



CARBONIBUS



IMPROVED COOKSTOVES IN LIBERIA

Document Prepared by



Project Title	IMPROVED COOKSTOVES IN LIBERIA
Version	3.0
Date of Issue	13 July 2023
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1 PROJECT DETAILS

1.1 Summary Description of the Project

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

Traditional cooking methods prevalent across host country households using traditional modes of cooking in the baseline. 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. The project activity intends to access carbon finance to mitigate the main barrier (price) for end users towards adopting clean cookstoves.

Expected Year wise distribution / installation of the project ICS is given below¹:

Year	Proposed Implementation Plan (# ICS)
Year 1	50,000
Year 2	100,000
Year 3	150,000
Year 4	100,000
Year 5	100,000

In the absence of this project activity, households would cook primarily using traditional inefficient stoves the scenario existing prior to the project activity), perpetuating environmental and health degradation.

The average annual GHG emission reduction from the project is estimated to be 1,627,469 tCO₂e and a total of 11,392,289 tCO₂e over the 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

¹ This is tentative/expected plan and may differ from actual implementation which depends upon market demand and user preferences, deemed outside the control of PP. The number of ICS units mentioned is therefore only an indicative number for ex-ante calculations and is non-binding. The number of units implemented may change ex-post, based on types of stoves distributed and user adoption/preference. During the crediting period, more/lesser systems may get distributed owing to customer demand and shall not be deemed a deviation from the project description.

The project is not a grouped project, and it is a large-scale project with multiple project activity instances².

1.3 Project Eligibility

1. The Seven Kyoto Protocol GHGs: The project is applicable to this scope, as project involves emission reduction comes from Kyoto GHGs such as CO₂, CH₄ and N₂O in the baseline.

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

3. Project activities supported by a methodology approved under the VCS program through the methodology development and review process: This project uses a methodology VMR006 version 1.1 which is approved under the VCS program through the methodology development and review process.

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. The project does not involve REDD+.

Additionally, the project activity is not listed in table 1, section 2.1.3 of the VCS standard version 4.4, given it involves installation of improved cooking stoves (ICS) in Liberia.

The proposed project activity envisages distribution of 500,000 ICS in the Liberia and meets compliance with section 2.1.3. of VCS Standard v 4.4).

Compliance with other general requirements are as described below:

Reference to VCS Standard version 4.4	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 3.14.1.	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.
3.1.3	Projects shall apply the latest version of the applicable methodology in all cases unless a grace period applies to the project as set out in 3.21. Projects must update to the latest	The project applies the latest version 1.1 of VCS approved methodology VMR0006. Refer to

² Each ICS unit is deemed as a project activity instance.

	version of the methodology when reassessing the baseline and renewing a crediting period.	section 3 of the PD below for more details.
3.1.4	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.
3.1.5	Where projects apply methodologies that permit the project proponent its own choice of model, such model 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).	Not applicable. The applied methodology VMR0006 version 1.1. does not provide any such option.
3.1.6	Where projects apply methodologies that permit the project proponent to choose a 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.
3.1.7	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.	Not applicable, the methodology does not conflict with any VCS program requirements.
3.1.8	Where projects apply methodologies from approved GHG programs, they shall conform with any specified capacity limits 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 VCS Program rules, the effective dates of these requirements are set out in Appendix 3 of VCS standard ver 4.4 and Effective Dates or equivalent for other program documents, and are listed in a companion Summary of Effective Dates document which corresponds with each update	The project will adhere to the new VCS Program rules, and the effective dates of these requirements set out in Appendix 3 of VCS standard ver 4.4..

1.4 Project Design

The proposed large scale project activity involves distribution of multiple project activity instances (PAI) in Liberia but is not being developed as a grouped project. All PAI (project ICS) shall remain limited to the geographical boundary of Liberia.

Eligibility Criteria

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

1.5 Project Proponent

Organization name	Carbonibus S.r.l
Contact person	Ekaterina Bakal
Title	Head of Sales & Marketing
Address	Via Giacomo Leopardi 26 20123 Milan, Italy
Telephone	+231778441873
Email	info@carbonibus.org

1.6 Other Entities Involved in the Project

Organization name	Envirofit International
Role in the Project	Project Implementer
Contact person	Nathan Lorenz
Title	CTO
Address	19 Old Town Square, Suite 238, Fort Collins, Colorado, 80524, USA
Telephone	+1 9703722874
Email	info@envirofit.org

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 9717093552
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 ICS to the project proponent.

Thus, all VCUs generated from the project instances shall be owned by Carbonibus S.r.l.

1.8 Project Start Date

15 May 2023 (Expected date for installation of 1st ICS under the Project).

1.9 Project Crediting Period

First Crediting Period start date: 15 May 2023

First Crediting Period end date: 14 May 2030

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

The date of first ICS (project activity instance) 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 ₂ e)
Year 1	252,593
Year 2	745,948
Year 3	1,468,467
Year 4	1,927,029
Year 5	2,370,514
Year 6	2,332,624
Year 7	2,295,114
Total estimated ERs	11,392,289
Total number of crediting years	7
Average annual ERs	1,627,469

1.11 Description of the Project Activity

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

Traditional cooking methods prevalent across Liberia, contribute to greenhouse gas (GHG) emissions due to inefficient combustion of unsustainably sourced, non-renewable biomass (NRB) fuel. The use of such fuels in host country is one of the major drivers of deforestation.

In 2021 alone, Liberia lost 128kha of natural forests³, widespread usage of NRB for meeting thermal energy needs reduces the ability of forests to sequester carbon, thereby causing GHG emissions.

In Liberia, 98.0% of households use solid fuel for cooking with firewood being the primary source of solid fuel (54.1% of household use)⁴. There is differential in cooking fuel use in between rural & urban areas of Liberia. The rural households have reported using wood as the primary cooking fuel, being used by 86.8% of households, followed by charcoal being used by 11.9% of households. On the other hand, urban households have reported using charcoal as the primary cooking fuel, being used by 73.6% of households, followed by wood being used by 20.5% of households.

Furthermore, the use of solid biomass fuels (e.g., wood) and charcoal in inefficient traditional stoves and/or open fires releases large amounts of particulate matter (PM), creating hazardous levels of indoor air pollution (IAP). For the year 2019, Liberia has reported 2,714 deaths⁵ that are attributed to Household air pollution from solid fuels. The smoke that emanates from cooking contributes to several chronic illnesses and acute health impacts such as early childhood pneumonia, emphysema, lung cancer, bronchitis, cardiovascular disease, and low birth weight.

These ICS result in a significantly more complete combustion of the fuel and are more efficient in transferring heat from the fuel to the pot. This saves a significant margin of fuel as compared to that consumed in the traditional stoves or three stone fires currently used by the Liberian population. Furthermore, the ICS proposed for distribution are designed not only to increase heat transfer, but also to match traditional utensils and cooking habits.

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

The Activity, by reducing the amount of fuel required for cooking, reduces emissions attributed to the consumption of non-renewable biomass which releases CO₂ and other greenhouse gases into the atmosphere when burned.⁶ By replacing less efficient, traditional stoves and open fires with the Activity ICS, non-renewable biomass consumption is reduced by at least 55%. The reduction in consumption of non-renewable biomass results in equivalent reductions in GHG emissions.

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

³ <https://www.globalforestwatch.org/dashboards/country/LBR>

⁴ Liberia DHS 2019-20 published in April 2021, table 2.4, page 25, link: <https://dhsprogram.com/publications/publication-FR362-DHS-Final-Reports.cfm>

⁵ <https://ourworldindata.org/indoor-air-pollution>

⁶ "Non-renewable biomass means that the extraction of biomass from a land area is not sustainable and that carbon stocks on the land area decrease over time."

air pollution for project users (reducing smoke, black soot, and PM). The reduction in consumption of cooking fuel also reduces GHG emissions attributed to the use of non-renewable biomass.

The project activity includes dissemination of CH2200, CH5300, and M5000 improved stoves⁷. Specification of these example ICS is given below:

Stove Model	CH2200 /EcoSaver Charcoal	CH5300/SuperSaver Charcoal	M5000/SuperSaver Wood
Photo			
Thermal Efficiency	52.4%	56.2%	38.3%
Estimated Life ⁸	7 Years	7 Years	7 Years
Unit Size (h x w x d)	15.4 x 31.3 x 22.9 cm	36.6x31.5x26 cm	28.0 x 26.5 x 26.5 cm
Unit Weight	2.3kg	5.0 kg	4.2 kg
Fixed/Portable	Portable	Portable	Portable
Grate/Chimney	Grate	Grate	Grate

In the absence of this project activity, households would 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. PP will coordinate with different manufacturers to produce ICSs. PP will provide guidelines for manufacturing including material and other specifications, serial identification, and quality standards of the cookstoves.
2. The distribution of the ICS will be managed by through their own distribution network, or with help of local partners.
3. The PP will communicate to the project beneficiaries during distribution to exclusively assign unconditional rights to the carbon credit generated by project ICS to the PP.
4. In line with the operational and management monitoring implementation, the PP will maintain and update the ICS distribution records and database continuously. To facilitate this process, each ICS will be assigned a unique serial number. The required data collection includes, but is not limited to, the following.

⁷ ICS listed are non-exhaustive. ICS distributions are subjected to potential customer demands and preferences. Other ICS models may be included in the PA subsequently, provided they meet the methodological requirements. This shall not be construed as a deviation or change from project description.

⁸ 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.

- (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 replaced
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: Liberia

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

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

Physical/Geographical location:

The boundary of the proposed project activity is determined by the location of the individual households where the ICSs are distributed and is limited to the territorial area of the host country, the Republic of Liberia as shown below. The geographical coordinates of Monrovia, capital of Liberia is 6°18'2.7864" N 10°47'49.7760" W⁹.

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

⁹ <https://www.latlong.net/place/monrovia-liberia-444.html>



Geographical boundary: Liberia

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 similar thermal energy needs as provided by project cookstoves in absence of project activity. As specified in Section 1.11 above, the use of traditional means of cooking is prevalent in Liberia since long and hence project has not been implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction.

The baseline scenario is same as the condition existing prior to the project.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project activity is not mandated by any enforced law, statute, or other regulatory framework.

Regulatory surplus means that the project shall not be mandated by any enforced law, statute, or other regulatory framework. There are no enforced laws, statutes and/or regulatory framework in Liberia that mandate / stipulate the use / distribution of improved biomass stoves. **Thus, the project is a voluntary effort by the project proponent.**

1.15 Participation under Other GHG Programs

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

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

1.15.2 Projects Rejected by Other GHG Programs

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

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The project activity is a voluntary initiative, and it is not to meet any local laws or regulatory compliances. The project does not reduce GHG emissions from activities, that are included

in an emissions trading program or any other mechanism that includes GHG allowance trading.

1.16.2 Other Forms of Environmental Credit

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

Supply Chain (Scope 3) Emissions

This is not applicable since project's GHG emissions reductions or removals do not occur within a supply chain but at the project beneficiary location. Also, the project beneficiary(ies) has assigned unconditional rights to the ownership of credits to Carbonibus precluding anyone other than Carbonibus to claim concerned credits.

1.17 Sustainable Development Contributions

The Liberia 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 be reduced with the use of the ICS as it shall reduce the fuel consumption by virtue of its increased efficiency. Thus, project ICS shall result in money savings in beneficiary households. The project will distribute ICS and will lead to reduction of poverty in the beneficiary households.	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 resources, appropriate new technology and financial services, including microfinance	Project Indicator / Specific Monitoring parameter: Average monthly household savings due to decrease in expenditure on basic services such as purchased fuel after shifting to project technology.
3 - Good Health and Well Being	Social Sustainability: The emission of indoor pollutants from inefficient burning of solid biomass fuels in the beneficiary households will be reduced. The project ICS shall aid improved combustion of fuel thereby reducing	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	Project Indicator / Specific Monitoring parameter: % users reporting reduction in smoke/PM after shifting to ICS in project.

	smoke and Particulate matter (PM) emissions.		
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.	SDG Indicator 4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by gender. Monitoring parameter: 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 purchase trips to market) due to reduced fuel consumption. This shall free the women involved in these activities (unpaid work) and utilize the same in more productive and income generating tasks.	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.	SDG Indicator 5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age and location. Monitoring parameter: The average time saving associated with cooking and fuel collection time due to adoption of project technology / measures.
7 - Affordable and Clean Energy	Social, Economic Sustainability: The project involves installation and dissemination of clean, modern technology for cooking. The project ICS shall be made available free of cost to beneficiary households.	7.1 By 2030, ensure universal access to affordable, reliable, and modern energy services.	SDG Indicator 7.1.2 Proportion of population with primary reliance on clean fuels and technology. Monitoring parameter: 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	8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with	SDG Indicator 8.5.1 Average hourly earnings of employees, by sex, age, occupation, and persons with disabilities

	well as in manufacturing, distribution and logistics.	disabilities, and equal pay for work of equal value.	Monitoring parameter: Number of male / female employment created by project.
12 - Responsible Consumption and Production	Economic, Environmental Sustainability: The usage of project ICS will result in saving of fuel, hence it will result in money savings and will also save the environment by reducing the usage of non-renewable biomass.	12.2 By 2030, achieve the sustainable management and efficient use of natural resources	SDG Indicator 12.2.2 - Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP Monitoring parameter: Average Fuel savings per household per year
13 - Climate Action	Environmental Sustainability: The project will help significantly reduce greenhouse gas emissions over its lifetime.	13.2 Integrate climate change measures into national policies, strategies, and planning.	SDG Indicator 13.2.2 Total greenhouse gas emissions per year Monitoring parameter: Amount of CO ₂ e 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 afforestation and reforestation globally.	SDG Indicator 15.2.1 Progress towards sustainable forest management. Monitoring parameter: Total non-renewable wood fuel saved after shifting to project device.

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 project. The table below outlines various aspects of the project, and helps determine if any negative impacts exist, and its mitigation measures, if required.

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.	No negative impacts, hence, mitigation measures are 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	No negative impacts, hence, mitigation measures are not applicable
2. Gender Equity			
1. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality 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	Yes	1. The primary beneficiaries of the Project activity, include domestic households, where 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	No negative impacts, hence, mitigation measures are not applicable

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 activity, 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 men, as the case may be, to Project activity participation and benefits. 3. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks 4. (Where required) Summary of opinions and recommendations of an Expert Stakeholder(s)		contribute towards Gender Equality. 2. PP does not discriminate on the basis on gender and promotes equal work for equal pay. PP (Carbonibus) further confirms that the average wages / remunerations paid to the employees working with Carbonibus 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	
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		cooking on traditional biomass stoves using solid biomass fuel.	
		4. Not Required	
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	No negative impacts, hence, mitigation measures are 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 rather than relocation / threat.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable

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?	No, refer justification for 4.1,4.2 above.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
2. For Projects involving land use tenure, are there any uncertainties with regards to land tenure, access rights, usage rights or land ownership?			
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	No negative impacts, hence, mitigation measures are 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.	No negative impacts, hence, mitigation measures are 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		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. Workers shall be able to establish and join labour organisations		2. The PP puts no constraints / limitations on employees to form a union.	
3. Working agreements with all individual workers shall be documented and implemented and include:		3. The PP's policies and employment contracts are compliant with the requirement	
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 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. 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.	
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			
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	No negative impacts, hence, mitigation measures are 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	No negative impacts, hence, mitigation measures are 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	No negative impacts, hence, mitigation measures are not applicable
8.1 Impact on Natural Water Patterns/Flows			
1. Will the Project affect the 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?	No, the by-products (ash and smoke) of the 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?	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
8.2 Erosion and/or Water Body Instability			
Will the Project directly or indirectly cause additional erosion or water body instability or disrupt the natural pattern of erosion? Is the Project's area of influence susceptible to excessive erosion 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	No negative impacts, hence, mitigation measures are 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	No negative impacts, hence, mitigation measures are 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	No negative impacts, hence, mitigation measures are 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	No negative impacts, hence, mitigation measures are 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	No negative impacts, hence, mitigation measures are 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	No negative impacts, hence, mitigation measures are 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	No negative impacts, hence, mitigation measures are 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	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable

	of biomass fuel in the region putting less pressure on forests for deforestation and will hence indirectly avoid erosion associated with tree cutting/felling.		
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	No negative impacts, hence, mitigation measures are 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	No negative impacts, hence, mitigation measures are 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 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.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
9.11 Threatened Species			
Are there any endangered species identified as potentially being present	No, the ICS are going to decrease the baseline emission	Requirements do not apply	No negative impacts, hence, mitigation

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?	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.		measures are not applicable
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2.2 Local Stakeholder Consultation

The local stakeholder consultation (LSC) was conducted on 27 February 2023 in Liberia as follows:

Date of LSC	27 February 2023
Time (Local Time)	11:00 am – 2:00 pm
Venue	iCampus (The Wologisi Mountain Hall), Carey Street, Monrovia
Attendance	28 Physical

The stakeholders were invited through various means such as email invitations, newspaper advertisement, invitation letters, phone calls, social media ads, posters advertisement at public places, etc. to maximize the stakeholder's participation and to collect their feedback on the project.

Email invitations were sent to various stakeholders (Local Communities, Government officials, NGOs, local association leaders etc.) during 12/02/2023 - 22/02/2023 along with the non-technical summary of the project and stakeholder feedback form. People were allowed to submit their feedback within 2 weeks from the date of receipt of the email through the feedback form provided. Further follow up mails were also sent to the stakeholders both before and after the event in order to collect their feedback.

The meeting had the presence of all categories of stakeholders targeted, with the sessions being quite productive and engaging. Stakeholders present during the meeting were provided with a non-technical summary of the project and a brief about the project and its components (including costs, risks, and benefits). The representatives of Carbonibus and Climate Secure were also present to address any questions/queries from the participating stakeholders.

During the meeting, important aspects of the proposed project activity were discussed including technology/measure, baseline, grievance mechanism, SDG benefits, transfer of ownership of credits etc. Stakeholder feedbacks were collected via question-and-answer session during the consultation as well as a feedback form designed specifically to collect stakeholder opinion and rating on various aspects of the project.

As a part of on-going communication with local stakeholders, end users were informed about the grievance register which is maintained at the local office locations of the PP. Thus, it was explained during the meeting that end users/stakeholders are free to voice grievances regarding the project activity in the grievance register. Any relevant concern received during operation of project activity, will be addressed according to its merit.



Stakeholder Consultation meeting event (27 February 2023)

In general, the participating stakeholders were appreciative of the initiative taken by Carbonibus and welcomed the project. Stakeholders acknowledged the features of project i.e., the reduction in Indoor air pollution / GHG and employment generation features of the project. No negative comments were raised during the Question session and feedback round.

Question/concerns raised during the physical stakeholder event by the participating stakeholders, and answers provide are given below for reference:

Question/ Concern Raised	Response Provided
What is the start of the delivery time?	The first batch of cookstoves is on the way to Liberia; and plan to start distribution at the in mid of May 2023.
What are the maintenance requirements?	ICSs under the project activity do not require any special treatment. After using it, remove the ash and wipe it with the tissue when cooled. Greasing with some palm oil is recommended to prevent rusting.
Is the Project for Montserrado county only or for the whole of Liberia?	The project activity has targeted to disseminate ICS in all the regions of Liberia.
Who's the actual owner of the cookstoves?	Customers are the sole owner of the cookstoves and Carbonibus owns the carbon credits that are being generated by the usage of ICS. Carbonibus will also be ensuring quality control, monitoring, training, guiding, and providing instructions to local sales and distribution partners. The ICS are provided by Carbonibus at free of cost.

Summary of feedback received via "stakeholder feedback form" during the physical meeting or virtually from invited stakeholders are given below:

1. Stakeholder Feedback - General

S. No.	Question	Summary of Feedback received
1	What are your views on system of waiver of ownership of carbon credits by end users?	The stakeholders acknowledged and expressed no issues on the system of ownership of carbon credit by end-users to Carbonibus.
2	Kindly express your views on the Continuous grievance / feedback mechanism explained above?	The stakeholders expressed that the mechanism of grievance/feedback register to raise any grievances is a standard procedure.
3	What recommendations do you have for monitoring procedures discussed above regarding the SDG indicators?	The stakeholders recommended focusing on data collection to enhance accuracy by building a survey app, acknowledging that statistical data may not be perfect.
4	What recommendations do you have for betterment of the project (improvement in implementation framework, interaction with other initiatives in region etc.)?	The stakeholders recommended Carbonibus to build a commercial stove.
5	Any other comment (technology, geographical spread/location etc.)	The stakeholders expressed their interest in project and stated that they have technology to roll and assemble ICS in Liberia.

2. Local Stakeholder Consultation – Overall Evaluation

Question: What is your impression of the Stakeholder Consultation?	The stakeholders have a positive impression of the stakeholder consultation, considering it as a responsible action by carbonibus, fulfilling, and valuable due to the direct feedback received
Question: What do you like about the project?	Stakeholders like various aspects of the project, including its energy, cost, health, and environmental benefits, the stakeholder consultation process, the project's ability to solve multiple issues, and its positive impact on Liberia.
Question: What do you not like about project?	No significant concerns were raised.

2.3 Environmental Impact

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

2.4 Public Comments

The project was opened for public consultation from 04/04/2023-04/05/2023. No feedback was received during the public comment 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 methodology VMR0006 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 Liberia.
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 the methodology	The proposed project is a large-scale project as the annual emission reduction is more than 300,000 tonnes of CO ₂ e per year which is in line with the section 3.10.1 of VCS standard version 4.4.
Non-renewable biomass has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports, or statistics	According to Global FRA 2020 Report Liberia ¹⁰ , there has been a decrement in the forest area in the Liberia since 1990. Further as per Global Forest Watch (database by World Resources Institute), from 2001 to 2021, Liberia lost 2.05Mha of tree cover, equivalent to a 22% decrease in tree cover since 2000 ¹¹ . This substantiates that non- renewable biomass has been in use in the Liberia since 1989.
For the specific case of biomass residues processed as a fuel (e.g., briquettes, wood chips), it shall be demonstrated that:	The project does not envisage use of processed biomass. In the case where processed biomass residues are used in the project, the following will be ensured: 1. It is renewable biomass

¹⁰ <https://www.fao.org/3/cb0022en/cb0022en.pdf>

¹¹ Global Forest Watch - Liberia

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	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.
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 ensure complete avoidance of double counting: 1. Unique serial number of ICS distributed; and 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

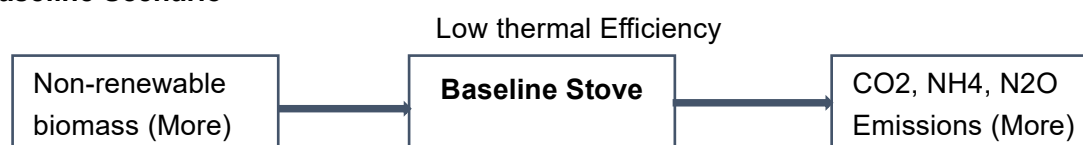
As per methodology, the project boundary is the physical, geographical location of all equipment and systems affected by the project activity. As the activity involves distribution of ICS (Improved Cookstove), the project boundary is the physical, geographical location of each household where the ICS (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 ₂ O	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 ₂ O	Yes	Major Source
		Other	No	No other source identified

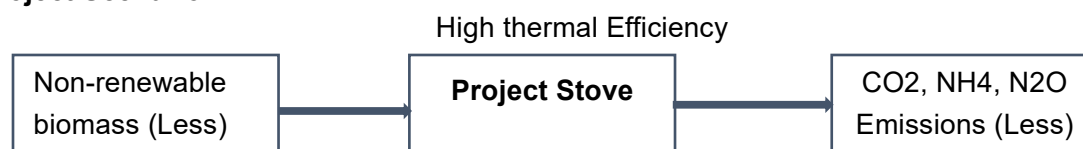
A representation of baseline and project boundary are given as below:

Republic of Liberia

Baseline Scenario



Project Scenario



3.4 Baseline Scenario

As per section 6 of the methodology VMR0006 Ver 1.1, “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.”

Refer section 1.11 above, where data from country statistics is provided to substantiate the assertion that the use of non-renewable wood fuel (such as firewood or charcoal) for traditional cooking methods is prevalent in the host country.

3.5 Additionality

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

Step 1: Regulatory Surplus

The proposed project is a voluntary coordinated action by Carbonibus, and there is no mandated government programme or policy in the host country of this project ensuring the distribution of 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 are being distributed at zero costs to the beneficiary households and is therefore automatically additional.

3.6 Methodology Deviations

The project does not involve any methodology 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 baseline 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:

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

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 CO₂e

$ER_{y,i,j}$ = Emission reductions by improved cook stove of type i and batch j during year y in t CO₂e

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

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:

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

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.

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

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

Ex-ante calculation of emission reduction

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
Year 1	252,593	0	0	252,593
Year 2	745,948	0	0	745,948
Year 3	1,468,467	0	0	1,468,467
Year 4	1,927,029	0	0	1,927,029
Year 5	2,370,514	0	0	2,370,514
Year 6	2,332,624	0	0	2,332,624
Year 7	2,295,114	0	0	2,295,114
Total	11,392,289	0	0	11,392,289

For detailed calculation, refer ex-ante ER calculator.

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	<table> <tr> <th>Stove</th><th>η_p</th></tr> <tr> <td>CH2200/EcoSaver Charcoal</td><td>52.40%</td></tr> <tr> <td>CH5300/SuperSaver Charcoal</td><td>56.20%</td></tr> <tr> <td>M5000/SuperSaver Wood</td><td>38.30%</td></tr> </table>	Stove	η_p	CH2200/EcoSaver Charcoal	52.40%	CH5300/SuperSaver Charcoal	56.20%	M5000/SuperSaver Wood	38.30%
Stove	η_p								
CH2200/EcoSaver Charcoal	52.40%								
CH5300/SuperSaver Charcoal	56.20%								
M5000/SuperSaver Wood	38.30%								
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	0.8835
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.
Purpose of Data	Calculation of baseline emissions
Comments	As per the methodology, this value has been fixed for each household that receives project ICS, during the project crediting period. 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	
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	$\eta_{new,i,j}$
Data unit	Fraction
Description	Efficiency of the device of each type i and batch j implemented as part of the project activity
Source of data	Calculation
Value applied	38.30% for Wood

	54.30% ¹² for Charcoal		
	As per equation (5) of the VMR006 ver 1.1, the applicable efficiency of example ICS model to be used in Ex-post ER calculations is as follows:		
	Age of stove	$\eta_{new, M5000/SuperSaver Wood}$	$\eta_{new, CH2200/EcoSaver Charcoal}$
	0-1 year	36.00%	49.26%
	1-2 year	35.64%	48.76%
	2-3 year	35.29%	48.28%
	3-4 year	34.93%	47.79%
	4-5 year	34.58%	47.32%
	5-6 year	34.24%	46.84%
	6-7 year	33.90%	46.37%
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		
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
$B_{renewable,y}$	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	$N_{y,i,j}$
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	PP 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

¹² A weighted average efficiency value of example ICS has been used for ex-ante calculations only. However, during verification, for ex-post calculations of ERs, the corresponding value of thermal efficiency as per equation (5) above shall be used. In case the project involves ICS models other than those listed above, its corresponding thermal efficiency value calculated in accordance with equation (5) shall be used.

	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	500,000
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 baseline emissions
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 pre-existing project ICS, if any, shall be monitored and in case a pre-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	$B_{y=1,new,i,survey}$
Data unit	tonnes/device/year
Description	Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i, determined in the first year of the implementation of the project through a sample survey
Source of data	Project fuel measurement campaigns/ survey
Description of measurement methods and procedures to be applied	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.
Frequency of monitoring/recording	Determined in the first year of project implementation
Value applied	For ex-ante calculation purpose, the value is assumed as 0.90 tonnes/device/year for Firewood 0.36 tonnes/device/year for Charcoal

Monitoring equipment	weighing scale, moisture meter etc. in case of fuel measurement campaigns
QA/QC procedures to be applied	
Purpose of Data	Calculation of baseline emissions
Calculation method	
Comments	i. Alternatively, 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. 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

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 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	$B_{y=1, new,i,survey}$	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 Project Database. 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 techniques¹³ 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 as per parameter requirements.

Stratified Random Sampling will be used to select samples from the Project Database for monitoring parameters.

The sample size shall be determined using the following formula:

¹³ Other Sampling approaches may be applied during the course of crediting period, in case needed.

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

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 (for proportion parameters):

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

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

Where,

gi = weight of strata i in the population

pi = expected proportion of strata i in the population

k = total number of strata in the population

and where (for mean parameters):

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

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

Where,

gi = weight of strata i in the population

pi = expected proportion of strata i in the population

k = total number of strata in the population

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.

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 PP.

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.

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 for usage survey 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
- Similarly, for fuel measurement campaign, sample sizes may be alternatively determined as per the KPT protocol¹⁴.

Organizational Structure, Role, and Responsibilities of Personnel Involved in the Project Activity

Carbonibus is the PP of the project. Role of entity's involved in the project is given in table below:

Entity	Roles and responsibilities
Project Proponent / Implementer	1. Overall management and development of the project. 2. ICS distribution 3. Establish and maintain a system to collect and store information from end users and to ensure exclusive rights to the carbon credits generated through the use of the project's ICS. 4. Provide after-sales maintenance services, as applicable, to ICS beneficiaries according to the agreed terms and conditions. 5. Provide training to local partners and monitoring staff for capacity building, as required. 6. Develop monitoring protocol/templates for ex-post monitoring. 7. Execute the sampling and monitoring plan. 8. Ex-post monitoring (may be outsourced) of ICS units to measure their performance and usage as per monitoring requirements. 9. Communication with VVB regarding project validation and verifications. 10. Communication with VERRA regarding project registration and issuances.
Local Partners/ Distribution Partners	1. Collect and record information from end users and store distribution data in accordance with the instructions provided by the Project Proponent. 2. Provide support and assistance to the PP in order to accomplish the project's objectives.

¹⁴ <https://cleancooking.org/binary-data/DOCUMENT/file/000/000/604-1.pdf>

	3. Facilitate the execution of agreements with end users, including the transfer of carbon credit rights generated through the use of ICS, to the Project Proponent.
Monitoring Staff/External third party	1. Use competent personnel for monitoring activities. 2. Perform ex-post monitoring in adherence with the monitoring requirements and guidelines. 3. Use appropriate monitoring protocol/templates/survey forms as applicable. 4. Effectively manage monitoring data / records and share with PP.
ICS Manufacturer or Supplier	1. Design and supply ICS to PP as per the specification/standard stated by PP. 2. Provide the stove technical specifications including thermal efficiency to PP.

Procedures for handling non-conformances with Validated Monitoring Plan

The personnel engaged in monitoring and reporting will undergo training to ensure a comprehensive understanding and proper execution of the monitoring and reporting procedures outlined in the monitoring plan. Project Proponent will be responsible to ensure that the staff responsible for monitoring and reporting receive sufficient and adequate training to minimize any deviations from the validated monitoring plan.

Policies for oversight and accountability, Internal Auditing and QA/QC

Quality assurance and quality control (QA/QC) measures will be adhered as described in section 5.2. The monitoring results and statistical reliability will be internally reviewed to mitigate any potential oversights, and the final approval should be granted by competent personnel.