Verified Carbon Standard

D.LIGHT'S IMPROVED COOKING PROJECT IN UGANDA

d.light

Document Prepared by

CLIMATE SECURE

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The "D. LIGHT'S IMPROVED COOKING PROJECT IN UGANDA" is a large-scale project that aims dissemination of energy-efficient improved cookstoves (ICS) to replace existing traditional Cookstoves in domestic households and communities in Uganda.

Traditional cooking methods prevalent across host country, contribute to greenhouse gas (GHG) emissions due to inefficient combustion of unsustainably sourced, non-renewable biomass (NRB) fuel. Furthermore, the use of solid biomass fuels (e.g., wood) in inefficient traditional stoves and/or open fires releases large amounts of particulate matter (PM), creating hazardous levels of indoor air pollution (IAP).

The ICSs disseminated under the project are designed to improve fuel combustion and heat transfer. The ICS results in the reduction of fuel consumption and improvement in levels of Indoor air pollution for project users (reducing smoke, black soot, and particulate matter (PM) emissions). The reduction in consumption of cooking fuel also reduces equivalent greenhouse gas (GHG) emissions attributed to the use of non-renewable biomass.

In the absence of this project, the project activity beneficiaries would cook primarily using traditional inefficient stoves for meeting their thermal energy needs, perpetuating environmental and health degradation. The project activity intends to access carbon finance to mitigate one of the main barriers (price) for end users towards adopting clean cookstoves.

The average annual GHG emission reduction from the project activity is estimated to be 462,172 tCO_2e and a total of 3,235,203 tCO_2e over the first crediting period of 7 years.

1.2 Sectoral Scope and Project Type

Mandatory Sectoral Scope: 03 – Energy Demand

Conditional Sectoral Scope: Not Applicable

Project Type: Energy Efficiency Project

The project is not a grouped project, but a large-scale project with multiple project activity instances[1].

1.3 Project Eligibility

1. The Six Kyoto Protocol GHGs: The project is applicable to this scope, as the project involves emission reduction comes from Kyoto GHGs such as CO_2, CH_4 and N_2O in the baseline.

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[1] Each ICS unit is deemed as a project activity instance.

2. Ozone-depleting substances: NA. This project does not involve ODSs.

3. Project activities supported by a methodology approved under the VCS program through the methodology approval process: This project uses the methodology VMR006 version 1.1 which is approved under the VCS program through the methodology approval process. Each project activity under the project shall, therefore, follow VMR0006.

4. Project activities supported by a methodology approved under an approved GHG program, unless explicitly excluded: NA. This project does not use a methodology approved under an approved GHG program.

5. Jurisdictional REDD+ programs and nested REDD+ projects as set out in the VCS Program document Jurisdictional and Nested REDD+ (JNR) Requirements: NA. This project does not involve REDD+.

Additionally, the project is not listed in table 1, section 2.1.1 of the VCS standard version 4.3, given it involves installation of improved cooking stoves (ICS) in Uganda.

The proposed project activity envisages distribution of 120,000 ICS in Uganda and meets compliance with section 2.1.1. of VCS Standard v (4.3).

Compliance with other general requirements is described below:

Reference to VCS Standard version 4.3	Requirement	Justification
3.1.1	Projects shall meet all applicable rules and requirements set out under the VCS Program, including this document. Projects shall be guided by the principles set out in Section 2.2.1.	The project meets all applicable rules and requirements as set out under the VCS Program and is guided by the ISO 14064-2:2006 clause 3.
3.1.2	Projects shall apply methodologies eligible under the VCS Program. Methodologies shall be applied in full, including the full application of any tools or modules referred to by a methodology, noting the exception set out in Section 3.13.1.	The project applies VCS approved methodology VMR0006, version 1.1 along with tools or modules as applicable. Refer to section 3 of the PD below for more details. This has been made an eligibility criterion for inclusion of project activity into the project.
3.1.3	Projects and the implementation of project activities shall not lead to the violation of any applicable law, regardless of whether or not the law is enforced.	The project and its instances shall remain in compliance with the applicable local laws. This has been made an eligibility criterion for inclusion of project activity into the project.
3.1.4	Where projects apply methodologies that permit the project proponent its own choice of model, such model	Not applicable. The applied methodology VMR0006

	shall meet with the requirements set out in the VCS Program document VCS Methodology Requirements and it shall be demonstrated at validation that the model is appropriate to the project circumstances (i.e., use of the model will lead to an appropriate quantification of GHG emission reductions or removals).	version 1.1 does not provide any such option.
3.1.5	Where projects apply methodologies that permit the project proponent its own choice of third-party default factor or standard to ascertain GHG emission data and any supporting data for establishing baseline scenarios and demonstrating additionality, such default factor or standard shall meet with the requirements set out in the VCS Program document VCS Methodology Requirements.	Not applicable. The applied methodology VMR0006 version 1.1 does not provide any such choice.
3.1.6	Projects shall preferentially apply methodologies that use performance methods where a methodology is applicable to the project that uses a performance method for determining both additionality and the crediting baseline (i.e., a project shall not apply a methodology that uses a project method where such a performance method is applicable to the project). Methodologies approved under the VCS Program that use performance methods provide a list of similar methodologies that use project methods (that were approved under the VCS Program or an approved GHG program at the time the performance method was developed). Such lists are not necessarily exhaustive but can serve as the starting point for determining whether a performance method is applicable to the project. Following the approval of a methodology that uses a performance method, projects may use any applicable pre-existing methodology that uses a project method for a six-month grace period.	Not applicable. The applied methodology VMR0006 version 1.1 does not provide the performance method for determining baseline or additionality.
3.1.7	Where the rules and requirements under an approved GHG program conflict with the rules and requirements of the VCS Program, the rules and requirements of the VCS Program shall take precedence.	The project activity applies only VCS methodology and so this is not applicable.
3.1.8	Where projects apply methodologies from approved GHG programs, they shall comply with any specified capacity limits (see the VCS Program document Program Definitions for definition of capacity limit) and any other relevant requirements set out with respect to the application of the methodology and/or tools referenced by the methodology under those programs).	The project activity only applies VCS methodology i.e., VMR0006 version 1.1 and so this is not applicable.
3.1.9	Where Verra issues new requirements relating to projects, registered projects do not need to adhere to the new requirements for the remainder of their project crediting periods (i.e., such projects remain eligible to issue VCUs through to the end of their project crediting period without revalidation against the new requirements). The new requirements shall be adhered to at project crediting period renewal, as set out in Section 3.8.9.	The project will adhere to the new guidelines on renewal of crediting period as per section 3.8.9 of the VCS standard version 4.3.

1.4 Project Design

The proposed large scale project activity involves distribution of multiple project activity instances (PAI) in the geographical boundary of Uganda. All PAI shall remain limited to the geographical boundary of Uganda.

Eligibility Criteria

The project is not a grouped project; hence this is not applicable.

1.5 Project Proponent

Organization name	d.light
Contact person	Karl Skare
Title	Managing Director - Global Partnerships & Strategy
Address	2100 Geng Road, Suite 210, Palo Alto, California, 94303, United States of America
Telephone	
Email	Karl.skare@dlight.com

1.6 Other Entities Involved in the Project

Organization name	Climate Secure
Role in the project	Entity Completing the Project Description
Contact person	Rohit Lohia
Title	Director
Address	P.O. Box 515000, Sharjah Media City, Sharjah, UAE
Telephone	+91 971093552
Email	rohit.lohia@climate-secure.com

1.7 Ownership

For each PAI, the ownership of the instance shall be clearly demonstrated by virtue of the following:

● Declaration / agreement with end users transferring the ownership rights of the carbon credits generated from the project activity instance (ICS) to the project proponent.

Thus, all VCUs generated from the project activity instances shall be owned by D.light, unless otherwise stated.

1.8   Project Start Date

01 March 2023 (Date for installation of 1st ICS under the project activity).

1.9   Project Crediting Period

First Crediting Period start date: 01 March 2023

First Crediting Period end date: 28 February 2030

Crediting Period Duration: 21 years (7 Years, Renewable twice)

The date of first ICS distribution under the project activity shall mark the start date of crediting period for the project.

1.10   Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	
Large project	X

Year	Estimated GHG emission reductions or removals (tCO_2e)
2023	310,164
2024	545,698
2025	521,658
2026	498,196
2027	475,306
2028	452,978
2029	431,204
Total estimated ERs	3,235,203
Total number of crediting years	7
Average annual ERs	462.172

1.11   Description of the Project Activity

The purpose of the project activity is to disseminate energy-efficient improved cookstoves (ICS) to replace existing traditional Cookstoves in domestic households and communities in Uganda.

One of the major causes of deforestation in Uganda is the use of solid biomass for domestic and institutional cooking. Over 90% of households in Uganda use firewood and/or charcoal for cooking, typically charcoal for urban dwellers, and wood for rural households using traditional cooking stoves[2].

This is further corroborated by the SE4ALL report for Uganda which states the following:

As per SE4ALL[3], By the end of 2018, just over 1 percent of Ugandan households were using clean fuel as their primary cooking energy source, typically LPG (0.7 percent) or electricity (0.5 percent). Approximately 95% of households still cook with wood or charcoal. Also, at the end of 2018, only about 1 percent of house- holds in Uganda were estimated to be cooking with charcoal or wood using a high-quality industrial ICS that meets international minimum standards on fuel efficiency and emissions. This is also supported by Uganda DHS 2019-2020 that specifies a whopping 94% population relying on wood or charcoal for cooking with only 5.3% population using clean fuel for cooking (including electricity and others)[4]. Thus, traditional cooking methods are prevalent across the host country. The use of these traditional inefficient biomass stoves is a significant driver of deforestation. Widespread usage of unsustainably sourced, non-renewable biomass (NRB) for cooking results in equivalent GHG emissions attributed to use of non-renewable biomass.

Additionally, the use of solid biomass fuels (e.g., wood) in inefficient traditional stoves and/or open fires releases large amounts of particulate matter (PM), creating hazardous levels of indoor air pollution (IAP). IAP generated by inefficient and poorly ventilated stoves burning biomass fuels is responsible for the deaths of an estimated 3.2 million people annually. Almost half of these deaths occur among children under five years of age. Exposure is high among women and children, who spend the most time near the domestic hearth. Reliance on polluting fuels and technologies also requires significant time for cooking on an inefficient device and gathering and preparing fuel. In developing countries with high mortality rates overall, indoor air pollution ranks fourth in terms of the risk factors that contribute to disease and death (World Health Organization)[5].

Technology/Measure

The ICS disseminated under the project is designed to improve fuel combustion and heat transfer. It results in the reduction of fuel consumption and improvement in levels of Indoor air pollution for project users (reducing smoke, black soot, and particulate matter (PM)). The reduction in

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[2] Charcoal and Wood Biomass Utilization in Uganda: The Socioeconomic and Environmental Dynamics and Implications, Sustainability 2020, MDPI

[3] https://www.seforall.org/system/files/2019-12/Taking-Pulse-Uganda_0.pdf, page 105

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

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

consumption of cooking fuel also reduces greenhouse gas (GHG) emissions attributed to the use of non-renewable biomass.

The project activity includes dissemination of Burn Kunikoa (Firewood) and Burn Jikokoa (Charcoal) ICS[6]. Specification of these example ICS is given below:

Stove Model	Burn Kunikoa (Firewood ICS)	Burn Jikokoa (Charcoal ICS)
Photo	Figure 1 Burn Kunikoa Stove	Figure 2 Burn Jikokoa Stove
Thermal Efficiency	43.4%	53.7%
Estimated Life[7]	7 Years	7 Years
Weight	3.80 kg	5.18 kg
Fixed/Portable	Portable	Portable
Grate/Chimney	Grate	Grate

In the absence of this project activity, the beneficiaries shall cook primarily using traditional inefficient stoves, perpetuating environmental and health degradation.

The project intends to access carbon finance to mitigate one of the main barriers (price) for end users towards adopting clean cookstoves.

Management Plan and Operational Framework: The project will be implemented according to the following plan:

1. The PP is responsible for general management of the project, including appointing all personnel / groups of personnel involved in the project development and implementation.

2. The distribution of the ICS will be managed via PP's own distribution network or with local distribution partners.

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[6] Stoves are sold based on potential customer demands and preferences. Other models may be included in the Project subsequently, provided they meet the methodological requirement.

[7] In case of estimated life of project devices is less than the crediting period (7 years renewable twice), then either these devices will be replaced after the end of their expected lifetime span or otherwise, emission reductions will be claimed only till the end-of-life span of the project devices.

3. The PP shall communicate the project beneficiaries during distribution that PP retains exclusive and unconditional rights to the carbon credit generated by project ICS.

4. The PP shall maintain and update the ICS distribution database continuously. The required data collection includes, but is not limited to, the following.

   (a) Date of distribution

   (b) Geographic area of distribution

   (c) Model/type of project ICS distributed.

   (d) Quantity of project ICS distributed.

   (e) Name of the beneficiary, address, and telephone number (if available)

   (f) Unique serial number for each project ICS

   (g) Primary Baseline fuel / technology being used.

5. The information collected will be stored in a database which will serve as the project database for ex-post project sampling and monitoring purposes. Also, this shall serve to avoid any double counting and duplicity of data.

6. The PP will coordinate ex-post monitoring activities as follows:

   a) Implement the monitoring plan,

   b) Determine the sample size as per sampling plan and identify the samples to be monitored (the sampling plan is detailed below)

   c) Ex-post monitoring - the data will be collected using survey questionnaires designed by experts. The surveys will be carried out by external parties or by project implementer teams experience / trained to conduct such surveys. PP will be responsible for ensuring that staff responsible for monitoring and reporting have received adequate training, as applicable.

   d) Ensure the quality of monitoring data (QA/QC) as per section 5.2 below. The monitoring results and statistical robustness will be reviewed internally and approved by competent staff.

   e) Use the data collected for emissions reduction calculations.

The aforesaid plan shall ensure that the project is managed and operated in a standard manner.

1.12 Project Location

Host Country: Uganda

Region/State/Province etc.: All regions of Uganda

City/Town/Community etc.: All cities and towns in Uganda

Physical/Geographical location:

The project location will be the geographical boundary of the Republic of Uganda. Uganda lies between 04°14' N and 01° 29' S latitude and between 35°02' E and 29° 34' E longitude and has a land area of 236,040 sq. km, one of the largest in Africa[8].

The map of Uganda, for reference purpose, is as follows:

Figure 3: Map of Uganda[9]

1.13 Conditions Prior to Project Initiation

The conditions prior to project initiation are the continued use of non-renewable biomass in traditional/inefficient baseline stoves by the target population to meet equivalent thermal energy needs as provided by project cookstoves in absence of project activity.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

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

1.15 Participation under Other GHG Programs

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

The project activity has not been registered, nor is it seeking registration under any other GHG program.

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[8] https://worldpopulationreview.com/countries/uganda/location

[9] https://www.nationsonline.org/

1.15.2 Projects Rejected by Other GHG Programs

The project activity 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 activity is a voluntary initiative, and it is not to meet any local laws or regulatory compliances. An undertaking has been submitted that PP shall not claim for GHG emission reduction credits for the given crediting period under any other emission-trading program or GHG binding limits.

1.16.2 Other Forms of Environmental Credit

An undertaking has been submitted that PP shall not claim other form of environmental credit for the concerned crediting period under any other emission-trading program.

Supply Chain (Scope 3) Emissions

This is not applicable, as scope 3 emissions are already deemed accounted in leakage emissions. This has been already informed to all the stakeholders involved (including end-users, distributors, retailers etc.) by end-user agreement and signed declaration between PP and distributor to avoid double counting.

1.17 Sustainable Development Contributions

Uganda is one of the United Nations member states that has committed to achieve Sustainable Development Goals. The project contributes to social, environmental, and economic benefits which contribute to sustainable development of the local environment and the country.

The project contributions to the relevant SDGs are discussed below:

SDG	Project Contributions - Justification	Relevant SDG Target	SDG Impact Indicator
1 - No Poverty	**Economic Sustainability:** Household expenditures on purchased cooking fuel will get reduced with usage of project ICS owing to its increased efficiency. Thus, project ICS shall result in money savings in beneficiary households. The project will distribute ICS and will lead to providing access to	1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural	1.4.1 Proportion of population living in households with access to basic services. **Indicator:** Average household savings due to decrease in expenditure on basic services such as purchased fuel after

	basic services to the beneficiary households.	resources, appropriate new technology and financial services, including microfinance	shifting to project technology.
3 - Good Health and Well Being	**Social Sustainability:** The indoor pollutants emissions attributed to inefficient burning of solid biomass fuels in the beneficiary households will be reduced. The project ICS shall aid improved combustion of solid biomass fuel thereby reducing smoke and Particulate matter (PM) emissions. The project will free the beneficiary households from exposure to smoke / PM associated with traditional cooking.	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	3.9.1 - Mortality rate attributed to household and ambient air pollution. **Indicator:** % users reporting reduction in smoke/PM after shifting to ICS in project.
4 - Quality Education	**Social Sustainability-** The project activity is targeting to provide formal and non-formal education and training to local people under the project activity. In this project activity, the local distribution team will be trained on improved cookstoves and the end-user HHs will trained about sustainable cooking practices.	4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational, and tertiary education, including university.	4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by gender. **Indicator:** Number of people receiving formal and non-formal education and training.
5 - Gender Equality	**Social Sustainability:** The project ICS shall save time in cooking activities (by faster cooking) as well as save time in fuel procurement (reduced collection time or reduced fuel purchase trips to market) due to reduced fuel consumption. This shall save time spent by the women involved in these activities (unpaid work) to be	5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.	5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age and location. **Indicator:** The average time saving associated with cooking and fuel collection time due to adoption of project technology / measures.

	utilized in the same in more productive and income generating tasks. The project will lead to helping beneficiary households in saving time in cooking activities (by faster cooking) as well as fuel procurement (reduced collection time or reduced fuel purchase trips to market).		
7 - Affordable and Clean Energy	**Social, Economic Sustainability:** The project activity by distributing ICS will provide access to clean cooking with primary reliance on clean fuels and technology. The project ICS will be made available free of cost to beneficiary households. The project will lead to project households getting access to clean cookstoves (ICS) by the end of its lifetime.	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. **Indicator:** 1. Number of Beneficiaries under the project i.e., Number of ICS distributed under the project. 2. % Users reporting operational project stove.
8 - Decent Work and Economic Growth	**Economic Sustainability:** The project will create local employment opportunities in operational and management roles, as well as in manufacturing, distribution and logistics.	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 employees, by sex, age, occupation and persons with disabilities **Indicator:** Number of male / female employment created by project.
13 - Climate Action	**Environmental Sustainability:** The project by replacing the inefficient traditional stove with the energy-efficient ICS will reduce GHG emissions.	13.2 Integrate climate change measures into national policies, strategies, and planning.	13.2.2 Total greenhouse gas emissions per year **Indicator:** Amount of CO_2e emissions avoided or sequestered.
15 - Life on Land	**Environmental Sustainability:** The project will help reduce the use of non-renewable biomass from forests, thus assist in conserving existing forest stock and the protection of natural forest eco-systems and wildlife habitats.	15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase	15.2.1 Progress towards sustainable forest management. **Indicator:** Total non-renewable wood fuel saved after shifting to project device.

		afforestation and reforestation globally.	

1.18   Additional Information Relevant to the Project

Leakage Management

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

Commercially Sensitive Information

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

Further Information

Not Applicable.

2   SAFEGUARDS

2.1   No Net Harm

No potential negative socio-economic impacts are generated by the projects. Some of the Mitigation measures for social and environmental impacts are listed in the table below:

Requirement Description	Relevance (Yes/Potentially/No)	How the Project will Achieve Requirements	Mitigation Measures (if required)
1. Human Rights			
1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights	Yes	The Project activity and PP both respect human rights and are not complicit in violence or human rights abuses.	Not Applicable
2. The Project shall not discriminate with regards to participation and inclusion	Yes	The Project activity does not discriminate with regards to participation and inclusion	Not Applicable
2. Gender Equity			
1. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality	Yes	1. The primary beneficiaries of the Project activity, include domestic households, where	Not Applicable

and/or the situation of women

a. Sexual harassment and/or any forms of violence against women – address the multiple risks of gender-based violence, including sexual exploitation or human trafficking.

b. Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls.

c. Restriction of women's rights or access to resources (natural or economic).

d. Recognise women's ownership rights regardless of marital status – adopt project measures where possible to support to women's access to inherit and own land, homes, and other assets or natural resources.

2. Projects shall apply the principles of non-discrimination, equal treatment, and equal pay for equal work

a. Where appropriate for the implementation of the project, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities.

b. Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status.

c. Ensure that these conditions do not limit the access of women or

women usually serve as primary cook. Thus, ICSs shall contribute towards Gender equality by freeing the women from the drudgery of fuel collection and cooking. The time saved in these activities would also help them to conduct other more productive /income generation activities. This would further contribute towards Gender Equality.

2. PP does not discriminate on the basis on gender and promotes equal work for equal pay. PP further confirms that the average wages / remunerations paid to the employees working with PP is at / above par with the industry standards and in compliance with the minimum wage rate prescribed by the state / local government regulations.

3. The project complies with National Women Development & Gender Policy and does not limit women access to or control of resources, entitlements, and benefits. On the contrary, the PA ameliorates the living condition of women by freeing them from the burden of biomass fuel collection, decreasing smoke levels and incidence of respiratory illness relative to cooking on traditional biomass

men, as the case may be, to Project activity participation and benefits.		stoves using solid biomass fuel.	
3. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks		4. Not Required	
4. (Where required) Summary of opinions and recommendations of an Expert Stakeholder(s)			

3. Community Health, Safety and Working Conditions

1. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community	Yes	The Project activity reduces exposure to indoor air pollutants and smoke levels, further reducing incidence of respiratory illness compared to cooking on traditional biomass stoves using solid biomass fuel.	

4.1 Sites of Cultural and Historical Heritage

1. Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional, or religious values or intangible forms of culture?	No, the ICSs are installed in the kitchen of beneficiary households. The ICSs do not interfere with any sites, structures, or objects with historical, cultural, artistic, traditional, or religious values or intangible forms of culture	Requirements do not apply	Not Applicable

4.2 Forced Eviction and Displacement

1. Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?	No, the project ICS are installed in the kitchens of the household and hence any possibilities of forced eviction/physical relocation of people due to the project is not applicable. The PP collaborates with the local entrepreneurs for fabrication as well as installation of project ICS thereby empowering them economically	Requirements do not apply	Not Applicable

	rather than relocation / threat.		
4.3 Land Tenure and Other Rights			
1. Does the Project require any change, or have any uncertainties related to land tenure arrangements and/or access rights, usage rights or land ownership? 2. For Projects involving land use tenure, are there any uncertainties with regards to land tenure, access rights, usage rights or land ownership?	No, refer justification for 4.1,4.2 above.	Requirements do not apply	Not Applicable
4.4 Native People			
1. Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?	No, the project does not involve any land/territory claim. The ICS are installed in the project beneficiary households at their discretion.	Requirements do not apply	Not Applicable
5. Corruption			
1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects	Yes	The PP does not promote / or is complicit in direct or indirect corruption.	Not Applicable
6.1 Labour Rights			

1. The Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles and standards embodied in the ILO fundamental conventions
2. Workers shall be able to establish and join labour organisations
3. Working agreements with all individual workers shall be documented and implemented and include:
  a. Working hours (must not exceed 48 hours per week on a regular basis), AND
  b. Duties and tasks, AND
  c. Remuneration (must include provision for payment of overtime), AND
		1. The Project activity does not involve any forced labour and the PP ensures that all employment is in compliance with local labour regulations and laws.
		2. The PP puts no constraints / limitations on employees to form a union.
		3. The CME/PI's policies (i.e. "Safeguarding Policy", "Inclusivity, Non-discrimination & Harassment Policy", "Child Labour Policy", "Code of Business Ethics Policy", "Anti-Corruption policy", etc. and employment contracts are compliant with the requirement	

d. Modalities on health insurance, AND e. Modalities on termination of the contract with provision for voluntary resignation by employee, AND f. Provision for annual leave of not less than 10 days per year, not including sick and casual leave. 4. No child labour is allowed (Exceptions for children working on their families' property requires an <u>Expert Stakeholder</u> opinion) 5. The Project Developer shall ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures		4. The PP does not promote / or is complicit in child labour 5. No, Major occupational hazards are envisaged during the operation of the project activity.	
6.2 Negative Economic Outcomes			
1. Does the project cause negative economic consequences during and after project implementation?	No, the project will rather contribute to money and time saving because of the reduced fuel consumption. Therefore, the economic outcomes are expected to be positive.	Requirements do not apply	Not Applicable
7.1 Emissions			
1. Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No, the project shall reduce GHG emission by virtue of the increased efficiency of the ICS.	Requirements do not apply	Not Applicable
7.2 Energy Resource			
1. 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) that provides for other local users?	No, the project does not use or intervene with the fuel type used in baseline scenario. In fact, the project minimizes the consumption and thereby reduces the emission by virtue of the increased efficiency of the ICS.	Requirements do not apply	Not Applicable
8.1 Impact on Natural Water Patterns/Flows			
1. Will the Project affect the natural or pre-existing	No, the by-products (ash and smoke) of the	Requirements do not apply	Not Applicable

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?	project cookstoves operation are same as baseline scenario since there is no fuel change. This rule out any additional potential impact on natural or pre-existing pattern of watercourses, groundwater and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?		
8.2 Erosion and/or Water Body Instability			
1. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? 2. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?	No, The Project activity shall result in reduction in demand of biomass fuel in the region putting less pressure on forests for deforestation and will hence indirectly avoid erosion associated with tree cutting/ felling.	Requirements do not apply	Not Applicable
9.1 Landscape Modification and Soil			
1. Does the Project involve the use of land and soil for production of crops or other products?	No, project ICSs shall be installed in the kitchen/cooking area of the beneficiary.	Requirements do not apply	Not Applicable
9.2 Vulnerability to Natural Disaster			
1. Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought, or other extreme climatic conditions?	No such consequences are envisaged.	Requirements do not apply	Not Applicable
9.3 Genetic Resources			
1. Could the Project be negatively impacted by or involve genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development, or take place in facilities or farms that include GMOs in their processes and production)?	No, the project intervenes only with design of the baseline stoves. It does not carry out any change in baseline fuel or that may add additional pollutant to in the air.	Requirements do not apply	Not Applicable
9.4 Release of pollutants			

1.	Could the Project potentially result in the release of pollutants to the environment?	No, the project intervenes only with design of the baseline stoves. It does not carry out any change in baseline fuel or that may add additional pollutant to in the air.	Requirements do not apply	Not Applicable
9.5 Hazardous and Non-hazardous Waste				
1.	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 manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	Requirements do not apply	Not Applicable
9.6 Pesticides & Fertilisers				
1.	Will the Project involve the application of pesticides and/or fertilisers?	No, the Project does not involve the application of pesticides and/or fertilisers	Requirements do not apply	Not Applicable
9.7 Harvesting of Forests				
1.	Will the Project involve the harvesting of forests?	No, The Project activity does not involve harvesting of forests. The Project shall result in reduction in demand of biomass fuel in the region putting less pressure on forests for deforestation and will hence indirectly avoid erosion associated with tree cutting/ felling.	Requirements do not apply	Not Applicable
9.8 Food				
1.	Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No, the project does not intervene with the baseline food or other edible items.	Requirements do not apply	Not Applicable
9.9 Animal Raising				
1.	Will the Project involve animal husbandry?	No, the project will not involve animal husbandry	Requirements do not apply	Not Applicable
9.10 High Conservation Value Areas and Critical Habitation				
1.	Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No, the ICS are going to decrease the baseline emission level solely due to improvements done on the key design element of the baseline stove. It does not involve change in baseline fuel or any	Requirements do not apply	Not Applicable

	other major interventions that may add additional pollutant to in the air. Thus, the project does not affect or alter the largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified.		
9.11 Threatened Species			
Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)? and/or Does the Project potentially impact other areas where endangered species may be present through transboundary effects?	No, the ICS are going to decrease the baseline emission level solely due to improvements done on the key design element of the baseline stove. It does not involve change in baseline fuel or does any other major interventions that may add additional pollutant to in the air. Therefore, the project implementation does not pose any threat to the endangered species prevalent in that area.	Requirements do not apply	Not Applicable

2.2   Local Stakeholder Consultation

The local stakeholder consultation (LSC) meeting for "D. LIGHT'S IMPROVED COOKING PROJECT IN UGANDA" is scheduled to be held on 2nd March 2023 and this shall be updated after the local stakeholder consultation meeting.

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

This shall be updated after closure of the public consultation period.

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, Version 1.1 dated 22 July 2021,

https://verra.org/wp-content/uploads/2021/07/VMR0006-Methodology-for-Installation-of-High-Efficiency-Firewood-Cookstoves-v1.1.pdf

For calculation of fraction of non-renewable biomass, the below tool is used "TOOL30: Calculation of the fraction of non-renewable biomass", *https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v3.0.pdf*

3.2 Applicability of Methodology

The applicability of VMR0006 methodology is justified as below:

Applicability criterion	Project Activity Applicability
Project activities shall be implemented in domestic premises, or in community-based kitchens	The proposed project involves deployment of ICS in domestic households and communities in Uganda.
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;	ICS planned to be distributed under the project are energy efficiency cookstove using woody biomass as fuel and have an efficiency more than 25%.
Both 'Projects' and 'Large Projects' can use this methodology	The proposed project is a large-scale project as the annual emission reduction is more than 300,000 tonnes of CO2e per year which is in line with the section 3.9.1 of VCS standard version 4.3.
Non-renewable biomass has been used in the project region since 31 December 1989, using	Non-renewable biomass has been in use since 31 December 1989 as evidenced by various FAO statistical data given below.
		Area (1000 hectares)

FRA 2020 categories[10]	1990	2000	2010	2020
Forest	3,575.47	3,162.95	2,750.42	2,337.90
Other wooded land	3,393.88	3,400.82	3,719.91	3,234.32
Other land	13,082.65	13,488.23	13,581.67	14,479.78
Total Land	20,052.00	20,052.00	20,052.00	20,052.00

survey methods or referring to published literature, official reports, or statistics

Uganda lost an average of 41,252 hectares of forest per year with average annual deforestation rate of 1.154% between 1990 and 2020. In total, Uganda lost 34.61% of its forest or 1,237,470 hectares.

For the specific case of biomass residues processed as a fuel (e.g., briquettes, wood chips), it shall be demonstrated that:

1. It is produced using exclusively renewable biomass (more than one type of biomass may be used).

2. The consumption of the fuel should be monitored during the crediting period and

3. 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

In the case where processed biomass residues are used in the project, the following will be ensured:

1. It is renewable biomass.

2. Its consumption will be monitored.

3. If renewable biomass processing (e.g., shredding and compacting in the case of briquetting) occurs in project case, the energy consumption for manufacturing and transportation of renewal biomass fuel (briquettes) will be monitored to calculate project emissions.

[10] https://www.fao.org/3/cb0037en/cb0037en.pdf

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The VCS PD 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).	The ICS installation database will have the following provisions to confirm complete avoidance of double counting: 1. Unique serial number of ICS distributed 2. End users' details (End username, address, and/or telephone number (if available))
The VCS PD 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.	At the time of ICS distribution, each ICS beneficiary transfers the rights of credit ownership to PP via an agreement or disclaimed via clear statement on the product packing or warranty card thereby avoiding any subsequent double claim on ownership of credits by other entities.

The applicability of tool 30 is justified as below:

| Applicability criterion	Project Activity Applicability
This tool may be used by: a) DNAs to submit region/country-specific default fNRB values, following the procedures for development, revision, clarification, and update of standardized baselines (SB procedures); or b) project participants to calculate project or PoA-specific fNRB values.	This tool is used by the project participants to calculate a project specific value for fNRB under option (b) of applicability condition 1.
For project or PoA specific fNRB values, project participants shall assess the area where biomass is sourced for end-users included in the project activity and justify the selection of the area in project design documents.	The area for the calculated value is selected within the geographical boundary of Project.

3.3 Project Boundary

As per the applied methodology, the project boundary is the physical and geographical location of all equipment and systems affected by the project activity. As the activity involves distribution

of ICS (Improved Cookstove), the project boundary is the physical, geographical location of each household where the ICS (Improved Cookstove) is distributed to replace the traditional stove.

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

A representation of baseline and project boundary are given as below:
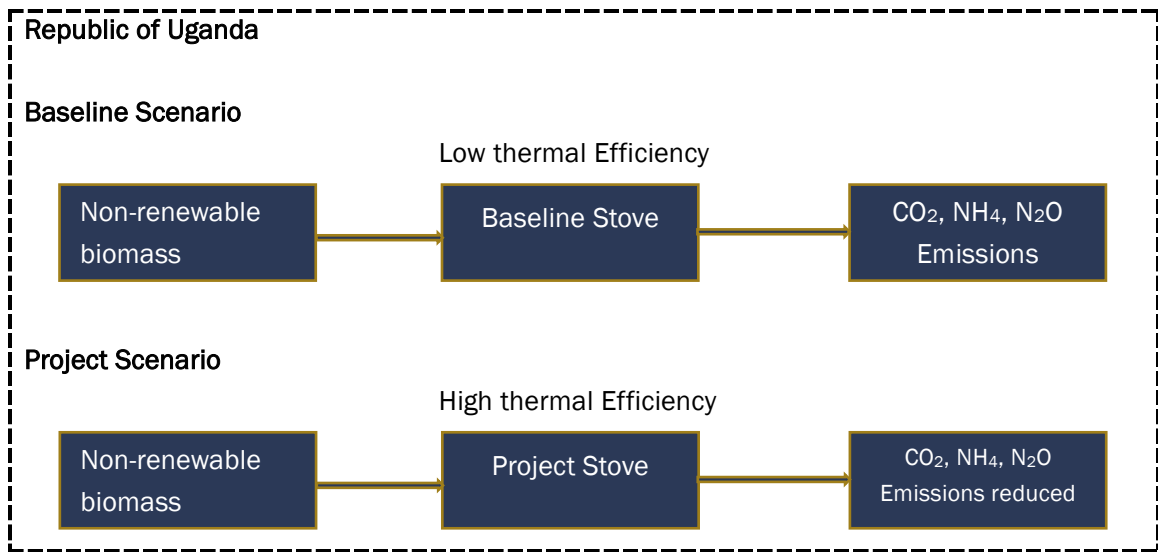
3.4 Baseline Scenario

As per methodology, "The baseline scenario is the continued use of non-renewable wood fuel (firewood/charcoal) or fossil fuel (coal/kerosene) by the target population to meet similar thermal energy needs as provided by project cook stoves in absence of project activity."

3.5 Additionality

Step 1: Regulatory Surplus

The proposed project is a voluntary coordinated action by D. light, and there is no mandated government programme or policy in the host country of this project ensuring the distribution of domestic fuel-efficient cookstoves. The project 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 (refer section 1.14 above).

Step 2: Positive List

Under the proposed project, project ICS shall be distributed at a subsidized price to end users. Although some revenue will be generated from the distribution of ICS, it is relatively small compared to the total cost to CME for delivering ICS to a beneficiary (including product cost, distribution and logistics cost, data collection cost etc.). Thus, the project activity is not financially viable without the support of carbon revenues from sale of VCUs and are additional.

3.6 Methodology Deviations

The project does not involve any methodological deviations.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 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 4.4.

4.2 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 4.4.

4.3 Leakage

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

4.4 Net GHG Emission Reductions and Removals

As per applicable methodology, formula to calculate emission reduction (ERs) is:

$$ER_y = \sum_i \sum_j ER_{y,i,j} \tag{1}$$

Where:

i Indices for the situation where more than one type/model of improved cook stove is introduced to replace the baseline stove

j Indices for the situation where there is more than one batch of improved cook stove of type i

ER_y Emission reductions during year y in t CO_2e

$ER_{y,i,j}$ = Emission reductions by improved cook stove of type i and batch j during year y in t CO_2e

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

Where:

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

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

$NCV_{wood\ fuel}$ Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonne)

$EF_{wf,CO2}$ CO_2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO_2/TJ)

$EF_{wf,non\ CO2}$ Non-CO_2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO_2/TJ)

$N_{y,i,j}$ Number of improved cook stoves 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 improved cookstoves to be estimated using equation below:

$$B_{y,savings,i,j} = B_{y=1,new,i,survey} \times \left(\frac{\eta_{new,y,i,j}}{\eta_{old}} - 1 \right)$$
(4)

Where:

$B_{y=1,new,i,survey}$ Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i and batch j, determined in the first year of the implementation of the project through a sample survey.

η_{old} Efficiency of baseline cookstove

$\eta_{new,i,y}$ Efficiency of the improved cook stove type i and batch j determined through water boiling test (WBT). efficiency may be determined using Equation 5.

$$\eta_{new,i,y} = \eta_p \times (DF_n)^{y-1} \times 0.94$$
(5)

Where:

η_p Efficiency of project stove (fraction) at the start of project activity

$(DF_n)^{y-1}$ 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, a default value of 0.99 efficiency loss per year can be considered.

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

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)
2023	310,164	0	0	310,164
2024	545,698	0	0	545,698
2025	521,658	0	0	521,658
2026	498,196	0	0	498,196
2027	475,306	0	0	475,306
2028	452,978	0	0	452,978
2029	431,204	0	0	431,204
Total	3,235,203	0	0	3,235,203

5 MONITORING

5.1 Data and Parameters Available at Validation

The following parameters are fixed for the entire crediting period using default values as per the methodology:

$\eta_{new,i,j}$ Fixed ex-ante using default discount factor as per methodology in equation (5)

η_{old} Fixed ex-ante using default values as per the methodology.

$NCV_{biomass}$ Fixed ex-ante using default values as per the methodology.

Data / Parameter	η_p
Data unit	Fraction
Description	Efficiency of project stove at the start of project activity

Source of data	Manufacturer's specification
Value applied	0.434 for Burn's Kunikoa(firewood) 0.537 for Burn's Jikokoa(charcoal)
Justification of choice of data or description of measurement methods and procedures applied	As per the specification sheet provided by the manufacturer
Purpose of Data	Calculation of baseline emissions
Comments	In case of inclusion of other/new models, during project lifetime, corresponding thermal efficiency values shall be used for ER calculations

Data / Parameter	f_{NRB}
Data unit	Fraction
Description	Fraction of woody biomass that can be established as non-renewable biomass
Source of data	Calculated
Value applied	0.9062
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per the "TOOL30: Calculation of the fraction of non-renewable biomass"
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	$NCV_{wood\ fuel}$
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass
Source of data	Default value (VMR0006 ver. 1.1, page 10)
Value applied	0.0156
Justification of choice of data or description of measurement methods and procedures applied	IPCC default for wood fuel, based on the gross weight of the wood that is 'air-dried', may be used if fuel used in the project device is woody biomass/renewable biomass.
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	$EF_{wf,CO2}$
Data unit	tCO_2/TJ

Description	CO$_2$ Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass
Source of data	Default value (VMR0006 ver. 1.1, page 10)
Value applied	112
Justification of choice of data or description of measurement methods and procedures applied	IPCC default value for wood fuel
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	$EF_{wf,non\,CO2}$
Data unit	tCO$_2$/TJ
Description	CO$_2$ Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass
Source of data	Default value (VMR0006 ver. 1.1, page 10)
Value applied	26.23
Justification of choice of data or description of measurement methods and procedures applied	IPCC default value for wood fuel
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	η_{old}
Data unit	Fraction
Description	Efficiency of baseline cookstove
Source of data	Default value
Value applied	0.10 for Firewood 0.20 for Charcoal
Justification of choice of data or description of measurement methods and procedures applied	A default value of 0.1 shall be used if the baseline device is a three-stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is, without a grate or a chimney. A default value of 0.2 shall be used for other types of devices. Further as per the methodology, this value has been fixed for each household that receives project ICS, during the project crediting period
Purpose of Data	Calculation of baseline emissions

Comments	To be updated at renewal of crediting period

Data / Parameter	DF_n
Data unit	Fraction
Description	Discount factor to account for efficiency loss of project cookstove per year of operation (fraction).
Source of data	Default value
Value applied	0.99
Justification of choice of data or description of measurement methods and procedures applied	As per the applied methodology
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	$\eta_{new,i,j}$
Data unit	Percentage
Description	Efficiency of the device of each type i and batch j implemented as part of the project activity
Source of data	Calculation
Value applied	As per equation (5) above the applicable efficiency of two example ICS models[11] to be used in Ex-post ER calculations is as follows:

Age of stove	Burn Kuniokoa (firewood)	Burn Jikokoa (charcoal)
0-1 year	40.8%	50.5%
1-2 year	40.4%	50.0%
2-3 year	40.0%	49.5%
3-4 year	39.6%	49.0%
4-5 year	39.2%	48.5%
5-6 year	38.8%	48.0%
6-7 year	38.4%	47.5%

Justification of choice of data or description of measurement methods and procedures applied	To adopt Option V given in the methodology: "Efficiency of the improved cookstoves to be estimated using equation 5 of applied approved methodology where loss in efficiency per year is calculated, and therefore this parameter does not need to be monitored"
Purpose of Data	Calculation of baseline emissions

[11]In case the project involves ICS models other than the one listed above; its corresponding thermal efficiency value calculated in accordance with equation (5) shall be used.

Comments	In case of inclusion of other/new models, during the project lifetime, corresponding thermal efficiency values shall be used for Ex-post ER calculations.

5.2   Data and Parameters Monitored

The following parameters as per section 9.2 of the methodology are deemed not applicable:

$\eta_{new,i,j}$ Fixed ex-ante using default discount factor as per methodology in equation (5)

η_{old} Fixed ex-ante using default values as per the methodology

B_{old} Applicable only in case of use of equation (3)

$B_{renewable,y}$ Applicable only in case of use of equation (7)

$\eta_{PJ,BL}$ Applicable only in case of use of equation (7)

$NCV_{biomass}$ Fixed ex-ante using default values as per the methodology

Data / Parameter	Ny,i,j
Data unit	Number
Description	Number of project devices of type i and batch j operating during year y
Source of data	Installation database and monitoring survey
Description of measurement methods and procedures to be applied	CME shall maintain a database of all ICS distributed. The usage rate of installed ICS shall be measured based on a representative sample. CDM Sampling standard shall be used for determining the sample size to achieve 90/10 confidence precision according to the latest version of CDM Standard for sampling and surveys for project activities and programme of activities. Alternatively, the simplified approach proposed in option (b), page 12 under Section 8.4 of the methodology may be used for determining the minimum sample size in which case compliance with 90/10 confidence precision is not obligatory.
Frequency of monitoring/recording	At least once every two years
Value applied	120,000
Monitoring equipment	Sampling based Monitoring survey
QA/QC procedures to be applied	In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of ICS
Purpose of data	Calculation of emission reductions
Calculation method	The results from sample-based monitoring will be used to calculate N y,i,j as follows

	$N_{y,i,j} = (n_{i,j,operational} / n_{i,j,total}) * N_{y,i,j,distributed}$ Where: N = number of stoves n = number of samples
Comments	During the stove distribution, the presence of existing project ICS, if any, shall be monitored and in case an existing project ICS is found in the same household, the subsequent (second) ICS will not be included in the ER calculations. Alternatively, the presence of multiple project ICS in a household may be determined ex-post during sampling surveys and the total ICS population shall be discounted by the fraction of sampled households found using more than one project ICS.

Data / Parameter	$B_{y=1,new,i,j,survey}$
Data unit	tonnes/device/year
Description	Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type I and batch j, determined in the first year of the implementation of the project through a sample survey
Source of data	Monitoring survey
Description of measurement methods and procedures to be applied	Minimum sample size of each type i and batch j should be in line with the latest version of Standard for sampling and surveys for CDM project activities and programme of activities or guidelines provided in methodology Section 8.4 option (b). Determined in the first year of the introduction of the devices (e.g. during the first year of the crediting period, y=1) through measurement campaigns at representative households and/or sample survey. Sample surveys to estimate this parameter, that are solely based on questionnaires or interviews (i.e. that do not implement measurement campaigns) may only be used if the following conditions are satisfied. (i) Baseline cookstoves have been completely decommissioned and only improved cookstoves are exclusively used in the project households; (ii) If multiple devices are used in the project; it is possible from the results of the survey questions to clearly differentiate the quantity of woody biomass being used by each device. In other words, if more than one device, or another device that consumes woody biomass, are in use in project households, then the sample survey needs to distinguish the quantity of woody biomass used by the project device and the other devices that use woody biomass
Frequency of monitoring/recording	Determined in the first year of project implementation
Value applied	For ex-ante calculation purpose, the value is assumed as 0.80 tonnes/device/year for firewood 1.95 tonnes/device/year for charcoal

Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	
Purpose of Data	Calculation of baseline emissions
Calculation method	
Comments	

Data / Parameter	Life Span
Data unit	Number of years
Description	Project promoters to state the operating lifetime of the project device for projects opting Equation 5 for determining project stove efficiency
Source of data	Manufacturer's specification
Description of measurement methods and procedures to be applied	The cookstoves will be manufactured to match the fixed design specification. This will ensure that ICS delivered to project households is standardized with respect to the dimensions and performance.
Frequency of monitoring/recording	Once at the time of project stove installation
Value applied	7.0 years
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of data	Calculation of emission reductions
Calculation method	-
Comments	In case of inclusion of other/new models, during project lifetime, corresponding thermal efficiency values shall be used for ER calculations.

Also, the PP shall either replace the ICS after the end of its life with an equivalent device to continue claim credits or otherwise shall cease claiming credits after the rated lifespan. |

5.3 Monitoring Plan

The monitoring plan is based on the applied methodology VMR0006, Version V1.1.

Sampling plan

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 as part of a cross-PA Sampling Plan in line with the requirements of

the methodology applied and the Standard: Sampling and surveys for CDM project activities and programmes of activities, version 9.0

Sample sizes will be sufficient to ensure that the precision of the sample means/proportions are in accordance with the methodological / standard requirements. In cases where survey results indicate that desired precision is not achieved, the lower bound value of the corresponding confidence interval of the parameter value may be used as an alternative to repeating the survey. Alternatively, the survey may be expanded to reach the required confidence/precision, unless option (b) on page 12 of the VMR0006 is used.

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

Sampling Methodology

Sampling Objective – The sampling objective for each parameter is to determine, via sampling survey, a statistically significant parameter value for the emission reduction calculations. These parameters are as listed in section 5.2:

No.	Monitoring Parameters	Sampling Parameters	Parameter type	Monitoring frequency
1	$N_{y,i,j}$	Proportion of operational ICS	Proportion	Biennially
2	$B_{y=1, new,i,j,survey}$	Quantity of woody biomass used by project devices	Mean	First year of project implementation

Field Measurement Objective and data to be collected – As listed in Section 5.2 above

Target population and sampling frame – The target population is the total population served under the project, and the sampling frame consists of aggregated data of end-users of the ICS as recorded in the PA Databases. The sampling frame will be kept for 2 years following the crediting period or the last issuance of the CERs of the project activity.

Sample method – Sampling will be conducted using stratified random sampling techniques[12] over the sampling frame, and detailed calculations are provided below as per CDM guidelines "Sampling and surveys for CDM project activities and programmes of activities" the ICS in the sampling frame shall be stratified by ICS model type *i* (model) and batch *j* (year of installation).

Stratified Random Sampling will be used to select samples from the Project Database for monitoring parameters. Optionally, other sampling approaches may be used in accordance with Standard "Sampling and surveys for CDM project activities and programmes of activities" and Guideline for Sampling and Surveys for CDM Project Activities and Programme of Activities when sampling techniques or statistical analysis necessitates it.

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

The sample size shall be determined using the following formula:

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

Where,

n = number of ICS to be sampled

N = Total number of ICS in the population

Z = Constant referring to level of confidence (1.96 for 95 %, 1.646 for 90%)

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

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

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

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

Where,

g_i = weight of strata i in the population

p_i = expected proportion of strata i in the population

k = total number of strata in the population

To ensure a random stratified sample selection, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its Serial ID number. Each ICS can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of ICS in the Database for that pre-defined stratified sampling frame. Applying the random number generators, the ICS can then be randomly chosen from the defined population up to the required sample size as calculated by the CME.

In the case of parameters monitored for the first time the expected variation for that measure in the sample may be based on results from similar studies, pilot studies, or from the project planner's own knowledge / experience of the data.

The data will be collected using surveys carried out either by external third parties or by project implementer teams. Data collected from the surveys will be compiled into an Excel spreadsheet.

Data obtained from the samples will be used to estimate proportions and mean values for the parameters described above. The values will then be factored into the emissions reduction calculations.

During sampling, there may be non-response from the target population. Over-sampling may be used to avoid non-response; however, sampling may be ceased once required confidence/precision is met.

Alternatively, a simplified approach proposed in option (b) under Section 8.4 of methodology may be used for determining the minimum sample size in which case compliance with required confidence/precision is not obligatory.

The minimum sample size for project cookstove to conduct the usage survey should be:

1.   Project target population < 300: Minimum sample size 30

2.   Project target population 300 to 1000: Minimum sample size 10% of group size

3.   Project target population > 1000: Minimum sample size 100

Refer section 1.11 above for the management plan and operation framework (e.g., responsibilities and competencies of the personnel that will be carrying out monitoring activities, the procedures for internal auditing and QA/QC, etc.).