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Transition Annex

Version 1 – September 2017

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KEY PROJECT INFORMATION

Title of Project/PoA/Activity:	African Biomass Energy Conservation PoA
GS ID of the project/PoA/activity:	GS 1265
GS Version:	2.2
Brief description of Project:	The goal of the PoA is to generate verifiable reductions of greenhouse gas emissions from non-renewable biomass in each of its voluntary project activities, while creating tangible sustainable development benefits. The improved household wood and charcoal stoves and institutional wood stoves reduce fuel consumption by improved combustion and improved heat transfer. The stoves raise the cooking pot to the hottest point above the flame. The improved household cook-stoves target predominantly low-income households using non-renewable biomass energy on traditional/unimproved/low-efficiency stoves. The institutional cook stoves target institutions that regularly cook for large groups of people, such as schools, health centres, prisons, barracks etc. that use non-renewable biomass energy on traditional/unimproved/low-efficiency stoves.
Project type: Energy/Land Use	End-user Energy Efficiency Improvement
For Renewable Energy Projects – intention to apply RECs Labels (y/n)	N/A
GS Stream (CDM/VER):	VER
Scale (large/scale/micro):	Small-scale
GS Registration Date:	23/04/2014
GS Crediting period start date:	24/11/2008
CDM Registration Date:	N/A
CDM Crediting period start date:	N/A
Project Developer:	Hestian Innovation Ltd.
Project Representative:	Mr. John O'Connnor
Project Participants and any communities involved:	Local communities in Malawi and Rwanda
Host Country/Location:	Malawi, Rwanda
Methodologies applied:	Technologies and Practices to Displace Decentralized Thermal Energy Consumption" Version 2.0, including rule update 18 December 2015
SDG Impacts:	1 – No Poverty 2 – Zero Hunger 3 – Good Health and Well-Being 5 – Gender Equality 7 – Affordable and Clean Energy 8 – Decent Work and Economic Growth 13 – Climate Action 15 – Life on Land 17 – Partnership for the Goals
Estimated amount of SDG Impact (GSVERs and others)	219,540 VERs

SECTION A Sustainable Development Goals (SDG) outcomes

A.1 Relevant target for each of the three SDGs

The domestic cook-stove model disseminated within PoA is a Ceramic Stove called the *Chitetezo Mbaula* in Malawi and *Canarumwe* in Rwanda. This stove can be used as a portable stove or can be fixed, and has a laboratory test efficiency of 30.6% (more than three times the default 10% efficiency of the baseline three stone and unimproved cook-stoves) which results in reduced fuel consumption by improved combustion, improved heat transfer, raising the cooking pot to the hottest point above the flame, and improved heat retention. The Ceramic Stove is produced at a local level using locally available materials, thereby creating employment in a 'green' industry.

The institutional cook stoves (*Mayankho* Fixed Institutional Stove) target institutions that regularly cook for large groups of people, such as schools, health centres, prisons, barracks etc. that use non-renewable biomass energy on traditional/unimproved/low-efficiency stoves. Mayankho Fixed Institutional Stove could have pot size with the volume from 20 to 200 litres. Based on the monitoring data the average efficiency of Mayankho Fixed Institutional Stoves is 0.386 tonnes of wood / 10,000 meals.

Analysis if the sustainable development goals outcomes is performed on the PoA level.

SDG Goal	Relevant SDG Target	Corresponding Indicator
1 – No Poverty	1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day	1.1.1 Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural)
	1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	1.2.1 Proportion of population living below the national poverty line, by sex and age 1.2.2 Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
2 – Zero Hunger	2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.	2.1.1 Prevalence of undernourishment 2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)
3 – Good Health and Well-Being	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous	3.9.1 Mortality rate attributed to household and ambient air pollution

	chemicals and air, water and soil pollution and contamination	
5 – Gender Equality	5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life	5.5.2 Proportion of women in managerial positions
7 – Affordable and Clean Energy	7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.2 Proportion of population with primary reliance on clean fuels and technology
	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption
	7.3 By 2030, double the global rate of improvement in energy efficiency	7.3.1 Energy intensity measured in terms of primary energy and GDP
8 – Decent Work and Economic Growth	8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors	8.2.1 Annual growth rate of real GDP per employed person
	8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities
		8.5.2 Unemployment rate, by sex, age and persons with disabilities
	8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	8.8.1 Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status
		8.8.2 Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and

		migrant status
13 – Climate Action	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	13.1.1 Number of deaths, missing persons and persons affected by disaster per 100,000 people 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions
15 – Life on Land	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	15.1.1 Forest area as a proportion of total land area 15.2.1 Progress towards sustainable forest management
17 – Partnership for the Goals	17.16 Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries 17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships	17.16.1 Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals 17.17.1 Amount of United States dollars committed to public-private and civil society partnerships

A.2 Explanation of methodological choices/approaches for estimating the SDG outcome

SDG Goal	SDG Indicators	Methodological choices / approaches
1 – No Poverty	1.1.1 Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural) 1.2.1 Proportion of population living below the national poverty line, by sex and age 1.2.2 Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	The Project contributes to poverty alleviation by providing employment opportunities in low-income rural communities and allowing financial savings for fuelwood purchase for households purchasing wood and time savings for households collecting wood (time could be used for income generating activities instead). **Monitoring approach:** • usage and monitoring surveys collecting information on financial savings for households that can be used for other needs; • usage and monitoring surveys collecting information on time savings for customers collecting wood; • • estimating financial savings based on the amount of fuel saved and average fuelwood prices as reported by relevant authorities or other publicly available information; savings estimated might only reflect economic estimation of wood savings and not real monetary savings for households since the wood is often collected and not purchased.
2 – Zero Hunger	2.1.1 Prevalence of undernourishment 2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity	The Project contributes to minimization of undernourishment as energy efficient cookstoves allows for cooking more with less fuel. Moreover, financial savings for fuelwood purchase for households purchasing wood and time savings for households collecting wood

	Experience Scale (FIES)	(time could be used for income generating activities instead) allow purchasing or sourcing more food. **Monitoring approach:** • usage and monitoring surveys collecting information on financial savings for customers purchasing wood; • usage and monitoring surveys collecting information on time savings for customers collecting wood • .
3 – Good Health and Well-Being	3.9.1 Mortality rate attributed to household and ambient air pollution	According to World Health Organization, each year, approximately 4 million people die prematurely from illness attributable to household air pollution from inefficient cooking practices using polluting stoves paired with solid fuels and kerosene.[1] Efficient cookstoves distributed by the Project lead to reduced indoor emissions and personal exposure to carbon monoxide (CO) and particles matter (PM2.5). **Monitoring approach:** • according to a study conducted in Malawi the use of *Chitetezo Mbaula* allows CO emissions reductions of 41% and PM 2.5 emission reductions of 50%;[2] • usage and monitoring surveys collecting qualitative information on the impact of Project stoves on smoke generation.
5 – Gender Equality	5.5.2 Proportion of women in managerial	The Project provides employment opportunities to both women and

[1] Household air pollution and health, https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health

[2] Jagger, P., J. Pedit, A. Bittner, L. Hamrick and T. Phwandaphwanda. 2017. Fuel efficiency and emissions of wood-burning improved cookstoves in Malawi: Implications for scaling-up cookstove programs. Chapel Hill, NC: FUEL Lab, Carolina Population Center.

	positions	men. **Monitoring approach:** • information on efficient stove production activities and employment of women and men as reported by Malawi's cookstove activities database;[3] • information on women and men involved in monitoring activities.
7 – Affordable and Clean Energy	7.1.2 Proportion of population with primary reliance on clean fuels and technology 7.2.1 Renewable energy share in the total final energy consumption 7.3.1 Energy intensity measured in terms of primary energy and GDP	The Project promotes efficient cooking technology, which use biomass fuel. **Monitoring approach:** • information on energy saved calculated based on the data used for carbon emission reduction estimation; • information on the non-renewable fraction of the woody biomass in the Host countries.
8 – Decent Work and Economic Growth	8.2.1 Annual growth rate of real GDP per employed person 8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities 8.5.2 Unemployment rate, by sex, age and persons with disabilities 8.8.1 Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status 8.8.2 Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International	The Project provides employment opportunities for stove production, marketing & distribution and monitoring activities as well as contribute to local economic development. Clear training and instruction manuals for production are available for each production group (Documents “How to make Chitetezo Mbaula using a bucket mould. Revised edition” and “How to fire Chitetezo Mbaula using a fuel efficient kiln”) in both English and local language. At a national level, Cleaner Cooking Camps have been organised since 2012 to build local capacity. During Cleaner Cooking Camps local stakeholders are brought together for intensive learning facilitated by experienced biomass energy professionals. Local authorities, such as Department of Energy and Malawi Bureau of

[3] https://energypedia.info/wiki/Malawi_cookstoves_DB_District_Overview

	Labour Organization (ILO) textual sources and national legislation, by sex and migrant status	Standards, collaborate through the National Cookstove Steering Committee (NCSC) to build capacity for conducting monitoring procedures. According to a research study by Vivid Economics published by Gold Standard, for every carbon credit issued from a Gold Standard-certified project clean cookstove project, $267 in economic value is created.[4] **Monitoring approach:** • information on the number of stoves disseminated by the Project and estimated sales volume based on average stove price; • information on efficient stove production activities and employment as reported by Malawi's cookstove activities database.[5]
13 – Climate Action	13.1.1 Number of deaths, missing persons and persons affected by disaster per 100,000 people 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions	The Project leads to greenhouse gases emissions reduction due to more efficient use of fuel wood. The methodological approach used for emission reductions estimation is described in details below. **Monitoring approach:** • information on GHGs emissions reduction during the monitoring period in tonnes of CO2 equivalent;
15 – Life on Land	15.1.1 Forest area as a proportion of total land area 15.2.1 Progress towards sustainable forest management	The Project supports the conservation of forest land and reduce deforestation activities in the Host country due to more efficient use of fuel wood. **Monitoring approach:** • monitoring fuelwood savings

[4] https://www.goldstandard.org/blog-item/report-valuating-benefits-improved-cooking-solutions
[5] https://energypedia.info/wiki/Malawi_cookstoves_DB_District_Overview

		in tonnes of wood based on the data used for carbon emission estimation.
17 – Partnership for the Goals	17.16.1 Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals 17.17.1 Amount of United States dollars committed to public-private and civil society partnerships	The project proponent actively supports cooperation on fostering clean cooking solutions around the globe. In particular, Hestian was a co-organiser of a conference called 'Pathways to clean cooking - Leaving no-one behind' that was held in May 2019 in Wexford, Ireland brought together key actors from around the world. The conference culminated in the launch of a declaration - The Wexford Declaration - which is a shared ambition for working towards universal access to sustainable energy for cooking and other household needs. The signatories committed to working towards universal access to sustainable energy for cooking and other household needs and to building relationships with the full range of stakeholders, institutions and disciplines necessary to achieve this goal. **Monitoring approach:** • information on the cooperation activities supported by the Project.

The PoA applies Gold Standard Methodology “Technologies and Practices to Displace Decentralized Thermal Energy Consumption Version 1.0” to calculate voluntary emission reductions.

This methodology is applicable to programs or activities introducing technologies and/or practices that reduce or displace greenhouse gas (GHG) emissions from the thermal energy consumption of households and non-domestic premises such as residential institutional, industrial, or commercial facilities.

Examples of these technologies include the introduction of **improved biomass or fossil fuel cook stoves**, ovens, dryers, space and water heaters (solar and otherwise), heat retention cookers, solar cookers, bio-digesters, safe water supply and treatment technologies that displace water boiling, thermal insulation in cold climates, etc.

Examples of practices include the improved application of such technologies, shift from non-renewable to renewable fuel (e.g. shift to plant oil fired stoves, humidity control through improved storage and drying of fuels, etc.).

The key criteria for inclusion of a technology in the PoA is that it reduces fuel consumption compared to the baseline and as a result brings about sustainable development benefits such as reduced exposure to smoke, reduced costs in procuring fuel, and reduced time in performing the service compared to the baseline.

The PoA also applies the following methodological documents:

- Tool 21: Methodological tool for Demonstration Of Additionality Of Small-Scale Project Activities (Version 10.0 - EB 83 Annex 14);
- Standard for Demonstration of Additionality, Development of Eligibility Criteria and Application of Multiple Methodologies for Programme of Activities (Version 03.0);
- Guidelines on assessment of de-bundling for SSC project activities (Version 03).

Each VPA will meet the applicability criterion that the aggregate energy savings of a single project activity shall not exceed the equivalent of 60 GWh per year or 180 GWh thermal per year in fuel input.

The baseline scenario is defined as households that consume firewood for domestic cooking and heating on three stove fires or other inefficient stoves such as traditional self-made wood stove, and whose basic energy needs are not being met. The baseline fuel consumption (calculated back through project fuel consumption and baseline/project fuel efficiencies) shall be fixed for the entire crediting period. The baseline fuel and the project fuel are the same (i.e. woody biomass), thus the baseline and project emission factors are also the same.

The project applies the suppressed demand approach, with the suppressed demand adjusted baseline consumption of 5.169 tonnes_wood / HH p.a. for Malawi and 3.889 tonnes_wood / HH p.a. for Rwanda. Baseline wood consumption is calculated based on thermal efficiency of primitive stoves (10%) and improved stoves (30.6%) and the fuel consumption of the project situation. The baseline fuel consumption shall be fixed for the entire crediting period. Project fuel consumption will be updated by annual WBTs as explained in the GS TAC rule update from 12/2015.

For VPA 2444 for the second crediting period the default thermal efficiency i.e. 10% for suppressed demand situation and case of single sample test is to be used under the condition that baseline wood fuel consumption is capped at 0.5 t/capita/year. Baseline wood consumption is calculated based on the default quantity of fuel derived using default value of 0.5 tonnes/capita/year specified in *Gold Standard methodology of Technologies and Practices to Displace Decentralised Thermal Energy Consumption Version 2 (24/04/2015) including revision to the TPDDTEC Methodology for cookstove activities (18/12/2015)* and average number of people per household of 5.4544 as defined during baseline survey in line with the VPA DD, Version 2 dated 25/07/2017.

For institutional cook stoves, baseline and project emissions are based on adjusted adult meals, where children's meals and light meals (e.g. teas) are normalised to be on the same metric as adult meals.

The baseline emission calculations are conducted as follows:

$$BE_{b,y} = B_{b,y} * ((f_{NRB,y} * EF_{b,fuel,CO2}) + EF_{b,fuel,nonCO2}) * NCV_{b,fuel}$$

Where:

$BE_{b,y}$	Emissions for baseline scenario b during the year y in tCO_2e
$B_{b,y}$	Quantity of fuel consumed in baseline scenario b during year y, in tons, as per by-default factors (cases with project performance field test only)
$f_{NRB,y}$	Fraction of biomass used during year y for the considered scenario that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario)
$EF_{b,fuel,CO2}$	CO2 emission factor of the fuel that is substituted or reduced. 112 tCO_2/TJ for Wood/ Wood Waste, or the IPCC default value of other relevant fuel
$EF_{b,fuel,NON-CO2}$	Non-CO2 emission factor of the fuel that is substituted or reduced
$NCV_{b,fuel}$	Net calorific value of the fuel that is substituted or reduced (IPCC default for wood fuel, 0.015 TJ/ton)

And:

$B_{b,y}$	Quantity of fuel consumed in baseline scenario p during year y, in tons, and as derived from the statistical analysis conducted on the data collected during the project performance field tests
$B_{b,y}$	is calculated using the efficiencies of the baseline ($\eta_{b,i,y}$) and project ($\eta_{p,i,y}$) technologies and the quantity of fuel consumed in the project scenario p during year y, in tons and as derived from the statistical analysis conducted on the data collected during the project performance field tests (cases when no baseline performance field test are performed, e.g. by-default baseline factors), $B_{p,y:}$ $B_{b,y} = (\eta_b / \eta_p) * B_{p,y}$

Based on the formula provided above baseline emissions are calculated in tonnes CO_2 per household per year.

Baseline emissions in tonnes CO_2 per household per year are than adjusted for each VPA and for each age group of stoves by taking into account monitoring data on actual efficiency of stoves by year of use and single weighted usage parameter. Single weighted usage parameter reflects usage rate of stoves from different age groups taking into account the share of each age group in total number of technology days for each VPA. This value is than used to calculate total baseline emission based on the number of technology days in each year.

For institutional cook stoves, baseline emissions were calculate in tonnes CO2 per 10,000 adjusted adult meals . These values were used to calculate total baseline emissions for each year of the monitoring period for each VPA based on the amount of technology days (number of days between start of operation within monitoring period and end of operation within monitoring period) for the respective year in each VPA.

Project emission calculations are conducted as follows:

$PE_{p,y} = B_{p,y} * ((f_{NRB,y} * EF_{p,fuel,CO2}) + EF_{p,fuel,nonCO2}) * NCV_{p,fuel}$

Where:

$PE_{p,y}$ Emissions for project scenario p during year y in tCO2e

$B_{p,y}$ Quantity of fuel consumed in project scenario p during year y, in tons, and as derived from the statistical analysis conducted on the data collected during the project performance field tests (cases when no baseline performance field test are performed, e.g. by-default baseline factors)

$f_{NRB, y}$ Fraction of biomass used during year y that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario)

$EF_{p,fuel,CO2}$ CO2 emission factor of the project fuel. This is equal to the baseline fuel EF in projects which use the same fuel, 112 tCO2/TJ for Wood/Wood Waste, or the IPCC default value of other relevant fuel

$EF_{p,fuel,nonCO2}$ Non-CO2 emission factor of the project fuel. This is equal to the baseline fuel EF in projects which use the same fuel.

$NCV_{p,fuel}$ Net calorific value of the project fuel (IPCC default for wood fuel, 0.015 TJ/ton). This is equal to the baseline fuel NCV in projects which use the same fuel.

Quantity of fuel consumed in project scenario p is estimated based on KPT:

- for Malawi the average value based on Kitchen Test Quantitative survey of Portable Clay Stove customers – 2009 and Usage Survey & Aging Stove KT Report Portable Ceramic Stoves Cluster – 2011 is used, which is 1.690 tonnes per HH per year;

- for Rwanda the value is based on Report on project fuel tests 2013 (Canarumwe Household Cookstove) is used, which is 1.271 per HH per year.

Based on the formula provided above project emissions are calculated in tonnes CO_2 per household per year.

Project emissions in tonnes CO_2 per household per year are than adjusted for each VPA and for each age group of stoves by taking into account monitoring data on actual efficiency of stoves by year of use and single weighted usage parameter. Single weighted usage parameter reflects usage rate of stoves from different age groups taking into account the share of each age group in total number of technology days for each VPA.

Adjusted project emissions in tonnes CO_2 per household per year are converted to project emissions in tonnes CO_2 per household per day. This value is used to calculate total project emissions for each year of the monitoring period for each VPA based on the amount of technology days for the respective year in each VPA.

For institutional cook stoves, project emissions were calculate in tonnes CO_2 per 10,000 adjusted adult meals for each age group based on the baseline emissions

in tonnes CO_2 per 10,000 adjusted adult meals and the ration between project and baseline stove efficiency.

Continuation of use of the displaced baseline technology (e.g. three stone fire) in parallel with project technology (improved efficiency portable clay stove) was identified as a source of leakages. Leakages were assessed based on the monitoring surveys results using assumed leakage rate (percentage of households, which continue use baseline technology in parallel with project technology). Leakage is calculated as a percentage of total emission reductions and calculations of emission reductions were adjusted accordingly.

In addition, emission reduction were also adjusted to account for households using several improved efficiency portable clay stoves (project technology). The continued use of baseline stoves together with the project stove was identified by specifically asking how often the baseline stove is used (never, seldom or often), with “seldom” defined as once a week on average, and “often” being defined as at least once every 2 days and/or asking about average daily cooking time using baseline stoves for breakfast, lunch and dinner in households using baseline stoves in minutes. Deduction for households with more than 1 stove installed was calculated as a percentage of total emission reductions and calculations of emission reductions were adjusted accordingly.

Other potential source of leakages occurs in cases, when improved stove users compensate for loss of the space heating effect of inefficient cook-stoves by adopting some other form of heating, such as open fires, or by retaining some use of inefficient stoves. During monitoring surveys none of the users claimed space heating to be a main use for the stove(s). In the baseline scenario conducted in March 2009 none of the respondents claimed space heating was a use of the three stone fire. Thus, this source of leakages was not accounted for.For FIS, the number of institutions using both project and non-project stoves was estimated during usage and monitoring surveys. It was assumed that the institutions that still use baseline stoves use them for cooking of 25% of all meals. Thus the leakage rate was calculated by multiplying the percentage of institutions using the FIS in parallel with baseline stoves out of all institutions still using FIS stoves (25% or 36 institutions out of 144 based on 2013 survey; 21.8% or 26 institutions out of 119 based on 2016 survey) by 25%. The calculation resulted in the leakage rate of 6.25% based on 2013 survey and 5.46% based on 2016 survey. The PP has conservatively applied a 10% leakage factor in calculation of emission reduction.

All potential sources of leakages will continue to be monitored in annual Monitoring and Usage Surveys, and Project Field Performance Tests.

It should be considered that the basic energy needs are not being met in the baseline scenarios and savings are used to bridge this gap and are unlikely to be wasted or lost through leakages.

Equation to be used in calculating emission reductions:

$$ER_y = BE_y - PE_y - LE_y$$

A.3 Data and parameters fixed ex ante for monitoring contribution to each of the three SDGs

Relevant SDG Indicator	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data/parameter	$f_{NRB,i,y}$
Unit	Fraction of non-renewability
Description	Non-renewability status of woody biomass fuel in scenario I during year y
Source of data	Default values of fraction of non-renewable biomass approved by CDM EB and accepted by DNA as indicated at UNFCCC website[6]
Value(s) applied	**Country** / **Default Values fNRB** Malawi / 81% Rwanda / 98%
Choice of data or Measurement methods and procedures	Fixed by baseline study for a given crediting period, updated if necessary as specified in section III.1 of the methodology. No equipment used.
Purpose of data	Calculation of baseline and project emissions
Additional comment	As applicable NRB assessment may be used for multiple scenarios. Default country specific value. The parameter value is fixed ex ante, and is to be re-assessed and fixed at the beginning of each crediting period.

Relevant SDG Indicator	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data/parameter	$NCV_{,biomass}$
Unit	TJ/t
Description	Net calorific value of the non-renewable biomass that is substituted
Source of data	Default value based on 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Chapter I: Introduction, Table 1.2
Value(s) applied	0.015
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline and project emissions
Additional comment	

[6] https://cdm.unfccc.int/DNA/fNRB/index.html

Relevant SDG Indicator	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data/parameter	$EF_{b, CO2}$ and $EF_{p, CO2}$
Unit	tCO_2 / t wood
Description	CO_2 emission factor arising from use of fuels in baseline and project scenarios
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Chapter I: Introduction, Table 1.2 and Table 1.4
Value(s) applied	1.680 tCO2/t wood (=112.0 tCO2/TJ * 0.015 TJ/ t)
Choice of data or Measurement methods and procedures	Default IPCC values for wood / wood waste and default NCV of the wood fuel are applied for calculation of emission factors required to calculate CO_2 emission reductions
Purpose of data	Calculation of baseline and project emissions
Additional comment	EF's in baseline and project have the same value as the project reduces use of the same fuel. PoA DD contains two values of NCV for biomass: rounded value 0.015 in the description of the parameter NCV, biomass and 0.0156 in the description of CO2 emission factor. To ensure consistency with PoA DD in terms of NCV value used and conservativeness of emission reduction calculation 0.015 was used for the calculation of non-CO2 emission factor. This resulted in inconsistency with PoA DD for the value of non-CO2 emission factor.

Relevant SDG Indicator	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data/parameter	$EF_{b, nonCO2}$ and $EF_{p, nonCO2}$
Unit	tCO_2 / t wood
Description	Non-CO_2 emission factor arising from use of fuels in baseline and project scenarios
Source of data	Average of default value range, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Chapter II: Stationary Combustion, Table 2.9
Value(s) applied	Values effective till 31.12.2012 0.438 tCO2/t wood Values effective from 01.01.2013: 0.509 tCO2/t wood

Choice of data or Measurement methods and procedures	Average of default IPCC values range for CH4 and N20 emissions factor of the wood / wood waste and are applied to calculate non-CO2 emission factor of the wood fuel / wood waste. Global warming potentials according to Fourth Assessment Report of the IPCC, Table 2.14 were used to convert non-CO2 emission factors to CO2 emissions. The following GWP100 are applied: 21 for CH4, 310 for N2O effective till 31.12.2012; 25 for CH4, 298 for N20 effective from 01.01.2013. Default net calorific value of the wood fuel was used to convert non-CO2 emission factor of the wood fuel / wood waste from tonnes CO2 / TJ to tonnes CO2 per tonne of wood.
Purpose of data	Calculation of baseline emissions and project emissions
Additional comment	Both defaults are within a range and the mean of the range is taken as the default. Technical references are from studies in developing country contexts and are more up-to-date than other default values. EF in baseline and project have the same value as the project reduces use of the same fuel. The values have changed from the values indicated in the registered PoA DD and VPA DD due to the following reason. PoA DD contains two values of NCV for biomass: rounded value 0.015 in the description of the parameter NCV, biomass and 0.0156 in the description of CO2 emission factor. To ensure consistency with PoA DD in terms of NCV value used and conservativeness of emission reduction calculation 0.015 was used for the calculation of non-CO2 emission factor. This resulted in inconsistency with PoA DD for the value of non-CO2 emission factor.

Relevant SDG Indicator	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data/parameter	$\eta_{baseline,\ PCS\ Malawi,y}$ $\eta_{baseline,\ PCS\ Rwanda,y}$
Unit	%
Description	Thermal efficiency of the various baseline technologies i in year y
Source of data	GS methodology default, footnote 24 on page 18 of the methodology
Value(s) applied	10%
Choice of data or Measurement methods and procedures	10% thermal efficiency for primitive stoves (those without chimney and grate).
Purpose of data	Calculation of baseline emissions

Additional comment	This parameter is included for *suppressed demand* calculations.

Relevant SDG Indicator	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data/parameter	Person – meal
Unit	% of person meal or adult-adjusted meal
Description	Appropriate weighting for (i) Workforce (male and female), (ii) children's meal (primary school), (iii) 6 year olds and under (pre-primary school) (iv) light meals (e.g. tea).
Source of data	Baseline FT for FIS; Conversion factors used to estimate Adult Equivalent (AE) are sourced from Government of Malawi, *Impact and output indicators for agriculture, food security, nutrition and natural resources projects/ programmes in Malawi*, July 2008. Should other countries in the PoA include VPAs for institutional cook stoves other documentation can be sourced if deemed more appropriate.
Value(s) applied	Workforce (male and female) meal = 0.90 person meal; Childrens' meals (primary school) = 0.75 person meal; 6 year olds and under (pre-primary school) = 0.60 person meal; Teas = 0.50 person meal
Choice of data or Measurement methods and procedures	
Purpose of data	Calculation of baseline and project emissions.
Additional comment	This parameter is used to normalise workforce made up of women and men, primary school meals, orphanage meals and light meals (e.g. tea).

Relevant SDG Indicator	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data/parameter	$B_{b,i,y}$
Unit	Kg/household day
Description	Quantity of fuel that is consumed in baseline scenario b during year y for technology i

Source of data	For all VPAs for the 1st crediting period: Default quantity of fuel derived using formula [$Fuel_{baseline} = \eta_{project} / \eta_{baseline} \times Fuel_{project}$] specified in GS methodology of *Technologies and Practices to Displace Decentralised Thermal Energy Consumption (11/04/2011)* page 18 footnote 24. For VPA 2444 for the 2nd crediting period: Default quantity of fuel derived using default value of 0.5 tonnes/capita/year specified in *Gold Standard methodology of Technologies and Practices to Displace Decentralised Thermal Energy Consumption Version 2 (24/04/2015) including revision to the TPDDTEC Methodology for cookstove activities (18/12/2015) at* page 18 footnote 24 and average number of people per household of 5.4544 as defined during baseline survey
Value(s) applied	In Malawi 14.16 kgs / HH / day (equivalent to 5.169 tonnes of wood / HH / year) In Rwanda 10.65 kgs / HH / day (equivalent to 3.889 tonnes of wood / HH / year) For VPA 2444 for the 2nd crediting period: 7.47. kgs / HH / day (equivalent to 2.727 tonnes of wood / HH / year)
Choice of data or Measurement methods and procedures	In line with the VPA DDs. In the VPA DD there is an typo error in the result of calculation using the formula $Fuel_{baseline} = \eta_{project} / \eta_{baseline} \times Fuel_{project.}$ In section D.6.2 of the VPA DD the result stated is 14.9 kgs / HH / day (equivalent to 5.4 tonnes of wood / HH / year). $Fuel_{baseline} = 1.690 * (30.6/10) = 5.169$ The figures presented in section D.6.3 of the VPA DD proves that the result should be 5.169. The value for Malawi is based on the initial baseline for PCS users conducted in Balaka District in 2009, which was reassessed for use in suppressed demand calculations. The methodology allows for the use of a default value, provided that the monitoring plan ensures that the baseline technology is not in use anymore or that KPTs in the project situation are conducted to determine fuel consumed by retained baseline stoves.
Purpose of data	Calculation of baseline and project emissions.

Additional comment	A single baseline fuel consumption parameter is weighed to be representative of baseline technologies being compared for project crediting. The single sample test approach avoids penalising people who are malnourished, under cooking, or using unfavourable fuels due to poverty, as per Annex 2 in the methodology on suppressed demand. Baseline efficiency assumed to be 3-stone fire or similar to be verified through monitoring surveys before verification. Project efficiency to be checked before verification.

Relevant SDG Indicator	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data/parameter	$P_{B, FIS, 0}$
Unit	Kg / adult-adjusted meal
Description	Quantity of fuel that is consumed in the baseline scenario for FIS
Source of data	Baseline FT for FIS, 2011
Value(s) applied	0.3604 kgs / adult-adjusted meal
Choice of data or Measurement methods and procedures	Baseline KPTs as per methodology.
Purpose of data	This is the initial fixed baseline data for FIS for first crediting period.
Additional comment	Baseline data for FIS has not yet been assessed for suppressed demand.

Relevant SDG Indicator	3 – Good Health and Well-Being 3.9.1 Mortality rate attributed to household and ambient air pollution
Data/parameter	Indoor air emissions reduction (CO, PM)
Unit	%
Description	The percentage of indoor air emissions reduction due to the use of Project stoves.
Source of data	Please, refer toJagger, P., J. Pedit, A. Bittner, L. Hamrick and T. Phwandaphwanda. 2017. Fuel efficiency and emissions of wood-burning improved cookstoves in Malawi: Implications for scaling-up cookstove programs. Chapel Hill, NC: FUEL Lab, Carolina Population Center.

Value(s) applied	41% for CO 50% for PM 2.5
Choice of data or Measurement methods and procedures	According to a study conducted in Malawi and referenced above the use of *Chitetezo Mbaula* allows CO emissions reductions of 41% and PM 2.5 emission reductions of 50%.
Purpose of data	Assessment of contribution to SDG 3
Additional comment	-

SECTION B Safeguarding Principles Assessment

B.1 Analysis of social, economic and environmental impacts

Analysis of social, economic and environmental impacts is performed based on the Gold Standard for the Global Goals Safeguarding Principles and Requirements, Version 1.1.

Safe-guarding principles	Assessment questions	Assessment of relevance to the project (Yes/ potentially/ no)	Justification	Mitigation measure (if required)
3.2 Gender Equality and Women's Rights	Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits?	No	The Project does not impact women's access to or control of resources, entitlements and benefits. The Project disseminate efficient stoves to both men and women and women are most often the final users of the stoves.	N/A
	Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?	No	The Project positively affects men and women in vulnerable rural communities by improving cooking practices and reducing health risks caused by indoor air pollution.	N/A
	Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the	No	Women are the primary target audience of the Project, as women are usually responsible for cooking and fuelwood collection.	N/A

	decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)?		The Project allows the reduction of time spent for fuelwood collection and cooking. The manuals distributed with the stoves are designed using pictures, which make them useful to illiterate clients.	
	Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?	Yes	The Project supports the access to efficient cooking technology to all members of targeted communities independently of gender. The Project stove is a portable stove model, which can be provided for landless people or people temporarily living in rescue camps (e.g. after flooding events in Malawi).	N/A
	Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities?	No	The Project technology reduces time spent for cooking (due to better stove performance) and fuelwood collection (due to more efficient fuel use and consequent lower demand) and thus contribute to the decrease in women's workload.	N/A
	Would the Project potentially reproduce or further deepen	No	The Project does not involve any kind of discrimination against women	N/A

	discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?		based on gender. The Project supports employment and training for both men and women (e.g. for stove manufacturing, monitoring activities, etc.)	
	Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?	No	The Project has positive impact on environmental goods and services by contributing to forests preservation. The Project does not limit women's ability to use, develop and protect natural resources.	N/A
	Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?	No	The Project reduce the exposure of women and girls to risks and hazards. Most of the users report that Project stoves are safer to use and generate less smoke, which reduce health risks related to indoor air pollution.	N/A
3.4.3 Land Tenure and Other Rights	Does the Project require any change to land tenure arrangements and/or other rights?	No	The Project does not impact land rights.	N/A
3.6.2 Negative Economic Consequen	The Project Developer shall demonstrate the financial	Yes	The Project is financially sustainable, which is proved by more	N/A

ces	sustainability of the Projects implemented, also including those that will occur beyond the Project Certification period.		than 10 years of operation in Malawi. Revenues from carbon credits sale allows making Project stoves affordable for the targeted low-income communities.	
	The Projects shall consider economic impacts and demonstrate a consideration of potential risks to the local economy and how these have been taken into account in Project design, implementation, operation and after the Project. Particular focus shall be given to vulnerable and marginalised social groups in targeted communities and that benefits are socially-inclusive and sustainable.	Yes	The Project has positive economic impact by stimulating job creation in the rural communities.	N/A
4.1.1 Emissions	Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No		N/A
4.1.2 Energy Supply	Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass)	No		N/A

	that provides for other local users?			
4.2.1 Impact on natural water patterns and flow	Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	The Project does not influence surface and ground water bodies. Limited water consumption is performed during stove production (mixing clay and water).	N/A
4.2.2 Erosion and/or water body stability	Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion?	No	The Project does not influence surface and ground water bodies or catchment areas. Environmental management activities to ensure soil protection and minimised erosion at clay source sites include reforestation every growing season and monitoring.	N/A
4.3.1 Landscape modifi-cation and soil	Does the Project involve the use of land and soil for production of crops or other products?	Yes	The Project involves the use of locally sourced clay for stoves manufacturing. The activities do not lead to landscapes degradation due to application of environmental management practices. The Project does not impact soils used for crops production.	Environmental management activities at clay source sites include reforestation every growing season and monitoring.
4.3.2	Will the Project be	No	The Project does	N/A

Vulnerability to Natural Disaster	susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?		not have significant impact on land use change and does not increase the vulnerability to natural or man-made hazards. Fuelwood savings resulting from the Project contribute to reduced tree felling and decrease soil erosion risks. Reforestation is applied at clay source sites every growing season to prevent erosion.	
4.3.3 Genetic Resources	Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?	No	The Project does not involve any use of genetically modified organisms	N/A
4.3.4 Release of pollutants	Could the Project potentially result in the release of pollutants to the environment?	Yes	The project involves fuelwood combustion, which leads to air pollutants release. Project stoves leads to air emission reductions. According to a study conducted in Malawi the use of Chitetezo Mbaula allows CO emissions reductions of 41% and PM 2.5 emission reductions of 50%.[7]	Air emission sources resulting from the Project has been identified and include PM and CO. Usage and monitoring surveys include question on the impact of the

				promoted tecnology on smoke generation.
4.3.5 Hazardous and Non-hazardous Waste	Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	The Project does not involve the use of hazardous chemicals and materials in any form. The stoves are made from clay. The only waste stream associated with the Project is ash from fuelwood combustion, which will be reduced to to more efficient stoves.	N/A
4.3.6 Pesticides and fertilizers	Will the Project involve the application of pesticides and/or fertilisers?	No	The Project does not involve the application of pesticides and fertilizers.	N/A
4.3.7 Harvesting of forests	Will the Project involve the harvesting of forests?	No	The Project does not involve forests harvesting and does not have negative impact on biodiversity and ecosystem functionality. Improved efficiency of stoves leads to reduced fuelwood demand and contribute to the reduction of deforestation.	N/A
4.3.8 Food	Does the Project modify the quantity or nutritional quality of food available such as through	No	The Project does not impact the quantity of food available and does not have negative influence on	N/A

[7] Jagger, P., J. Pedit, A. Bittner, L. Hamrick and T. Phwandaphwanda. 2017. Fuel efficiency and emissions of wood-burning improved cookstoves in Malawi: Implications for scaling-up cookstove programs. Chapel Hill, NC: FUEL Lab, Carolina Population Center.

	crop regime alteration or export or economic incentives?		nutritional quality of food. The Project can have positive impact on the food quality by increasing the efficiency and thus affordability of cooking practices and also due to financial savings on wood fuel that could be used for food purchase.	
4.3.9 Animal Husbandry	Will the Project involve animal husbandry?	No	The Project does not involve animal husbandry.	N/A

SECTION C Monitoring plan

C.1 Data and parameters to be monitored

Relevant SDG Indicator/Safeguarding Principle	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data / Parameter	$U_{P,y}$
Unit	Percentage
Description	Usage rate in project scenario p during year y
Source of data	Annual usage survey
Value(s) applied	Single Weighted Usage Parameter for PCS age 0-4 and FIS age 0-4. Based on cumulative usage rate for technologies in project scenario PCS and FIS. Usage of stoves over time to determine project fuel consumption for PCS and FIS users.
Measurement methods and procedures	Usage of stoves over time to determine project fuel consumption for stove users. No equipment used. Usage rates for PCS of each age group taken as percentage of stoves in use with 90 % confidence intervals. A normal linear regression model was fitted to the data to determine the trend. Single weighted usage parameter is the sum of products of usage rates and % of total technology days for PCS of each age group: = (% of technology days age 0-1 * XX%) + (% of technology days age 1-2 * YY%) + (% of technology days age 2-3 * ZZ%) + (% of technology days age 3-4 * WW%)
Monitoring frequency	Annual usage survey and in all cases on time for any request of issuance.
QA/QC procedures	Transparent data analysis and reporting.
Purpose of data	Calculation of baseline and project emissions.
Additional comment	A single usage parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario

Relevant SDG Indicator/Safeguarding Principle	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data / Parameter	$N_{p,y}$
Unit	Project technology-days in project database for project scenario p through year y

Description	Technologies in the project database for project scenario p through year y
Source of data	Calculated based on Total sales record
Value(s) applied	-
Measurement methods and procedures	No equipment used.
Monitoring frequency	Continuous
QA/QC procedures	Transparent data analysis and reporting.
Purpose of data	Calculation of baseline and project emissions.
Additional comment	For each year of the monitoring period the number of technology-days for the group of stoves sold at a specific date is calculated by multiplying the number of stoves sold on this date (based on total sales record database) and stoves operation days during the monitoring period. Stoves operation days during the monitoring period for each year of the monitoring period is defined as the number of days between either the start date of stove operation (for the first year of operation) or the beginning the year (for the following years) and either the end of stoves operation lifetime or the end of the year (end of the monitoring period). Total number of technology-days is calculated as the sum of the numbers of technology-days for all groups of stoves sold at a specific date. Total number of technology-days for each age group is calculated as the sum of the numbers of technology-days for the groups of stoves sold at a specific date meeting the age group conditions (age group 1 – stove operation from the date of installation is 1-365 days, age group 2 – stove operation from the date of installation is 366-730 days, age group 3 – stove operation from the date of installation is 731-1095 days, age group 4 – stove operation from the date of installation is 1096-1417 days), Assumed stove operation lifetime is limited to 1417 days.

Relevant SDG Indicator/Safeguarding Principle	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data / Parameter	$LE_{p,y}$
Unit	tCO_2eq / year
Description	Leakage in project scenario PCS Malawi during year y Leakage in project scenario FIS during year y
Source of data	Baseline and monitoring surveys

Value(s) applied	% to be discounted
Measurement methods and procedures	Potential sources of leakage investigated at least every two years as described in section 6 of the methodology. No equipment used.
Monitoring frequency	Every 2 years. The CME has chosen to monitor it more frequently to provide more reliable data for ER calculation. For VPAs in Malawi the leakage rate was estimated for 2013, 2014 and 2015. For the years 2016 and 2017, the most conservative value among the estimated in 2013-2015 was used.
QA/QC procedures	Transparent data analysis and reporting.
Purpose of data	Calculation of leakage.
Additional comment	Aggregate leakage can be assessed for multiple project scenarios, if appropriate. For single sample performance tests and efficiency ratio multiplier potential leakage is not subsumed.

Relevant SDG Indicator/Safeguarding Principle	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data / Parameter	$B_{p,i,y}$
Unit	Kg/household day or Kg/adult equivalent meal
Description	Quantity of fuel that is consumed in project scenario p during year y for technology i
Source of data	Total Sales record, Project Field Tests, project FT updates, and any applicable adjustment factors.
Value(s) applied	4.63 kgs / HH / day (equivalent to 1.690 tonnes of wood / HH / year) for Malawi 0.046 Kg / adjusted adult meal (equivalent to 0.460 tonnes wood / 10,000 meals)
Measurement methods and procedures	Measurement equipment include weights and moisture meters. Monitoring equipment has been also checked by monitoring facilitators as per the equipments' operating instructions, prior to conducting tests.

Monitoring frequency	Domestic cook stoves in VPAs using V.01 of TPDDTEC establish baseline fuel consumption through project fuel consumption and baseline/ project fuel efficiencies without applying the cap 0.5t/capita/year. The baseline fuel consumption will be fixed for the entire crediting period. A project KPT will be carried out prior to first issuance. The project fuel consumption will be updated for efficiency degradation through annual WBTs as explained in the GS TAC rule update from December 2015. For institutional stoves KPTs are conducted every 2 years.
QA/QC procedures	Follow KPT guidelines in Annex 4 of methodology. Large capacity spring scale most appropriate (0.1 – 0.5 kg accuracy); Moisture Metre. For Institutional Stoves, to normalise different types of meals into person-meals or adult equivalent meals, adjustment factors are presented in person meal parameter presented in data and parameters fixed ex-ante above.
Purpose of data	Calculation of baseline and project emissions.
Additional comment	A single baseline fuel consumption parameter is weighed to be representative of project technologies being compared for project crediting.

Relevant SDG Indicator/Safeguarding Principle	13 – Climate Action 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Data / Parameter	$\eta_{projecti,y}$
Unit	%
Description	Thermal efficiency of project technology i in year y
Source of data	Water Boiling Test Report
Value(s) applied	Assess change in performance, measured in thermal efficiency, over time.
Measurement methods and procedures	Stoves of different ages to be tested for efficiency to measure performance of technology as it ages using water boiling test using protocol as at http://www.pciaonline.org/node/1048 Measurement equipment include scales, thermometers, and moisture meters. Digital phones are used as timers. Monitoring equipment is checked by monitoring facilitators as per the equipments' operating instructions, prior to conducting tests. Equipment also has factory calibration and does not usually require recalibration during warranty period.

Monitoring frequency	Annual
QA/QC procedures	Calibration of measuring equipment performed before project field tests. The minimum sample size of each age group shall comply with the 90/10 rule.
Purpose of data	Calculation of baseline and project emissions.
Additional comment	Accuracy of equipment will depend on the equipment that is locally available or procurable within reason.

Relevant SDG Indicator/Safeguarding Principle	1 – No Poverty 1.1.1 Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural) 1.2.1 Proportion of population living below the national poverty line, by sex and age 1.2.2 Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions 2 – Zero Hunger 2.1.1 Prevalence of undernourishment 2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)
Data / Parameter	Financial savings for households
Unit	Local currency or %
Description	Financial savings for households due to the introduction of project stoves that can be used for other needs
Source of data	Usage and monitoring surveys
Value(s) applied	To be provided in monitoring report
Measurement methods and procedures	Interviews
Monitoring frequency	Annualy
QA/QC procedures	Training of the evaluators
Purpose of data	Evaluation of contribution to SDG 1 and SDG 2
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	1 – No Poverty 1.1.1 Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural) 1.2.1 Proportion of population living below the national poverty line, by sex and age 1.2.2 Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions 2 – Zero Hunger 2.1.1 Prevalence of undernourishment 2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)
Data / Parameter	Time savings for households
Unit	Hours or %
Description	Time savings for households due to the introduction of project stoves that can be used for other needs
Source of data	Usage and monitoring surveys
Value(s) applied	To be provided in monitoring report
Measurement methods and procedures	Interviews
Monitoring frequency	Annualy
QA/QC procedures	Training of the evaluators
Purpose of data	Evaluation of contribution to SDG 1 and SDG 2
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	1 – No Poverty 1.1.1 Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural) 1.2.1 Proportion of population living below the national poverty line, by sex and age 1.2.2 Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
Data / Parameter	Financial savings achieved due to more efficient use of fuel wood
Unit	Local currency
Description	Financial savings achieved as a result of project stoves use due to more efficient use of fuel wood for cooking and less fuel wood purchase

Source of data	Calculated based on the estimated fuel wood savings and public information on fuel wood prices
Value(s) applied	To be provided in the monitoring report
Measurement methods and procedures	Calculated based on the amount of fuel saved and average fuelwood prices as reported by relevant authorities or other publicly available information
Monitoring frequency	Annually
QA/QC procedures	Cross-checking price information with different sources
Purpose of data	Evaluation of contribution to SDG 1
Additional comment	Savings estimated might only reflect economic estimation of wood savings and not real monetary savings for households since the wood is often collected and not purchased.

Relevant SDG Indicator/Safeguarding Principle	3 – Good Health and Well-Being 3.9.1 Mortality rate attributed to household and ambient air pollution
Data / Parameter	Percentage of households reported lower smoke generation
Unit	%
Description	Impact of the Project stoves on smoke generation
Source of data	Usage and monitoring surveys
Value(s) applied	To be provided in the monitoring report
Measurement methods and procedures	Interviews
Monitoring frequency	Annually
QA/QC procedures	Training of the evaluators
Purpose of data	Evaluation of contribution to SDG 3
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	5 – Gender Equality 5.5.2 Proportion of women in managerial positions
Data / Parameter	Total number of women employed and percentage of women
Unit	Number of women, %
Description	Information on efficient stove production activities and employment of women and men
Source of data	Malawi's cookstove activities database https://energypedia.info/wiki/Malawi_cookstoves_DB_District_Overview

Value(s) applied	To be provided in the monitoring report
Measurement methods and procedures	-
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	Evaluation of contribution to SDG 5
Additional comment	Information would be complemented with the information on women and men involved in monitoring activities

Relevant SDG Indicator/Safeguarding Principle	7 – Affordable and Clean Energy 7.1.2 Proportion of population with primary reliance on clean fuels and technology 7.2.1 Renewable energy share in the total final energy consumption 7.3.1 Energy intensity measured in terms of primary energy and GDP
Data / Parameter	Energy savings
Unit	GJ
Description	Information on energy saved calculated based on the data used for carbon emission reduction estimation
Source of data	ER calculation file
Value(s) applied	To be provided in the monitoring report
Measurement methods and procedures	Calculated based on the information on fuel wood saved in tonnes divided by the net calorific value of biomass
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	Evaluation of contribution to SDG 7
Additional comment	The information on the non-renewable fraction of the woody biomass in the Host countries will be also reported

Relevant SDG Indicator/Safeguarding Principle	8 – Decent Work and Economic Growth 8.2.1 Annual growth rate of real GDP per employed person 8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities 8.5.2 Unemployment rate, by sex, age and persons with disabilities 8.8.1 Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status 8.8.2 Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status

Data / Parameter	Sales volumes
Unit	Local currency
Description	Estimated stoves sales volume based on the average stove price and the number of stoves disseminated by the Project
Source of data	Total sales database
Value(s) applied	To be provided in the monitoring report
Measurement methods and procedures	Calculated multiplying the sales numbers with the average market price of the stove
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	Evaluation of contribution to SDG 8
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	8 – Decent Work and Economic Growth 8.2.1 Annual growth rate of real GDP per employed person 8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities 8.5.2 Unemployment rate, by sex, age and persons with disabilities 8.8.1 Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status 8.8.2 Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status
Data / Parameter	Employment
Unit	Number of people
Description	Information on efficient stove production activities and employment
Source of data	Malawi's cookstove activities database https://energypedia.info/wiki/Malawi_cookstoves_DB_District_Overview
Value(s) applied	To be provided in the monitoring report
Measurement methods and procedures	-
Monitoring frequency	Annualy
QA/QC procedures	-
Purpose of data	Evaluation of contribution to SDG 8
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	15 – Life on Land 15.1.1 Forest area as a proportion of total land area 15.2.1 Progress towards sustainable forest management
Data / Parameter	Fuel wood savings
Unit	tonnes
Description	Monitoring fuelwood savings based on the data used for carbon emission estimation.
Source of data	ER calculation file
Value(s) applied	To be provided in the monitoring report
Measurement methods and procedures	Calculated based on the amount of carbon emission reductions achieved and carbon emission factor of biomass fuel (both CO_2 and non-CO_2 emission factor).
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	Evaluation of contribution to SDG 15
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	17 – Partnership for the Goals 17.16.1 Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals 17.17.1 Amount of United States dollars committed to public-private and civil society partnerships
Data / Parameter	information on the cooperation activities supported by the Project
Unit	-
Description	Information on the cooperation activities supported by the Project to foster multi-stakeholder partnership and voluntary commitments in promotin clean cooking technologies, as well as information on the the stakeholders involved in such activities.
Source of data	Coordinated management entity
Value(s) applied	To be provided in the monitoring report
Measurement methods and procedures	-
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	Evaluation of contribution to SDG 17
Additional comment	-

C.1.1 Other elements of monitoring plan (if applicable)

Monitoring activities will be performed in line with the registered PoA DD and VPA DDs, as well as taking into account the clarifications provided during design change procedure and certification of voluntary emission reductions.

SECTION D Duration and crediting period

D.1 Duration of project

D.1.1 Start date of project

The start date of the programme of activities is 29/08/2012.

D.1.2 Expected operational lifetime of project

28 years

D.1 GS Crediting period of the project/activity

PoA and each VPA under the PoA will have 7 years long renewable crediting period.

D.2.1 Start date of the ongoing GS crediting period

The start date of the ongoing GS crediting period of the PoA is 29/08/2012. Information about the start dates of the ongoing crediting periods of each VPA is presented in the table below.

Reference number of the specific-case VPA included in the PoA as of the end of this monitoring period	Title, identification/ reference number and version number of the generic VPA to which the specific-case VPA applies	Crediting period start dates of the specific-case VPA
VPA GS 2397	GS 2397 - African Biomass Energy Conservation PoA – Rwanda Biomass Conservation (Domestic cook stoves Rwanda)	29/08/2012
VPA GS 1330	GS 1330 – GS 1265 – African Biomass Energy Conservation PoA – Malawi Biomass Conservation (Domestic cook stoves Malawi)	17/10/2012
VPA GS 2444	GS 2444 – GS 1265 – African Biomass Energy Conservation PoA – Malawi Biomass Conservation (Domestic & Institutional cook stoves Malawi)	2nd CP 24/11/2015
VPA GS 2445	GS 1330 – GS 1265 – African Biomass Energy Conservation PoA – Malawi Biomass Conservation (Domestic cook stoves Malawi)	01/03/2013
VPA GS 2446	GS 1330 – GS 1265 – African Biomass Energy Conservation PoA – Malawi Biomass Conservation (Domestic cook stoves Malawi)	01/03/2013
VPA GS 2447	GS 1330 – GS 1265 – African Biomass Energy Conservation PoA – Malawi Biomass Conservation (Domestic cook stoves Malawi)	01/03/2013

D.2.3 End date of the ongoing GS crediting period

The end date of the ongoing GS crediting period of the PoA is 28/08/2019. Information about the end dates of the ongoing crediting periods of each VPA is presented in the table below.

Reference number of the specific-case VPA included in the PoA as of the end of this monitoring period	Title, identification/ reference number and version number of the generic VPA to which the specific-case VPA applies	Crediting period end dates of the specific-case VPA
VPA GS 2397	GS 2397 - African Biomass Energy Conservation PoA – Rwanda Biomass Conservation (Domestic cook stoves Rwanda)	28/08/2019
VPA GS 1330	GS 1330 – GS 1265 – African Biomass Energy Conservation PoA – Malawi Biomass Conservation (Domestic cook stoves Malawi)	16/10/2019
VPA GS 2444	GS 2444 – GS 1265 – African Biomass Energy Conservation PoA – Malawi Biomass Conservation (Domestic & Institutional cook stoves Malawi)	23/11/2022
VPA GS 2445	GS 1330 – GS 1265 – African Biomass Energy Conservation PoA – Malawi Biomass Conservation (Domestic cook stoves Malawi)	29/02/2020
VPA GS 2446	GS 1330 – GS 1265 – African Biomass Energy Conservation PoA – Malawi Biomass Conservation (Domestic cook stoves Malawi)	29/02/2020
VPA GS 2447	GS 1330 – GS 1265 – African Biomass Energy Conservation PoA – Malawi Biomass Conservation (Domestic cook stoves Malawi)	29/02/2020

D.2.3 Total length of the GS crediting periods

28 years

SECTION E Stacking of new assets

The project does not plan to stack new assets over GSVERs.

Appendix 1. Contact information of project participants

Organization name	Hestian Innovation Ltd.
Registration number with relevant authority	
Street/P.O. Box	
Building	
City	Cragmuir Chambers Road Town, Tortola
State/Region	
Postcode	
Country	British Virgin Islands
Telephone	+442071934710
Fax	
E-mail	info@hestian.com
Website	www.hestian.com
Contact person	
Title	
Salutation	Mr.
Last name	O'Connor
Middle name	
First name	John
Department	
Mobile	
Direct fax	
Direct tel.	+442071934710
Personal e-mail	John.oconnor@hestian.com