuel use to account for any continued use of pre-project devices during the year y
Source of data	Ex-ante: based on assumed μ_y Ex-post: Based on μ_y from monitoring survey
Description of measurement methods and procedures to be applied	Application of equation 6
Frequency of monitoring/recording	Once per monitoring period
Value applied	Ex-ante : 2.35
Monitoring equipment	-
QA/QC procedures to be applied	See QA/QC for μ_y
Purpose of data	Calculation of emission reductions
Calculation method	Application of equation 6
Comments	-

6.3 Monitoring Plan

The monitoring plan is designed to monitor the parameters listed in the section above. The share of operating stoves and the continued use of pre-project devices will be determined based on sampling procedures as outlined below. United Purpose will be responsible for conducting the sampling surveys and maintaining a database with all operating stoves.

Baseline survey and baseline fuel consumption

For the baseline survey, the sampling frame consists of households living within the 214 clusters where project stoves will be disseminated across the 2 districts of Machinga and Zomba. 16 clusters are

randomly selected[59] and for each cluster up to 10 households . Surveyors are advised to walk from center of the cluster in different directions of the cluster and ask the first householder they meet with if he/she is willing to participate in the survey. If the householder is not willing, surveyors should talk to the subsequent householder they meet with. After a successful first survey, surveyors walk to the next household/person (randomly selected) and ask for their willingness to participate and so on. Following the aforementioned procedure allows random sampling of households and avoid any bias.

Since one of the clusters, Ndaje Mkalawire, was particularly difficult to reach, it was replaced by another randomly sampled household, namely Nkula Mlelemba.

Important guidelines were given to the surveyors on how to sample households randomly, as described above, and perform a proper data collection[60] They were also given a training. [61]

Based on the results of the baseline survey, baseline scenarios were identified[62]. Scenarios that appeared in more than 5% of the cases were deemed significant, which were households cooking with only a three-stone stove/open fire and households using a combination of a three-stone stove/ open fire and a traditional stove. For these two scenarios, a baseline fuel consumption test was organised to determine the B_{old}. The Baseline Kitchen Performance Test (BKPT) protocol was used for this[63]. The same clusters were visited as in the baseline survey and BFCT and where possible, the same households were visited.

Monitoring survey

No monitoring for leakage through competitive use 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:

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, representative sampling will be undertaken in line with the requirements of section 8.4 option b of the VMR0006 methodology.

Objective and reliability requirements

[59] See document "VCS3262_LVF Clusters in Machinga and Zomba_Analysis" and "VCS3262_LVF Clusters_new_sampling"

[60] See document "VCS3262_Baseline Survey Guidelines and Instructions_UP_Malawi_v1.0"

[61] See document "VCS3262_Training Attendance Register.pdf"

[62] See document "VCS3262_Baseline Survey_UP_Malawi_LV", tab "Report" cells M87 to V97

[63] See document "VCS3262_Baseline KPT protocol_v.1.0_EN"

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 applied methodology VMR0006 V1.1).

Parameter	Description of parameter	Frequency
$N_{y,i,j}$	Number of project devices of type i and batch j operating during year y	Biennial
μ_y	Adjustment to account for any continued use of pre-project devices during the year y	Biennial

Target populations

The target population are all households in the project database which are using fuelwood in the CM stoves distributed under the project for cooking.

Sampling frame

It is expected that the geographical locations do not have influence on the parameters of interest that are $N_{y,i,j}$ and μ_y. Therefore, these parameters can be assumed to be homogeneous regardless of how the end user group and distribution/installation location is defined since the end users shall always be households and geographical location is restricted to the project boundary. Since all stoves are of the same type, all stoves can be grouped into a homogeneous sampling frame.

When sampling to determine $N_{y,i,}$ and μ_y, a simple random sampling approach shall be followed as described in VMR0006. Since the project target population is bigger than 1000 households, the minimum sample size will be 100. Oversampling is encouraged to compensate for attrition, outliers or non-response. Therefore, a sample of 150 households was taken.

The fraction of each age-group in the sample will be the same as the proportion of that age-group in the total number of households of the project database.

Sampling method

The sampling method for monitored parameters $N_{y,I}$ and μ_y is simple random sampling. After determining the proportion of households in age group 0-1 and 1-2 at the moment of sampling, the number of households necessary for each age group is determined and accordingly randomly selected using a random number generator[64].

Data
Surveys

[64] For the first monitoring period, the document "VCS3262_LV_UP_malawi_sampling_full_MP1.xlsx" documents the sampling process.

The majority of interviews will be conducted in person by the local team of United Purpose in Malawi or by hired externals trained beforehand. Data quality control will be performed by the consultant.

The survey is done biennially to assess the required parameters mentioned below. Questions will be asked about the usage of the ICS as well as baseline technology use, fuel consumption and seasonal variations.

All of the aforementioned surveys/tests are intended to be carried out with smartphones (by using e.g. AKVO Flow or Kobo Collect or any other appropriate software tools) and as soon as the user is online all the captured data are transferred to a centralized database. The team of United Purpose and the external carbon consultant carries out further data analysis based on these data. If smartphone technology for any reason cannot be used, data will be recorded in paper form.

Monitoring of cookstove database

United Purpose keeps records of all distributed ICS in an electronic database. As a minimum the following information will be recorded in the database:

- Unique serial number of the ICS
- Date of sales or distribution
- End-user contact details (name, state, mobile number, or national ID number)
- Name of stove promoter
- Quantity of ICS distributed or sold
- Model type of the ICS

The USN of each ICS entered into the distribution database will be linked to a distribution date (recorded during distribution). Thus, for any monitoring period it is possible to calculate the period of time for which the stoves included in the emissions reduction calculations are deemed operating. If e.g. a stove has been operating for 100 days, then the full-year operating fraction is 0.274 (=100/365 days). A stove will be counted as operational (= start crediting) from the next day following the stove distribution. The sum of the operating fractions of all appliances determines the equivalent full-time appliances for the monitoring period.

The database will be continuously checked for possible double-entries or implausible data entries. Though a household may own more than one ICS at the same time, only one ICS with serial number and being within the age of 4 years per household can claim carbon credits.

To monitor the number of stoves that continue to be in use ($N_{y,i,}$), the data collected will be a representative number of households from the database. The method of collecting data will be field surveys of the required sample size of ICS users in the database. Data will be collected from the field surveys, entered in the database and included in the monitoring report.

For the first monitoring survey, 141 of the 150 sampled households were surveyed. Of 3 of these 141 households, it was recorded that the stove was completely broken and no further survey was done. A

usage rate of 0% has been applied. The 9 unsurveyed households were either not present at the time of surveying or moved/ were untraceable. These households were not taken into account in the analysis.

Monitoring of μ_y

During the same field surveys, μ_y, the proportion of users still using their baseline stove, will also be determined. This method is preferred over using data loggers, since installing data loggers is not considered practical. Occasional usage of a pre-project stove is deemed insignificant, so μ_y is only calculated if baseline stoves are used on a weekly basis.

This survey will be part of the above mentioned $n_{y,i,j}$ survey and will therefore be conducted with the same households.

The surveys should capture the number of meals cooked using the baseline stove in the dry and wet season. There will be three situations:

1. Project ICS are completely discarded
2. Baseline stove(s) are completely discarded
3. Baseline stove(s) used along with project ICS.

The first scenario will not be taken into account for μ, since this proportion of operational stoves is already used to calculate $N_{y,i,j}$. The second scenario gives a μ of 0% for that household. For the third case, the number of meals cooked in the dry and wet season using the baseline stove will be divided by the number of meals cooked in the dry or wet season respectively. Then, a weighted average of the two will be taken to determine the baseline stove use percentage. The obtained percentages of all households in the second and third scenario will be averaged to obtain μ_y.

Monitoring of $N_{y,i}$

A visual inspection of the premises will be done to see if the ICS is operational and in use. Additionally, an interview with the end user will be held to ascertain that the stove is used on a regular basis. This will determine of the stove is in use or not (Yes/No).

Additionally, the household will be asked how many project stoves they currently have (not counting replacement stoves as an old stove and its replacement stove are accounted as one stove in the database) (number of stoves).

The project database will be used to determine the number of stove equivalents (days stove in use during monitoring period/ 365). Since the database only records the sale date, the monitoring survey will also ask how many days after the purchase of the project stove the device has been taken in use and this will be taken into account when calculating the stove equivalents.

7 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

7.1 Data and Parameters Monitored

Data / Parameter	Ny,i,j		
Data unit	Number		
Description	Number of equivalent project devices of type i and batch j operating during year y.		
Value applied		2021	2022
	AG 0-1	14,178	12,983
	AG 1-2	0	8,129
Comments	For the calculation of ny,i,j, see document "VCS3262_StoveDataBase.xlsx". For the calculation of Uy and DFstoves per HH,y, see document VCS3262_MalawiCookstovesLV_MS1_Analysis.xlsx For the calculation of Ny,i, see document VCS3262_ER_Livelihoods Chitetezo Mbaula Project_MS1.xlsx		

Data / Parameter	μ_y
Data unit	Fraction
Description	Adjustment to account for any continued use of pre-project devices during the year y
Value applied	12%
Comments	See document "VCS3262_MalawiCookstovesLV_MS1_Analysis.xlsx"

Data / Parameter	$B_{old,adjusted}$
Data unit	Tonnes/year
Description	Adjusted baseline fuel use to account for any continued use of pre-project devices during the year y

Value applied	2.17
Comments	NA

Data / Parameter	Date of commissioning of project device i
Data unit	Date
Description	Actual date of commissioning of the project device
Value applied	26/03/2021 for first stove[65]
Comments	NA

7.2 Baseline Emissions

The methodology does not account for baseline emissions separately, but instead quantifies net emission reductions achieved by the project. Please refer to Section 3.4.

7.3 Project Emissions

The methodology does not account for baseline emissions separately, but instead quantifies net emission reductions achieved by the project. Please refer to Section 3.4.

7.4 Leakage

Leakage shall be considered as default 0.95 in accordance with methodology.

7.5 Net GHG Emission Reductions and Removals

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.

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

Where:

i = Indices for the situation where more than one type/model of improved cookstove is introduced to replace there 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 tCO2e

$ER_{y,i,j}$, = Emission reductions by improved cookstove of type i and batch j during year y in tCO2e

[65] See carbon waiver, document "VCS3262_LV_CarbonWaiver_CM_First Stove Sold"

$$ER_{y,i,j} = B_{y,savings,i,j} \times NCV_{wood\ fuel} \times f_{NRB,y} \times (EF_{wf,CO2} + EF_{wf,non\ CO2}) \times N_{y,i,j} \times 0.95$$ 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	AG0-1 1.4267 & AG1-2: 1.4192
$f_{NRB,y}$	Fraction of woody biomass that can be established as non-renewable biomass	0.98
NCV_{wood}	Net calorific value of the non-renewable woody biomass that is substituted or reduced(IPCC default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is 'air-dried')	0.0156
$EF_{wf,CO2}$	CO_2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO2/TJ)	112
$EF_{wf,non-CO2}$	Non-CO2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO2/TJ)	26.23
$N_{y,i,j}$	Number of improved cookstoves of type i and batch j operating during year y	See section 6.1
0.95	Discount factor to account for leakage	0.95

To calculate $B_{y,savings}$, we use ooption 1 of the applied methodology[66]

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

Where

B_{old}	Quantity of wood fuel used in the absence of the project activity in tonnes per household per year	2.47
η_{old}	A default value of 10% is used	10%
$\eta_{new,i,j}$	Efficiency of the system being deployed as part of the project activity, as determined by water boiling test protocol.	AG 0-1: 29.14% AG 1-2: 28.85%

$$\eta_{new,i,y} = \eta_p \times (DF_n)^{y-1} \times 0.94$$

Where

η_p	Efficiency of project stove (fraction) at the start of project activity	31%
$(DF_n)^{y-1}$	Discount factor to account for efficiency loss of project cookstove per year of operation (fraction). This value may be based on actual monitoring or based on manufacturer's declaration on expected loss in efficiency or through publicly available literature on relevant industry standards. Alternatively default value of 0.99 efficiency loss per year can be considered.	0.99

[66] Equation 3 of methodology VMR 0006

0.94	Adjustment factor to account for uncertainty related to project cookstove efficiency test.	0.94

As some of the project households continue to use baseline cookstoves along with improved cookstoves, Bold 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:

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

Where

$B_{old,adjusted}$	Adjusted Bold to account the ex-post usage of firewood in baseline cookstove(s) by project households in addition to improved cookstove (in tonnes per device per year)	2.17
μ_y	Baseline stove usage factor to account for use of baseline cookstoves along with improved cookstoves	12%

The complete calculations can be found in document "VCS3262_ER_Livelihoods Chitetezo Mbaula Project_ExAnte.xlsx".

This leads to the following ER savings for the first monitoring period:

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)
Year 1 26-03-2021 – 31-12-2021	0	40,610	0	40,610
Year 2 01-01-2022 – 30-09-2022	0	60,349	0	60,349
Total	0	100,959	0	100,959

Ex ante estimations are made to the prorate of the number of days on each year :

- 2021 : (280 days/365 days) * 30,014 = 23,024 tCO2e
- 2022 : (272 days/365 days) * 102,269 = 76,211 tCO2e

Ex-ante emissions reductions /removals	Achieved emissions reductions /removals	Percent difference	Justification for the difference
23,024	40,610	+76%	Unexpected start of operations, especially on SCTP beneficiaries
76,211	60,349	-26%	Slower development on commercial model

APPENDIX 1: STAKEHOLDER CONSULTATION PROCESS

Invitation list

Stakeholder Type/Organisation (if relevant)	Name of invitee	Male/ Female	Method of invitation	Date of invitation
Traditional Authority	Mlumbe	Male	Word of Mouth	23/08/2021
Group Village Head	Nkanda	Male	Word of Mouth	23/08/2021
Group Village Head	Sikamu	Male	Word of Mouth	23/08/2021
Group Village Head	Issa	Female	Word of Mouth	23/08/2021
Group Village Head	Sikamu	Male	Word of Mouth	23/08/2021
Group Village Head	Kutambala	Male	Word of Mouth	23/08/2021
Area Development Committee Chairperson	Malonga	Male	Phone call	23/08/2021
Stove production group member	Grace Kintu	Female	Phone call	25/08/2021
Stove production group member	Laisani Mitiyala	Male	Phone call	25/08/2021
Stove production group member	Benard Mitsokwe	Male	Phone call	25/08/2021
Stove production group member	Bester Malata	Male	Phone call	25/08/2021
Stove production group member	Samuli Pondani	Male	Phone call	25/08/2021
Stove Promoter	Sellina Ndojime	Female	Phone call	25/08/2021
Stove Promoter	Jenifer Likagwa	Female	Phone call	25/08/2021
Stove Promoter	Dorothy Iweni	Female	Phone call	25/08/2021
Stove Promoter	Violet John	Female	Phone call	25/08/2021
Stove Promoter	Josophine Chinkwasale	Female	Phone call	25/08/2021
Community Social Support Committee member	Rhoda Kambona	Female	Phone call	25/08/2021

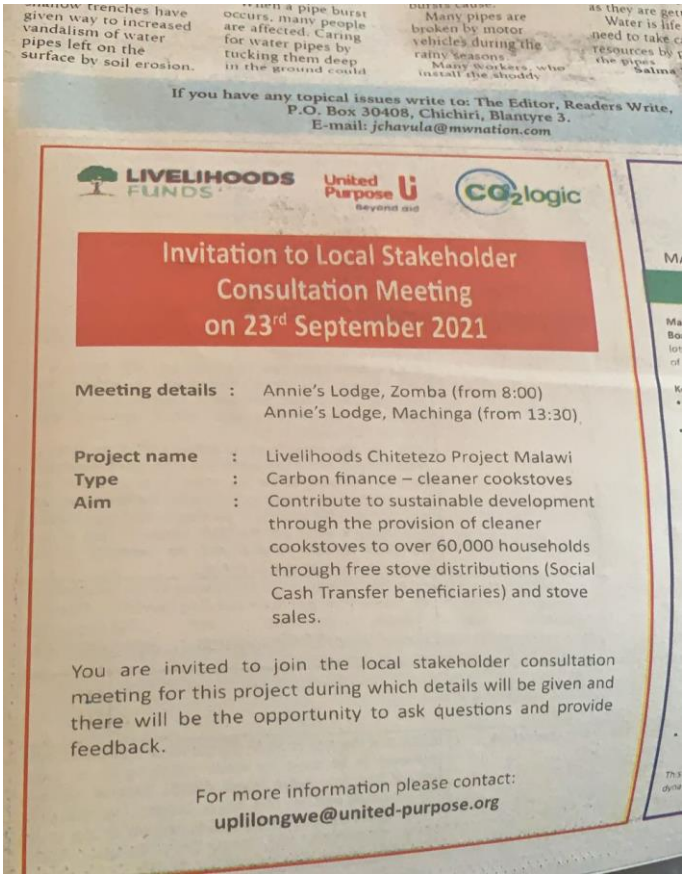
Community Social Support Committee member	Linily Enusa	Female	Phone call	25/08/2021
Community Social Support Committee member	Cecelia Asani	Female	Phone call	25/08/2021
Traditional Authority	Sitola	Male	Word of Mouth	25/08/2021
Group Village Head	Saiti	NA	Word of Mouth	25/08/2021
Group Village Head	Kwilasya	NA	Word of Mouth	25/08/2021
Group Village Head	Misikizi	NA	Word of Mouth	25/08/2021
Group Village Head	Napwanga	NA	Word of Mouth	25/08/2021
Group Village Head	Sitola	NA	Word of Mouth	25/08/2021
Area Development Committee Chairperson	Jaibu Mkumba	Male	Phone call	25/08/2021
Stove production group member	Magret Maulino	Female	Phone call	25/08/2021
Stove production group member	Kelita Chiwaya	Female	Phone call	25/08/2021
Stove production group member	Elizabeth Jabilu	Female	Word of Mouth	25/08/2021
Stove production group member	Loveness Joseph	Female	Word of Mouth	25/08/2021
Stove production group member	Baxton Malove	Male	Phone call	25/08/2021
Stove Promoter	Beston Kanjira	Male	Phone call	25/08/2021
Stove Promoter	Magret Mailosi	Female	Phone call	25/08/2021
Stove Promoter	Thom Kaliati	Male	Phone call	25/08/2021
Stove Promoter	Ethel Lemani	Female	Phone call	25/08/2021
Stove Promoter	Esther Bwanali	Female	Phone call	25/08/2021
Stove Promoter	Lewis Kamasa	Male	Phone call	25/08/2021
Community Social Support Committee member	Rose Napawa	Female	Phone call	25/08/2021
Community Social Support Committee member	Ellen Daudi	Female	Phone call	25/08/2021
NA	NA	NA	NA	NA
Zomba District Council-	S.L Gwedemula	Male	Email	23/08/2021

District Commissioner				
Zomba District Council- Director of Planning and Development	Walter Chikuni	Male	Email	23/08/2021
Zomba District Council- Environmental District Officer	Sylvia Maria Nema Ambali	Female	Email	23/08/2021
Zomba District Council- District Forestry Officer	Amon Kabango	Male	Email	23/08/2021
Zomba District Council- Principal Social Welfare Officer	Ned Mkumba	Male	Email	23/08/2021
Machinga District Council- District Commissioner	Rosemary Moyo	Female	Email	23/08/2021
Machinga District Council- Director of Planning and Development	McPherson Mwankhwawa	Male	Email	23/08/2021
Machinga District Council- Environmental District Officer	Jarvis Mwenechanya	Male	Email	23/08/2021
Machinga District Council- District Forestry Officer	Harry Chalira	Male	Email	23/08/2021
Machinga District Council- Principal Social Welfare Officer	Daniel Hopeson Zidana	Male	Email	23/08/2021
Environmental Affairs Department	Shamiso Najira	Female	Email	23/08/2021
Environmental Affairs Department	Chimwemwe Yonasi	Male	Email	23/08/2021
Energy NGO- Emmanuel International	Martin Phiri	Male	Email	23/08/2021
Energy NGO- CADECOM	Chancy Sibakwe	Female	Email	23/08/2021
Carbon Implementer- SunFire Social	Yamungu Botha	Male	Email	23/08/2021
Carbon Implementer- Total Land Care Green	Jordan Kowalke	Male	Email	23/08/2021

Energy NGO- Area 55	Josophine Muzira	Male	Email	23/08/2021
Energy NGO- CADECOM	Christopher Milinyu	Male	Email	23/08/2021
Energy NGO- CARD	Grant Mzembe	Male	Email	23/08/2021
Energy NGO- GOAL Malawi	Kumbesi Golime	Male	Email	23/08/2021
Global Offset Research	Siddarth Yadav	Male	Email	24/08/2021
CEDESOL	David Whitfield	Male	Email	23/08/2021
Lean Management Systems Promotion Society	Raave Jain	Male	Email	23/08/2021
HIVOS	Harry Clemens	Male	Email	23/08/2021
Concern Health Ghana	Isaac Ampomah	Male	Email	23/08/2021

Public invites

An invitation was sent through the newspaper as shown below: the two leading newspapers in the country published the invitation. See also document “Blantyre Newspapers”.



given way to increased vandalism of water pipes left on the surface by soil erosion.

occurs, many people are affected. Caring for water pipes by tucking them deep in the ground could

Many pipes are broken by motor vehicles during the rainy seasons

Many workers, who install the shoddy

Water is life need to take c resources by the pipes

If you have any topical issues write to: The Editor, Readers Write, P.O. Box 30408, Chichiri, Blantyre 3. E-mail: jchavula@mwnation.com

LIVELIHOODS FUNDS

United Purpose

CO2logic

Invitation to Local Stakeholder Consultation Meeting on 23rd September 2021

Meeting details : Annie's Lodge, Zomba (from 8:00)
Annie's Lodge, Machinga (from 13:30)

Project name : Livelihoods Chitetezo Project Malawi
Type : Carbon finance – cleaner cookstoves
Aim : Contribute to sustainable development through the provision of cleaner cookstoves to over 60,000 households through free stove distributions (Social Cash Transfer beneficiaries) and stove sales.

You are invited to join the local stakeholder consultation meeting for this project during which details will be given and there will be the opportunity to ask questions and provide feedback.

For more information please contact:
uplilongwe@united-purpose.org

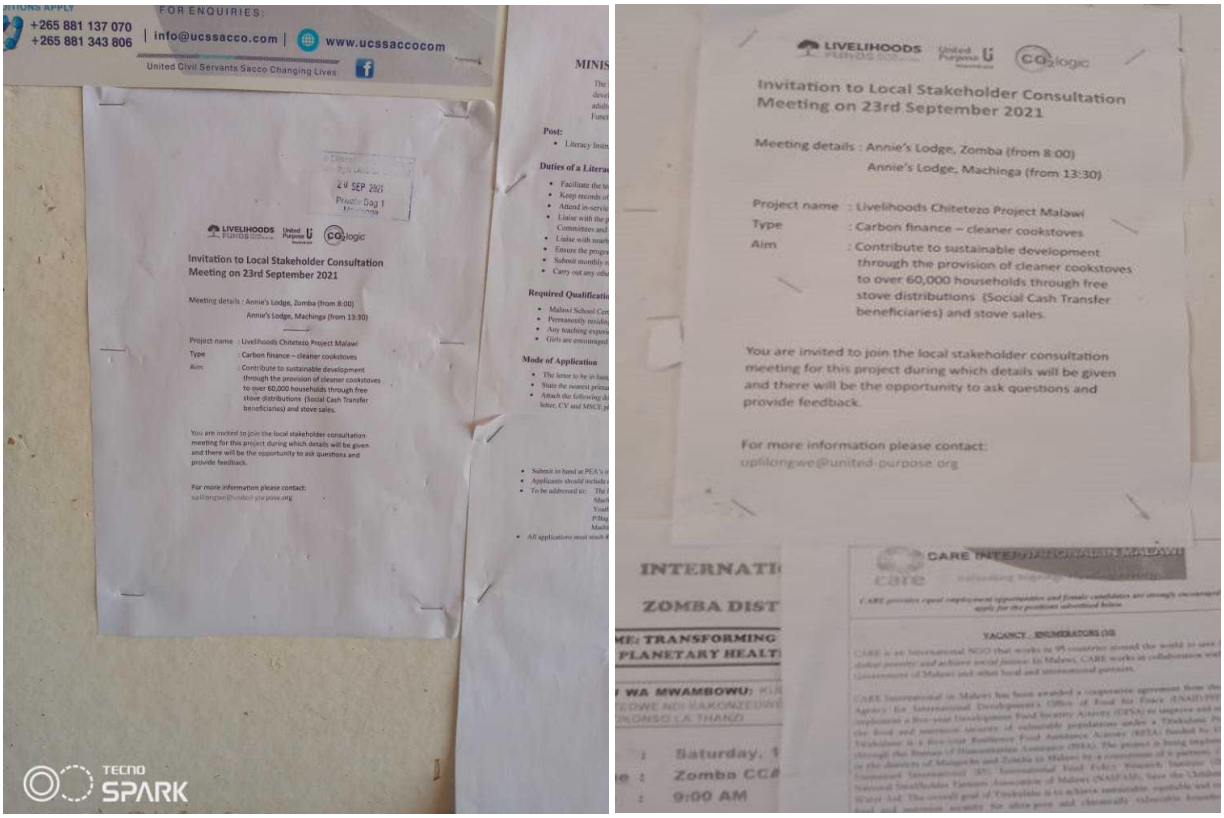
Banners inviting people to the stakeholders consultation meeting were put in town both in Machinga and Zomba





Banner in Machinga in town on billboard Banner in Zomba town at the District council

Posters inviting the local people to the stakeholders consultation were pasted on the notice boards of the District Council Offices in both Machinga and Zomba.



Poster in Machinga and Zomba

Participation list

LSC in Annie's lodge Zomba at 23/09/2021

Name of participant, job/ position in the community	Male / Female	Contact details	Organisation (if relevant)
Witness MAKAWA, Group Village Head	M	0991454309	Village Sikamu
Cecilia CHIWEWE, Group Village Head	F	0997527543	Vill. Issa
Cecilia Assan, Promotor	F	0994876448	Vill. Issa
Violet JOHN, Promotor	F	0993128328	Vill.Ndiwalire
Chimwemwe NAMAL, chairman	M	0997051509	Vill. Thundu
Dorothy IWENI, Promotor	F	0999870413	Vill. Issa
Samuli PONDANI, vice secretary	M	0993599103	Kadewere Stove Production Group
Lyson MITIYALA, chairperson	M	0994787787	Kadewere stove production group
Bernard MISOKWE, General Secretary	M	0883669525	Kadewere stove production group
Grace KUNTU, vice chairman	F	0999772685	Kadewere stove production group
Ned MKUMBA, Social Welfare Officer	M	0888867923	Zomba District Council
Bester MALATA, Tressure	M	0993202998	Kadewere stove production group
Ellen MATANDE, DTT-SCTP	F	0884285487	Zomba District Council
Selina NDOJIME, promotor	F	0998866446	Vill. Nkanda
Edward MALONGA, Area Development Committee	M	0998005104	Vill. Mlumbe
Vitumbiko NAMONDWE, PRMC	M	0885919625	Yoneco
Ahoda KAMBONA, Community Social Support Committee member	F	0885082021	Sikamu
Yamungu BOTHA, Team Leader	M	0888406202	Sunfire Energy
Andrew CLIBUEZO, D/L	M	0995486668	UP
Jennipher LIKAGWA, promotor	F	0994180288	Sikamu 1
Josophine CHINKWASALE, promotor	F	0999620068	Sikamu 2
Linily ENUSA, Community Social Support Committee member	F	0999586664	Sikamu2
Joseph ILAMOW, Group Village Head	M	0994332872	Kutambala

Edeth NJOBWDE, Group Village Head	F	0995219854	Sikamu
Patrick KATOPOLA, Group Village Head	M	0981796569	Nkanda
Thandiwe SESA, Field officer	F	0999636684	Cadecom ZA
Yablo LIPEYC, MDE	F	0883441942	UP
Mayamik MINOFF, PM	M	0999067969	UP
Immaakfe MWALIJE, FF	F	0888659826	UP
Said KAMPHOPO, Senior chief	M	0883636669	Mulumbe
Akimm BANDA, FF	M	0998992119	UP
Chimwemwe KSHISH, Accountant	F	0884654245	UP
Alice H. MBAYONI, AEDC	F	0991414806	Agriculture

United Purpose EVENT ATTENDANCE SHEET

Sheet No. ____ Of totals sheets ____

Date of Event: 23/09/21

Location of Event: Amiko Lodge Zambia.

Type of Event: Local Stakeholders Meeting.

Project Code/Project name: _____ Budget Code: _____

No	Name of Participant	Sex M/F	Position	Organization/ Dept /Village	Contacts	Signature/
1	WITNESS MAKAWA	M	SGH SIKAMA	mud 2 SIKAMA	0991454309	
2	Cecilia Chiweme	F	SGHH/ISSA	ISSA	0997527543	C. Chiweme
3	Cecilia ASSAN	F	Promoter	ISSA	0994876448	C. ASSAN
4	VIOLET JOHN	F	PROMOTER	NDUWALIRE	0993128328	V. JOHN
5	CHIMWEMWE NAMAL	M	CHAIRMAN	THUNDU	0997051509	CNMR
6	Dorothy Iwen	F	PROMOTER	ISSA	0999870443	D. Iwen
7	SAMUEL MOBARI	M	VICE SECRETARY	KADEWERE STOVE PROJECT	0993599109	
8	Lyson Mitiyala	M	Chairperson	Kadewere stove group	0991478787	
9	BERNARD MISAKILE	M	FEMALE SECR	KADEWERE STOVE	0883669525	
10	Grace Kuntu	F	Vice chair	Kadewere Stove	0999772685	G. Kuntu
11	Ned Nkumba	M	SUB-SCTP	ZA-DC	0888867923	
12	BESTER MALATA	M	TREASURER	KADEWERE STO	0993202998	Batolata
13	Ellen Matande	f	DIT-SCTP	ZDC	0884285487	
14	Selina Ndojime	F	Promoter	Nkunda 1	0998866446	
15	Edward Malonga	M	ADC	Mimbe	0998005104	
16	MUMBUKO KAMBANI	M	PRMC	YONECO	0885919625	
17	Rhoda Kambona	f	CSSC	Mkunda Sikamu	0885082021	R. Kambona
18	Yamunge Botha	M	Team Leader	Sunfire Energy	0888406202	

I have prepared this event attendance sheet, the supporting documents and allocated the coding. I confirm that the details provided are correct. The document is now ready for checking by finance and authorization from the budget holder.

Prepared By: Chimwemwe Kslish (Name - United Purpose Officer) _____ Signature

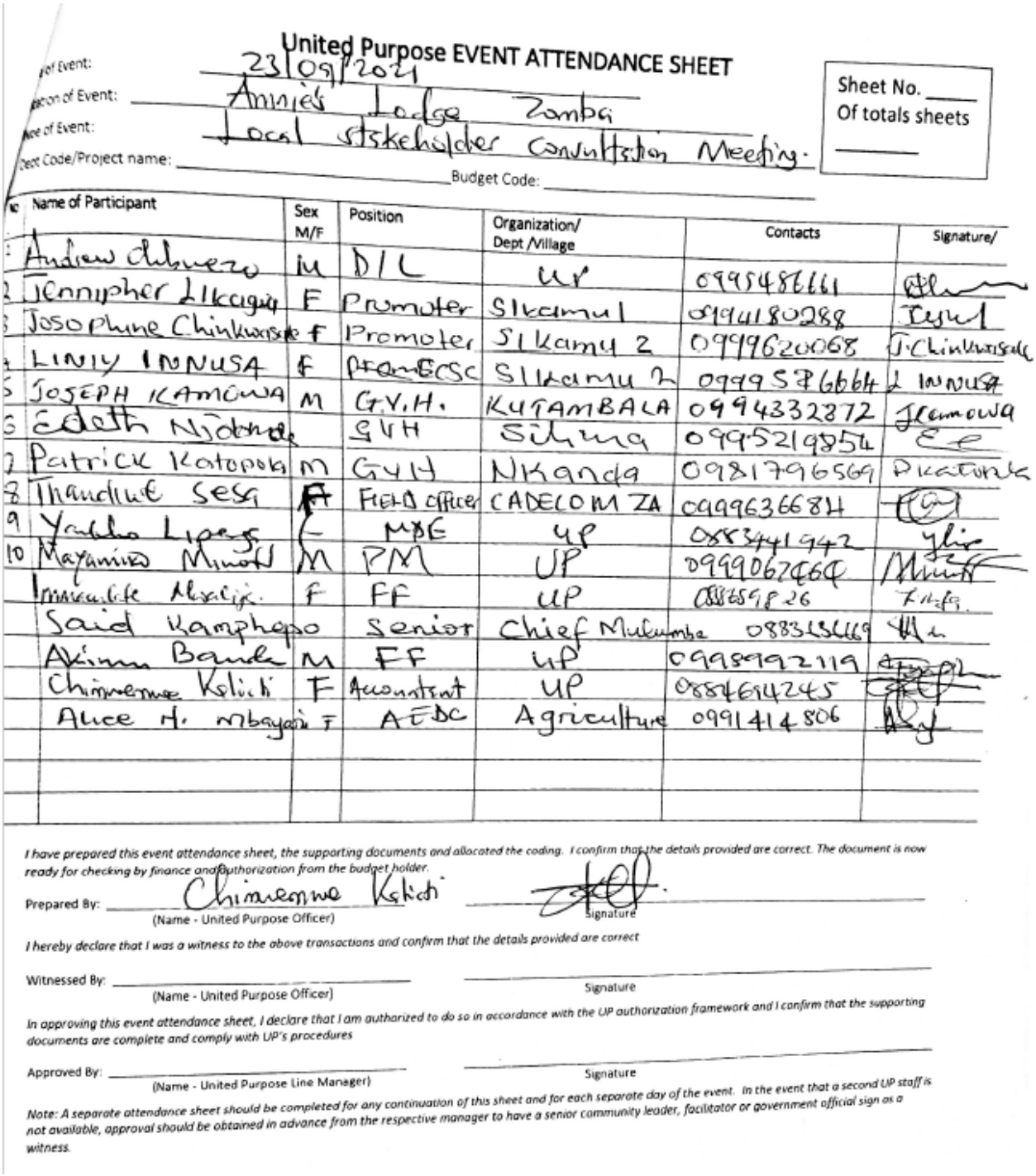
I hereby declare that I was a witness to the above transactions and confirm that the details provided are correct

Witnessed By: _____ (Name - United Purpose Officer) _____ Signature

In approving this event attendance sheet, I declare that I am authorized to do so in accordance with the UP authorization framework and I confirm that the supporting documents are complete and comply with UP's procedures

Approved By: _____ (Name - United Purpose Line Manager) _____ Signature

Note: A separate attendance sheet should be completed for any continuation of this sheet and for each separate day of the event. In the event that a second UP staff is not available, approval should be obtained in advance from the respective manager to have a senior community leader, facilitator or government official sign as a witness.



United Purpose EVENT ATTENDANCE SHEET

Date of Event: 23/09/2021
Location of Event: Annies Lodge Zamba
Type of Event: Local stskeholder Consultation Meeting.
Project Code/Project name: _____ Budget Code: _____

Sheet No. ____
Of totals sheets ____

No	Name of Participant	Sex M/F	Position	Organization/ Dept /Village	Contacts	Signature/
1	Andrew Chirwa	M	D/C	UP	0995486661	
2	Jennipher Likaga	F	Promoter	Sikamu	0994180288	
3	Josophine Chinkwanda	F	Promoter	Sikamu 2	0999620068	
4	LINLY INUSA	F	Promoter	Sikamu 2	0999578664	
5	JOSEPH KAMOWA	M	G.V.H.	KUTAMBALA	0994332872	
6	Edith Njoloma		GVH	Sikuna	0995219854	
7	Patrick Katopola	M	GVH	Nkanda	0981796569	
8	Thandiwe Sesa	F	Field officer	CADECOM ZA	0999636684	
9	Yabba Lipesa	M	M&E	UP	0883441942	
10	Mayamiko Mwafongo	M	PM	UP	0999067464	
	Immaculate Mkisi	F	FF	UP	0885598 26	
	Said Kamphepo		Senior	Chief Mukumba	0883454469	
	Akimu Banda	M	FF	UP	0995992119	
	Chimwemwe Kshishi	F	Accountant	UP	0884654245	
	Alice H. Mbaya	F	AEDC	Agriculture	0991414806	

I have prepared this event attendance sheet, the supporting documents and allocated the coding. I confirm that the details provided are correct. The document is now ready for checking by finance and authorization from the budget holder.

Prepared By: Chimwemwe Kshishi (Name - United Purpose Officer) _____ Signature

I hereby declare that I was a witness to the above transactions and confirm that the details provided are correct

Witnessed By: _____ (Name - United Purpose Officer) _____ Signature

In approving this event attendance sheet, I declare that I am authorized to do so in accordance with the UP authorization framework and I confirm that the supporting documents are complete and comply with UP's procedures

Approved By: _____ (Name - United Purpose Line Manager) _____ Signature

Note: A separate attendance sheet should be completed for any continuation of this sheet and for each separate day of the event. In the event that a second UP staff is not available, approval should be obtained in advance from the respective manager to have a senior community leader, facilitator or government official sign as a witness.

LSC in Annie's lodge Liwonde at 23/09/2021

Name of participant, job/ position in the community	Male / Female	Contact details	Organisation (if relevant)
Chimwemwe Kshish, Accountant	F	0884654245	UP

Louis KAMASA, Promoter	M	0999412292	Nkula
Jaibu MKUMBA, Area Development Committee Chairperson	M	0995704351	Sitola
Alani DAILESI, Traditional Authority	M	0994764335	Sitola
Akimy ELIGS, District Council Rep	M	0996026897	Machinga
Yamikani BANDA, P Coordinator	M	0992242396	MAEVE/ AREA 55
Adam LAMECK, Group Village Head	M	0993966703	Sitola
Beston KANJIRA, promotor	M	0992718645	Sitola
Thom KALIAT, promotor	M	0995798695	Sitola
Baxton MALOVE, chairman	M	0995435239	Mphatso Stove Production Group
Cindy BWANALI, Social Welfare Officer	F	0883328881	Sitola
Bertha Kabembe, Group Villlage Head	F	0995704573	Sitola
Alick MWANZA, Group Village Head	M	0999488701	Sitola
Sitanile ALL, Group Village Head	M	0998683995	Sitola
Loveness JOSEPHY, member	F	/	Mphatso Stove Production Group
Mayamko MINOTU, PM	M	0999067969	UP
Prince KEYM, FF	M	0993795089	UP
Zachous GAZANI, ??	M	0888878264	UP
Amidu Chinyama, Group Village Head	M	0997640276	Misikidzi
Margret PORULINO, chairlady	F	0999520182	Moses
Eliza JABILU, Treasure	F	/	Moses
Kelita CHIWAYA, secretary	F	0997520097	Moses
Rose MAPETU, member	F	0999638083	Malajila
Ether LEMANI, Promotor	F	0996811460	Malajila
Ellen ASAMU, member	F	0996181009	Ndaje/ Nkalanire
Ester BWARALI, promotor	F	0991444233	Ndaje/ Nkalanire
Kumbesi Golime, Coordinator	M	0999006825	GOAL Malawi
Phillip Masanza, District Forestry Officer	M	0884188117	Machinga District Council

Jacob PHIN, DM	M	0991126935	Yoneco
Daniel H ZIDANO, Principal Social Welfare Officer	M	0888716740	Machinga Social Welfare
Andrew L Mbeqwan, Driver	M	0888508509	Machinga-District Council
Ernest MUKOME, Driver	M	0888161619	Machinga Social Welfare

United Purpose EVENT ATTENDANCE SHEET

Sheet No. ____ Of totals sheets ____

Event: 23/05/2021

Name of Event: Annies Lodge Luwonde

Type of Event: Local Stakeholders Consultation meeting

Project Code/Project name: _____ Budget Code: _____

	Name of Participant	Sex M/F	Position	Organization/ Dept /Village	Contacts	Signature/
1	Chimwemwe Kalindi	F	Accountant	United Purpose	0884654245	
2	LOUIS KAMASA	M	PROMOTER	NKULA	0999412292	
3	JAIDI MKUMBA	M	ADC Chair	SITOLA	0995794351	
4	ALAN DAILESI	M	T/A	SITOLA	0996764335	
5	ALIMU ELIAS	M	DC Rep	MHEE-DC	0956026897	
6	Yamikani Banda	M	P. Coordinator	MAEVE/AREASS	0992242396	
7	Adam Lameck	M	G.V.H	SITOLA	0993966703	
8	Beston Kanjira	M	promoter	SITOLA	0992778645	
9	Thom Kalisi	M	promoter	SITOLA	0995798695	
10	BAXTON MALOWE	M	CHAIR	MPATSO	0995435239	
11	Cindy Buranali	f	SWO	SITOLA	0883328881	
12	Bertha Kazembe	f	EA YH Sitola	Sitola	0995702573	Kazembe
13	ALICK MKANDA	M	GVH	SITOLA	0999488701	
14	SITANILE ALL	M	GVH	SITOLA	0998683975	
15	Joyceness Joseph	F	mukemba	MPHASC		Joseph
16	Mayamiko Mlenga	M	PM	UP	0999067464	
17	Prince Kaunda	M	FF	UP	0993795089	
18	Zachaus Gazani	M	Driver	UP	0888878264	

I have prepared this event attendance sheet, the supporting documents and allocated the coding. I confirm that the details provided are correct. The document is now ready for checking by finance and authorization from the budget holder.

Prepared By: Chimwemwe Kalindi (Name - United Purpose Officer) _____ Signature

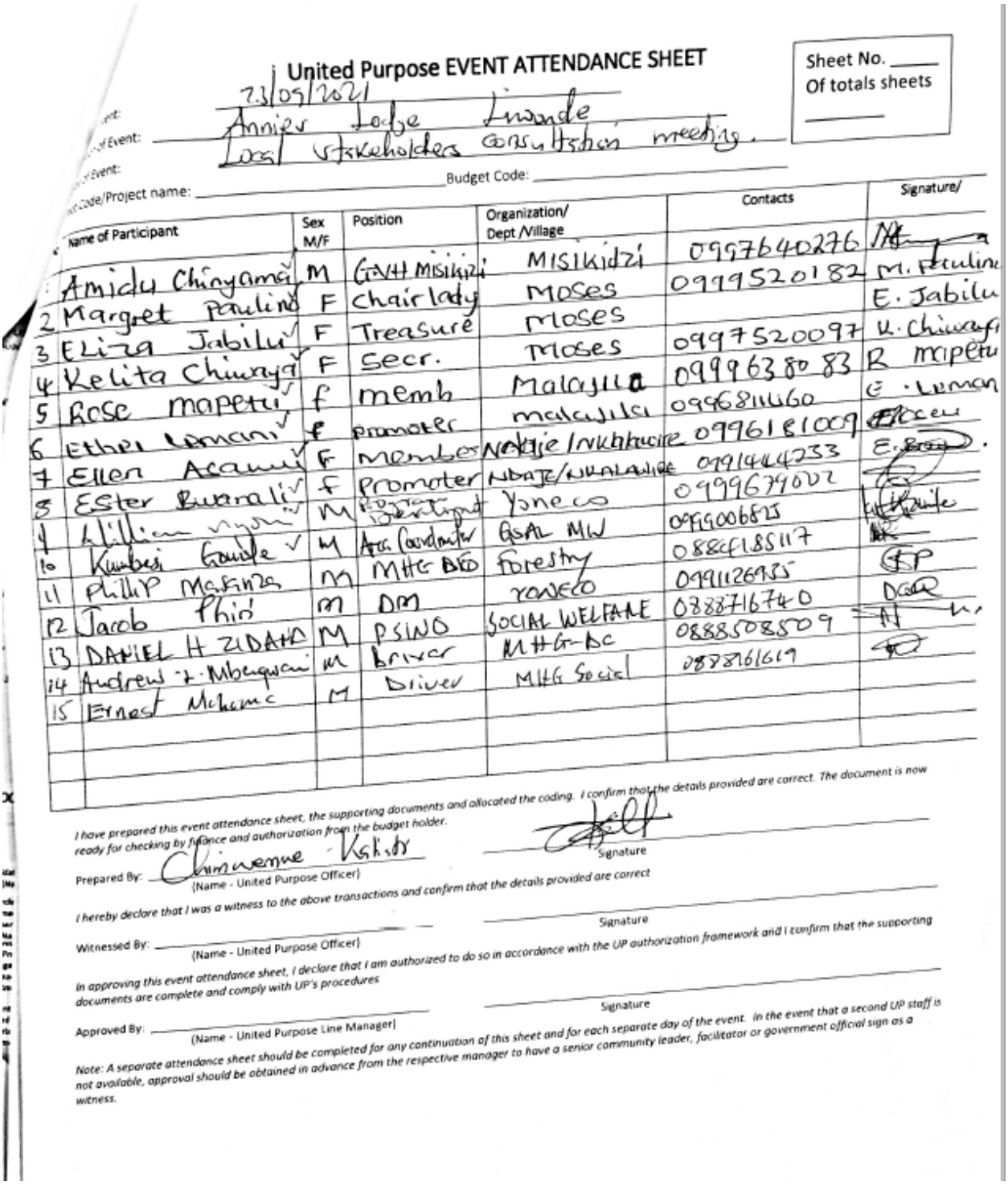
I hereby declare that I was a witness to the above transactions and confirm that the details provided are correct

Witnessed By: _____ (Name - United Purpose Officer) _____ Signature

In approving this event attendance sheet, I declare that I am authorized to do so in accordance with the UP authorization framework and I confirm that the supporting documents are complete and comply with UP's procedures

Approved By: _____ (Name - United Purpose Line Manager) _____ Signature

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United Purpose EVENT ATTENDANCE SHEET

Sheet No. _____
Of totals sheets
_____

Event: 7.3/09/2021
Annier Lodge Livande
Event: Last Stakeholders Consultation meeting.
Code/Project name: Budget Code:

	Name of Participant	Sex M/F	Position	Organization/ Dept /Village	Contacts	Signature/
1	Amidu Chinyama	M	GVH Misikidzi	MISIKIDZI	0997640276	
2	Margret Pauline	F	Chairlady	Moses	0999520182	M. Pauline
3	Eliza Jabilu	F	Treasure	Moses		E. Jabilu
4	Kelita Chinyama	F	Secr.	Moses	0997520097	K. Chinyama
5	Rose Mapeti	f	memb	Malaylla	0996380 83	R Mapeti
6	Ethel Lemani	f	promoter	malaylla	0996811660	E. Lemani
7	Ellen Acamu	F	Member	Ndaje/Nkalakuse	0996181009	
8	Ester Bwanali	F	Promoter	NDAJE/NKALAKUSE	0991444233	E. Bwanali
9	Lillian Nyirenda	M	Project Participant	Yoneco	0999679002	
10	Kumbesi Gausie	M	Area Coordinator	GSAL MW	0991900685	
11	Phillip Mafinga	M	MHG BEO	Forestry	0884188117	
12	Jacob Phiri	m	DM	YONECO	0991126985	
13	DANIEL H ZIDANA	M	PSWO	SOCIAL WELFARE	0888716740	
14	Andrew T. Mbewana	M	Driver	MHG-BC	0888508509	
15	Ernest Mchemc	M	Driver	MHG Social	0888161619	

I have prepared this event attendance sheet, the supporting documents and allocated the coding. I confirm that the details provided are correct. The document is now ready for checking by finance and authorization from the budget holder.

Prepared By: Chimwemwe Kaliati (Name - United Purpose Officer) _____ Signature

I hereby declare that I was a witness to the above transactions and confirm that the details provided are correct

Witnessed By: _____ (Name - United Purpose Officer) _____ Signature

In approving this event attendance sheet, I declare that I am authorized to do so in accordance with the UP authorization framework and I confirm that the supporting documents are complete and comply with UP's procedures

Approved By: _____ (Name - United Purpose Line Manager) _____ Signature

Note: A separate attendance sheet should be completed for any continuation of this sheet and for each separate day of the event. In the event that a second UP staff is not available, approval should be obtained in advance from the respective manager to have a senior community leader, facilitator or government official sign as a witness.

Pictures of Machinga LSC





LSC participants in Machinga (left) and Mayamiko leading the SDG making a comment session (right)





Participants in Machinga giving comments





Participants pose for a group photo in Machinga (left) and Patrick presents about Gold Standard in Machinga (right)

Pictures of Zomba LSC




Ellen gives her comments in Zomba LSC (left) and Participants listen to the presentation in Zomba



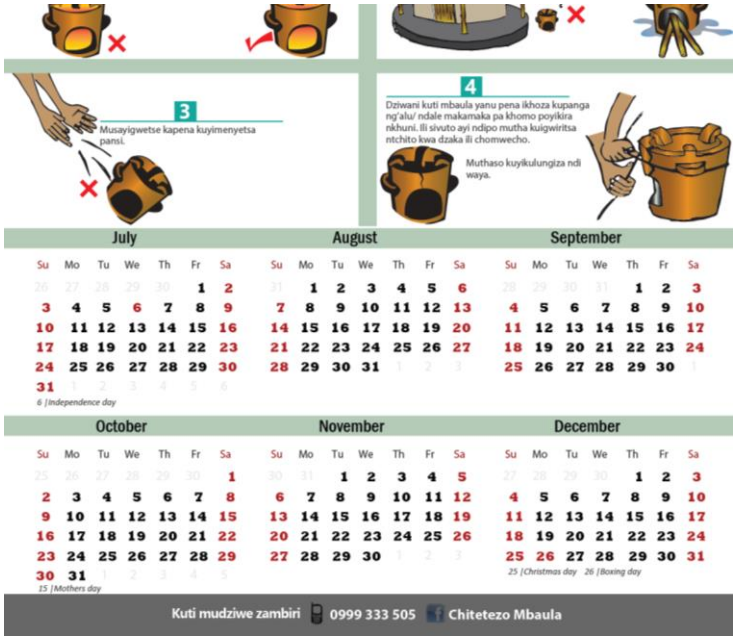

Yankho takes minutes for the LSC (left) participants pose for a group photo in Zomba (right)

APPENDIX 2: COMMUNICATION MECHANISMS

As per the § 3.17.4 of the VCS standard version 4.3 ,"*The project proponent shall establish mechanisms for ongoing communication with local stakeholders to allow stakeholders to raise concerns about potential negative impacts during project implementation*".

The following mechanisms are in place to ensure fluid communication with stakeholders :

- Every customer receives a calendar with the main hotline number mentioned :



- United Purpose has a dedicated channels to collect concerns - anonymously if necessary - available in Chichewa and English :





- Ads are available at the promoters' locations and contact numbers are widely advertised (radio, promoters shirts, signposts)





