METHODOLOGY ASSESSMENT REPORT FOR ENERGY EFFICIENCY AND FUEL-SWITCH MEASURES IN COOKSTOVES

Document Prepared by Earthood Services Private Limited

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Summary

Verra has contracted Earthood Services Private Limited, a Validating Verifying Body, to conduct the validation assessment for the proposed methodology titled “Energy Efficiency and Fuel-Switch Measures in Cookstoves”, prepared by Atmosphere Alternative. The proposed methodology applies to project activities that deploy improved thermal energy generation units in households, community-based kitchens, institutions (e.g., schools, hospitals), or small and medium-sized enterprises (SMEs), collectively described as the “target population”. Improved thermal energy generation units include cookstoves in households, communities, institutions, or SMEs. The proposed methodology covers a broad set of activities and consolidates elements of existing methodologies currently approved for use within the VCS Program. The proposed Methodology Element belongs to sectoral scope 3 (Energy Demand).

The purpose of validation was to conduct an independent assessment of the proposed methodology titled "Energy Efficiency and Fuel-Switch Measures in Cookstoves" to determine whether it complied with the Verra's requirements/08/09/, including the appropriateness of the Emission Reduction claims and the planned design for their monitoring. The validation's scope included an assessment of the impacts and subjects within project boundary and the advantages to people, prosperity, and the environment that they entail.

Validation was performed using a combination of document review, and interactions with relevant parties. The proposed methodology was evaluated in accordance with Verra’s requirements.

07 clarification requests (CLs) and 02 corrective action requests (CARs) were raised and successfully resolved as findings throughout the validation process. 07 FARs were also raised by Verra for assessment during this assessment- all these findings were raised and resolved. Earthood Services Private Limited audit team's conclusions from the validation process have been closed.

There were no uncertainties identified during the assessment of methodology.

A team composed of technical experts and methodology experts carried out the assessment and referred to the Verra's requirements/08/09/ for the assessment, along with the use of standard auditing techniques, methodological development requirements, tools, guidelines, etc. wherever applicable.

The VVB can confirm that:

- The proposed methodology complies with the Verra's requirements/08/09/;
- The methodology form for its applicable version has been appropriately filled for all relevant sections.
- The application of tools, guidelines, and other applicable document/08/09/ (as mentioned in the methodology) is not altered
- All relevant information has been consistently applied within the applicable sections in the methodology document.

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1 INTRODUCTION

1.1 Objective

Verra contracted Earthood Services Private Limited to conduct an independent assessment of the proposed methodology "Energy Efficiency and Fuel-Switch Measures in Cookstoves" to determine its compliance with the requirements of the Verified Carbon Standard (VCS).

The scope of the VVB assessment focuses exclusively on:

1. Structure and clarity of methodology: Assessment of whether the methodology is written in a clear, logical, concise, and precise manner that will enable project developers to implement projects consistently and transparently report project results.
2. GHG quantification: Assessment of whether the approach for calculating baseline emissions, project emissions, leakage emissions, and emission reductions is appropriate, adequate, conservative and in conformance with VCS Program rules and requirements. This must also include an assessment of the consistency of the equations and parameters with the GHG sources in the baseline and project scenario and the monitoring parameters.
3. Verifiability: Assessment of whether the methodology is sufficiently clear and specific to require project developers to transparently report project results that can pass validation and verification with high confidence.

1.2 Summary Description of the Methodology

The assessed methodology aims to quantify emission reductions arising from the introduction of improved cookstoves in households, communities, institutions, and micro, small, and medium-sized enterprises. The methodology applies to project activities that introduce energy efficiency and fuel-switch measures in cookstoves. The emission reductions result either from enhanced efficiency and/or fuel switch to lower greenhouse gas-intensive fuels (i.e., involving the replacement of fossil fuels and non-renewable biomass). The methodology falls within Sectoral Scope 3: Energy Demand of the Verified Carbon Standard (VCS) Program.

The globally applicable methodology covers a broad set of activities and consolidates elements of existing methodologies currently approved for use within the VCS Program. The proposed methodology includes improvements to represent current best practices, streamlined monitoring approaches, and reflect the latest heat generation technologies, baseline fuels, and quantification methods.

The typical baseline scenario including the GHG sources are defined according to the technologies, practices, fuel types and fuel consumption patterns that will be replaced by the project technology in the defined target population. The baseline scenario, GHG sources,

additionality, monitoring plan, sampling plan and all other aspects of the methodology are assessed below in this report.

2 ASSESSMENT APPROACH

2.1 Method and Criteria

The methodology Validation, from Contract Review to Assessment Report, was conducted using VVB's internal procedures. The proposed methodology was checked against the requirements of the VCS Program Guide v4.4/42/, VCS Standard v4.7/8/ and VCS Methodology requirements v4.4/09/.

The methodology Validation process is conducted as per Earthood Services Private Limited's internal ISO 14065 Quality Manual and in accordance with criteria laid down by Verra. It includes the following steps:

- contract with methodology developer for the scope and appointment of validation team and technical review team.
- completeness check of Verra methodology form.
- desk review of methodology in accordance with the tools & requirements and mentioned references/statistics wherever applicable.
- reporting and closure of findings (CARs/CLs/FARs) and preparation of draft validation report.
- issuance of the final assessment report to contracted methodology developer (or authorized representatives).

2.2 Document Review

The proposed methodology assessment is performed primarily as a document review of the documents submitted at various stages of assessments. The review is performed by assessment team using dedicated protocols. The assessment team cross checks the information provided in the documents (filled-in methodology form) and information from sources other than those used by the methodology developer, if available, and conducts independent background investigations. VVB has conducted a desk review as under:

- A review of the data and information presented to verify their completeness.

- A review of the revisions made to the methodology, including referenced tool(s), referenced sources and, where applicable, the quality assurance and quality control procedures. An evaluation of revisions made in terms of their influence on the quantification of calculations.

2.3 Interviews

No site visit or interview was conducted for this assessment. However, the assessment included email interactions with representatives of Verra and Atmosphere Alterative:

S.No.	Name	Organisation	Topics Covered
1.	Kranav Sharma	Verra	Methodology applicability, Applicability conditions, revisions and Emission Reduction quantification rationale
2.	Jessica Wade Murphy	Atmosphere Alternative	

2.4 Assessment Team

The names, roles, and affiliations relevant to the methodology assessment team are as follows:

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1	Team Leader	IR	Guleria	Shifali	Central Office
2	Technical Expert	IR	Guleria	Shifali	Central Office
3	Validator	IR	Sengupta	Akanksha	Central Office
4	Trainee Validator	IR	Singh	Kishlay	Central Office

Further, the Competence statement of each team member, containing summary of their qualifications/expertise/experience, is included in Appendix 3.

2.5 Resolution of Findings

As an outcome of the validation & verification process, the team can raise different types of findings:

A Clarification Request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met.

Where a non-conformance arises the team leader shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- The methodology developer has made mistakes that will influence the ability of the methodology to allow projects to achieve real, measurable additional emission reductions.
- The VCS requirements have not been met.
- There is a risk that emission reductions cannot be monitored or calculated.

The validation process may be halted until this information has been made available to the team leader's satisfaction. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR.

During the validation and verification process, total 02 CARs, 07 CLs were raised and resolved successfully. 07 FARs were raised by Verra for VVB review, which were raised to the methodology developer and closed satisfactorily. The list of CARs/CLs/FARs raised and the response provided, the mean of validation, reasons for their closure and references to correction in the relevant documents are provided in Appendix 4 of this report.

3 ASSESSMENT FINDINGS

The proposed methodology designs to provide guidelines for quantifying time savings resulting from the adoption of improved cookstoves (ICS), the replacement of inefficient baseline cooking methods in the household, or the retrofitting of existing installations.

As per the desk review, observations, and evidence provided, it was possible to assess them, in general, the proposed methodology revision would result in time savings on cooking fuel collection and cooking tasks in a household.

The methodology is found to be in compliance with the principles set out in the VCS Standard and other VCS rules and requirements. The new methodology provides thermal efficiency project quantification details, while adhering to the principles of VCS (relevance, completeness, consistency, accuracy, transparency, and conservativeness). Applicable VCS-approved tools are appropriately cited for determining project significance, baseline, additionality and risk. The methodology assessment addressed specific issues that arose in the methodology, which are pertinent to the above-mentioned principles set forth by the VCS Standard.

3.1 Relationship to Approved or Pending Methodologies

Methodology	Title	GHG Program	Comments
VMR0006	Energy efficiency and solid waste diversion activities within a sustainable community	VCS	The methodology provides a framework for quantifying greenhouse gas (GHG) emission reductions from energy efficiency improvements. It outlines procedures for establishing a baseline, calculating project emissions, and determining the net emission reductions.
AMS-II. G	Energy efficiency measures in thermal applications of non-renewable biomass	CDM	This methodology comprises efficiency improvements in thermal applications of nonrenewable biomass. Examples of applicable technologies and measures include the introduction of high efficiency biomass fired project devices (cookstoves or ovens or dryers) to replace the existing devices and/or energy efficiency improvements in existing biomass fired cookstoves or ovens or dryers.
AMS-I.E.	Switch from non-renewable biomass for thermal applications by the user	CDM	This methodology comprises of activities to displace the use of non-renewable biomass by introducing renewable energy technologies to households, communities, and/or institutions such as schools, prisons or hospitals (hereinafter referred as end-users)

The VVB has checked the following registries on similar methodologies:

Registry
Climate Action Reserve /11/

UNFCCC Clean Development mechanism/12/
Gold Standard for Global Goals (GS4GG) /13/
Global Carbon Council (GCC) /14/
Verified Carbon Standard (VCS) /15/

As stated above, the proposed methodology includes several updates and changes that reflect current best practices of project design and implementation in distributed thermal energy generation. It also incorporates streamlined monitoring approaches such as direct measurement techniques (e.g., stove use monitors, fuel weight sensors, electricity meters) and updated default values for various ex ante parameters. Moreover, it covers a broad set of activities and consolidates elements of existing methodologies currently approved for use in the VCS Program, including the following:

- *VMR0006 Energy Efficiency and Fuel Switch Measures in Thermal Applications, v1.2/02/*
- *AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass, v13.1 /03/*
- *AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user, v13.0 /04/*

As per VVB's assessment, no other similar methodology has been identified and the list of all similar methodologies as per provided new methodology is considered complete and no other similar methodology could have been reasonably revised to meet the objective of the current Methodology, and thus, the current Methodology is justified.

3.2 Stakeholder Comments

The project has been published by Verra for public commenting from December 15, 2023, to January 31, 2024. A total of 393 comments were received during the public stakeholder consultation for the methodology. Stakeholders provided highly detailed and specific feedback. Based on the comments received, the methodology has been updated where applicable. All comments have been documented in Appendix 1, and each comment has been considered and addressed with a response by the methodology developer. During the assessment of the methodology, all comments were reviewed, and responses not found satisfactory were incorporated into findings in the assessment report. Overall, all stakeholder comments have been thoroughly considered and appropriately addressed.

3.3 Structure and Clarity of Methodology

The methodology is drafted with a clear, concise and logical approach, bearing all the relevant sections applicable as per the methodology form template/10/. It was assessed that:

- The methodology template instructions/10/ have been adhered to, and methodology form also fulfils requirements and criteria laid in the appropriate sections within the form.
- The terminologies used in the methodology follows Verra program requirements and GHG accounting generally.
- The applicable keywords have been used appropriately and consistently, denoting requirements, recommendations and permissible or allowable options, wherever applicable.
- The criteria and procedures are drafted in an easy-to-understand manner and can be applied readily and consistently by project proponents.
- The revisions do not introduce any ambiguity which may lead to lack of clarity in undertaking audits by the project activity(ies).

The clarity of content, its applicability and continuity in terms of use with other similar tools is observed in the methodology. The structure of methodology is well defined, maintaining consistency with the methodology form.

3.4 Definitions

The following key terms and their definitions have been duly incorporated in the methodology.

Term	Definition	Assessment
Batch	The population of a device of the same type commissioned during a certain period (e.g., week or month) in a certain calendar year	The VVB concludes that that no key term has been skimped over, and that terms all have been defined clearly and appropriately, with no room for misinterpretation. The terms have been listed in alphabetical order and it has been ensured that there is no overlap with terminologies already defined under the VCS program.
Biomass	Biomass means non-fossilized and biodegradable organic material originating from plants, animals and micro-organisms. This shall also include products, by-products, residues and waste from agriculture, forestry and related industries as well as the non-fossilized and biodegradable organic fractions of industrial and municipal wastes	

Biomass residue	Biomass residue refers to the organic material that remains after the primary product has been extracted or harvested. These residues are often biomass by-products, residues, and waste streams from agriculture, forestry, and related industries.	
Improved cookstoves	A cooking device that improves on traditional baseline technologies in terms of fuel savings through energy efficiency improvements and/or fuel switching to a less GHG-intensive fuel, thereby leading to GHG emission reductions.	
Electric Cooking Devices	Project devices powered by electricity and connected to national/regional grid or mini grids that include but are not limited to induction cook stoves, hot plates, ceramic cooking-hob with heating coils, electric pressure cookers, slow cookers, crock pots, electric rice cookers, multi cookers.	
Project device	An individual improved cookstove unit used as part of the project activity.	
Self-generated renewable electricity	Electricity produced locally in off-grid systems using renewable energy sources, such as photovoltaic solar energy, that is used to power cookstoves.	
Technical Life	Total time for which the improved cookstove is technically designed to operate from its first commissioning. The technical lifetime is expressed in years or hours of operation.	

CL#01 and CAR#01 were raised with respect to the definitions and were successfully resolved.

3.5 Applicability Conditions

This methodology applies to project activities that introduce energy efficiency and fuel-switch measures in cookstoves. The proposed Methodology includes significant changes in the applicability conditions with respect to version 1.2 of VM0006 /02/ in order to make it consistent with various aspects in the methodology regarding the procedures for estimating the change fuel types and the additions made in the GHG accounting of the methodology. While in version 1.2 of VMR0006 /02/ the applicability criteria is restricted to either use more efficient devices with same baseline fuel or fuel switch to renewable biomass. The methodology under assessment accounts for fuel switch to:

i) Efficient project devices fired by renewable biomass or bioethanol;

ii) Efficient project devices fired by liquefied petroleum gas (LPG); or

iii) Electric-powered project devices

Hence, making it a far more comprehensive methodology, which takes into its ambit a wider range of CEPs. With respect to use of renewable biomass, the methodology specifies the conditions for if the renewable biomass is a by-product, residue/ waste or originates from dedicated plantations that comply to conditions as per CDM Tool 16/24/.

The methodology also species the use of multiple types of renewable biomass, processed biomass, charcoal, specifically produced from efficient charcoal production processes, wherein the methane byproduct is captured, destroyed or utilized.

The renewable biomass sources are documented in the project description and monitoring reports, including origin, quantities, and conditions prior to use under the project activity. Where the biomass is sourced from a third party, proof of purchase must be provided (e.g., contractual agreements or purchase receipts).

While VMR0006 does not explicitly specify the characteristics and use of the cookstoves which qualify, the methodology under assessment clearly documents the same, detailing the difference in applicability depending on whether the CEP utilized renewable biomass, LPG, Bioethanol or electricity.

The proposed applicability conditions as per the methodology under assessment are discussed below:

Applicability Conditions	VVB Assessment
1) The project activity corresponds to:	

a) Replacement of non-renewable biomass (e.g., firewood, charcoal) fired cookstoves with any of the following:	The applicability condition provides a clear identification of the types of devices that can be replaced by the project activities, while also clearly listing the technologies which are permitted to replace the baseline devices. The condition has separately identified the applicable technologies for replacement of non-renewable biomass fired cookstoves and for replacement of fossil fuel fired cookstoves. Therefore, the condition is sufficiently clear for project activities to demonstrate compliance through documentation of baseline technologies and project technologies at the time of project validation.
i) More efficient project devices that use the same fuel as in the baseline;	
ii) Efficient project devices fired by renewable biomass or bioethanol;	
iii) Efficient project devices fired by liquefied petroleum gas (LPG); or	
iv) Electric-powered project devices.	
b) Replacement of solid or liquid fossil-fuel (e.g, coal, kerosene) fired cookstoves with any of the following:	
i) Efficient project devices fired by renewable biomass or bioethanol;	
ii) Efficient project devices fired by LPG; or	
iii) Electric-powered project devices.	
2) Project units are used in households, communities, institutions, or SMEs, collectively referred to in this methodology as the "target population."	This applicability condition refers to what can be considered the target population by the projects. The populations- identified as households/ communities/ institutions/ SMEs, are required to be identified by the project proponents at the time of validation to demonstrate compliance with condition. Therefore, the potential target population for the projects is sufficiently clear and it is concluded that the conformance with the applicability condition can be demonstrated at the time of project validation by identifying the population which will be benefitted by the project
Use of renewable biomass	

3) Where renewable biomass is used, it is exclusively renewable and qualifies as one of the following:	The methodology further provides fuel specific applicability conditions for the project technologies which are allowed under the methodology. These applicability conditions clearly demarcate the rules for using renewable biomass as cooking fuel in the project cookstoves- requiring the fuel to be exclusively renewable and qualifying as either a by-product/ residue/ waste stream from agriculture, forestry or related industries, or originating from dedicated plantations. Clear reference to CDM EB reports and relevant tools applicable to these conditions have also been included to remove any scope of ambiguity to apply these requirements to the projects. Further, conditions #4 and #5 clarify additional requirements for use of biomass residues and where these can be sourced from. These conditions ensure that usage of biomass residues does not result in decrease in existing carbon pool or result in additional emissions from increased processing capacity of raw input. These requirements will be complied by projects using biomass and appropriately cover all aspects of the biomass sources. The conditions are found to be written clearly and precisely, such that the involved stakeholders can determine and demonstrate whether the project activity meets the condition at the time of project validation and registration.
a) A by-product, residue, or waste stream from agriculture, forestry, and related industries; or	
b) Originating from dedicated plantations that comply with all relevant applicability conditions in the latest version of the CDM TOOL16/24/	
4) Where biomass residues are used, they would have been left to decay or burned without energy recovery before implementation of the project activity, and their use does not involve a decrease in carbon pools – in particular of dead wood, litter, or soil organic carbon – on the land areas from which the biomass residues originate.	
5) Where biomass residues from a production process are used, project implementation does not result in an increase in the processing capacity of raw input or any other substantial changes (e.g., product change) in this process.	
6) More than one type of renewable biomass may be used. Each of the biomass types used must comply with the applicability conditions.	This applicability condition provisions usage of more than one type of renewable biomass, provided that all related applicability conditions are complied with by each type. Therefore, the condition is found to be clear

	and precise, allowing demonstration of compliance at the time of validation.
7) Renewable biomass may be processed into fuels, such as briquettes, wood chips or charcoal.	This applicability clearly identifies the forms in which renewable biomass may be processed. The condition is clear and precise and assessment team concludes that compliance with this applicability condition can be demonstrated at the time of validation through documentation of types of fuels that will be utilised by the project activity.
8) For project activities introducing renewable biomass in the form of charcoal, the methodology is restricted to renewable charcoal produced by efficient charcoal production processes (including but not limited to retort sedentary kilns, improved sedentary kilns, Casamance kilns). Methane produced during the charcoaling process must be captured and destroyed or combusted for energy purposes.	Since the previous applicability condition allows the use of charcoal as renewable biomass, further condition has been included to ensure that the project activities are limited to only introduce renewable charcoal produced through efficient production processes. A footnote has been included in the methodology to clarify what can be considered an efficient production process. The project proponent, through this applicability condition, are required to document the production process of the charcoal used in the project activity to ensure compliance with the applicability condition and demonstrate this compliance at the time of validation. The condition is found to be written in a clear and precise manner.
9) The renewable biomass sources are documented in the project description and monitoring reports, including origin, quantities, and conditions prior to use under the project activity. Where the biomass is sourced from a third party, proof of purchase must be	This applicability conditions mandates the biomass sources and their origin, quantities, conditions prior to the project activities to be documented in the project description and monitoring reports, thus ensuring that compliance with all aforementioned

provided (e.g., contractual agreements or purchase receipts).	requirements relating to use of renewable biomass are demonstrated in the project documents. The condition is precise, clear and ensures conformance with applicability conditions is demonstrated.
<u>Cookstove characteristics and use</u>	
10) Project cookstoves using renewable biomass (fuel-switch) or non-renewable biomass (improved efficiency) are single-pot, multi-pot portable or in-situ cookstoves with an initial thermal efficiency of at least 25 percent.	The applicability conditions #10, #11 and #12 provide clear mandate regarding the minimum thermal efficiency that each type of technology included in the project activity must have at the time of initial installation of the devices. Clear reference to relevant technology standards has been included in the methodology for the applied thermal efficiency thresholds. The applicability condition is written in clear and precise manner, conformance with which can be demonstrated by conducting appropriate efficiency tests of the technologies and presenting those at the time of validation.
11) Project cookstoves using LPG or bioethanol are single-pot, multi-pot portable or in-situ cookstoves with an initial thermal efficiency of at least 30 percent.	
12) Electric project cookstoves have an initial thermal efficiency of at least 40 percent, and maximum risk factor scores of 15 on the Cookstove Durability Protocol.	
13) Project devices using LPG comply with all of the following conditions:	Specific eligibility conditions have been included in the methodology for projects introducing LPG as the cooking technology as part of project activity. These conditions specify the applicable baseline scenario (to be determined as part of the baseline surveys), requirement for metering of the project devices, the duration till when emission reductions from introduction of LPG can be claimed, and requirement for introduction of transition plan from LPG to lower GHG-emission technologies. These applicability conditions ensure that introduction of LPG, a fossil fuel, is only used
a) The baseline fuel includes either non-renewable biomass or is a more carbon-intensive fossil fuel (demonstrated by the baseline survey, see Section 6.2);	
b) The project must have a provision for the metering of LPG supplied to a consumer at the LPG filling station, in order to determine the household LPG consumption.	
c) The project does not issue any carbon credits for periods after 31 December 2045; and	

d) The project proponent presents at initial validation a plan to support its target population to transition from LPG to lower-GHG-emissions alternative(s) beginning, at the latest, during the first year of the final project crediting period (or at the third year of the fixed crediting period) and reserves a percentage of carbon credit revenues for this purpose. The transition plan and appropriate lower-GHG-emissions alternative(s) will vary depending on factors including the target population, type of project device, national circumstances, and local circumstances in the project area, including resource availability. Project proponents may consider transition toward alternatives such as, inter alia, electric-powered devices, renewable biomass fired devices, and bioethanol fired devices.	as a transition technology for households relying on non-renewable biomass or more carbon intensive fossil fuels to newer, more efficient and cleaner fuels and technologies over time. The metering ensures that clear monitoring of the fuel usage is available for calculation of emission reductions. The applicability condition is found to be appropriate and written in a clear and precise manner, such that compliance can be demonstrated at the time of project validation
14) For electric project devices, the following electricity sources are eligible:	Specific eligibility conditions have been included in the methodology for projects introducing electric devices as the cooking technology as part of project activity. This applicability condition identifies the eligible electricity sources which can be utilised for operating the project devices. These conditions provide clear information on which electricity sources are to be excluded from the project activity. The requirement is clear and sufficient to demonstrate compliance through documentation of planned electricity sources at the target population.
a) Decentralized renewable energy systems. Decentralized energy systems using fossil fuels are not eligible, except for backup generators that supply less than 1 percent of the annual electricity of the decentralized renewable energy system;	
b) Self-generated renewable electricity, where at least 80 percent of the annual electricity generated is consumed by the project devices; and	
c) National or regional electricity grid.	
15) The project developer designs incentive mechanisms to reduce the use of inefficient baseline devices and practices that can be replaced by the project devices and describes these mechanisms in the project description.	The applicability condition is introduced to ensure adoption of project technology through development of incentive mechanisms. The condition is clear and requires documentation of these mechanism in the project description, thus ensuring that

	conformance with the applicability condition can be demonstrated at the time of project validation.
Avoiding harm and double counting	
16) Project proponents implement a method for the distribution and identification of project devices that avoids double counting of emission reductions by other mitigation actions and includes unique product identification on the stove itself at the time of distribution /sale (e.g., program logo, alpha/numeric ID, and end-user locations, e.g., geographic coordinates, complete address information).	Applicability condition has been included to ensure clear identification of the project devices through documentation of specific data points which are unique to those project devices, to ensure no double counting of emission reductions by more than one project activity. The condition is written in clear and precise manner and project activity can demonstrate conformance with this applicability condition through mechanisms documented for collection of these datapoints as part of the project design.
17) The project complies with any national, sub-national or local regulations or guidance for the installation, commercialization, distribution, and use of improved cookstoves and/or fuel supply and use for the target population. National, regional, and local regulatory frameworks must be documented for provision of the type of thermal energy services provided by the project. Where the host country does not have applicable regulations for the project technology, the project developer must demonstrate that its performance is in compliance with Tier 2 or above according to ISO/TR 19867-3[10], and that implementation of the project activity is not likely to cause any negative impacts.	The applicability condition is introduced to ensure compliance with national and local regulations with respect to implementation of such project activities involving commercialization, distribution, and use of improved cookstoves and/or fuel supply and use for the target population. Clear requirement has been added for documentation of these requirements, thus ensuring that the conformance with the applicability condition is demonstrated at the time of validation. The condition is found to be written and precise manner to be able to determine whether a project activity meets the condition.

18. For projects that reduce emissions from non-renewable biomass, including firewood and charcoal, the risk of double counting is assessed on a national basis by evaluating whether there are REDD+ projects or jurisdictional REDD+ programs whose project boundary overlaps with the expected fuel source area of the project. For the assessment of double counting risk, the requirements and guidelines set out in the latest version of the VCS Standard must be followed.	The applicability condition has been introduced to avoid double counting with respect to REDD+ projects introduced in the areas overlapping with expected fuel source areas of the project, which shall be documented in line with the latest version of VCS standard requirements. However, since the rules and requirements relating to this have not yet been released by Verra, a confirmation was sought and received from Verra about work in progress on this double counting aspect.

VVB has reviewed the applicability criteria and is able to confirm that they are appropriate for the assumptions made in the GHG accounting procedures of the methodology and describes clearly the conditions under the methodology can or cannot be applied. VVB confirmed that the methodology is in compliance with VCS Methodology Requirements Version 4.4 /09/. Issues identified during the assessment were correctly addressed by the Methodology proponent

CL#02 was raised and successfully resolved.

3.6 Project Boundary

The methodology under assessment specifies controlled, related and affected sources to be included in the project boundary.

Controlled sources are emissions that the project developer directly manages or financially controls. Related sources involve material or energy flows linked to the project. Affected emission sources are influenced by the project but are outside the developer's control and do not have direct material or energy exchanges with the project.
Unlike other similar methodologies, the one under assessment, along with providing the GHG sources included in or excluded from the project boundary, also provides instructions as to how the project must identify its project boundary including all the relevant sources and reservoirs for its specific circumstances and characterize each as controlled, related, or affected depending upon the project case, with examples., hence making the process clearer.

The methodology provides following instructions with regards to how GHG sources are to be selected:

- Include CO_2 emissions for all relevant emission sources.

- Asses the significance of non-CO_2 GHG, considering that methane and nitrous oxide may be a significant source of GHG emissions especially in the use of charcoal, biomass fuels and biomass residues.
- Emissions from fuel production and transportation may be ignored where they are higher in the baseline than the project scenario.

The methodology builds upon VMR0006/2/ and takes it further by introducing more sources under both baseline and project scenario. While baseline sources now include the GHG from thermal energy generation and production of charcoal fuel, project scenario includes thermal energy generation, Transport of fuel (where applicable), Production of fuel (where applicable), Self-generated electricity and Grid electricity generation and distribution.

The VCS Methodology Requirements require the methodology establish criteria and procedures for describing the project boundary and identifying and selecting optional carbon pools, e.g., sources, sinks, and reservoirs relevant to the baseline and project scenarios. Procedures to quantify emissions are appropriately included in all required carbon pools. The methodology provides clear criteria and procedures for defining the spatial boundaries of the project. The methodology provides a clear diagram of carbon pools and sources (Refer below tables).

GHG Sources Included in or Excluded from the Project Boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Thermal energy generation	CO_2	Yes	Major source
		CH_4	Yes	May be significant for some fuels
		N_2O	Yes	May be significant for some fuels
	Production of charcoal fuel	CO_2	Yes	Major source
		CH_4	Yes	May be significant for charcoal
		N_2O	Yes	May be significant for charcoal
Project	Thermal energy generation	CO_2	Yes	Major source
		CH_4	Yes	May be significant for some fuels
		N_2O	Yes	May be significant for some fuels
	Transport of fuel (where applicable)	CO_2	Yes	Major source
		CH_4	Yes	May be significant for some fuels
		N_2O	Yes	May be significant for some fuels
	Production of fuel (where applicable)	CO_2	Yes	Major source
		CH_4	Yes	May be significant for some fuels
		N_2O	Yes	May be significant for some fuels
	Self-generated electricity	CO_2	Yes	Major source
		CH_4	Yes	May be significant for some fuels
		N_2O	Yes	May be significant for some fuels

	Grid electricity generation and distribution	CO_2	Yes	Major source
		CH_4	No	Negligible
		N_2O	No	Negligible

All emission sources are included in the project boundary other than CH_4 and N_2O emissions from grid electricity generation and distribution. Some of these emission sources have been indicated as significant for some fuels, which will be assessed at project level for relevance. Since the project boundary includes all sources, the inclusion of all GHGs is considered appropriate.

Table below presents the project's expected impact on the identified emissions sources as indicated by the proposed methodology- the impact is classified as either increased or reduced emissions due to the project activity. The categorization was assessed, and the table is found to be appropriately classifying the impacts of project on GHG emission sources. It is confirmed that emissions from thermal energy sources and production of charcoal fuel will be reduced in project scenario as compared to baseline scenario (considering that amount of fuel used would be reduced). Although emissions will be reduced from transport and production of fuel in case of energy efficiency projects, the assumption in methodology that emissions from transport and production might increase in case of fuel-switch projects is also acceptable since the new fuel is likely to be brought in from farther distances due to absence of natural existence in baseline scenario.

Emissions from electricity sources are applicable in cases of project activities introducing electric stoves- GHG emissions from electricity generation and distribution have been appropriately included in the project boundary.

Project impact on GHG emission sources

GHG Emission Source	Project impact on the source
Thermal energy generation	- Energy efficiency project: Reduced - Fuel-switch project: Reduced
Production[Error! Bookmark not defined.] of charcoal fuel	- Energy efficiency project: Reduced - Fuel-switch project: Reduced
Transport of fuel (where applicable)	- Energy efficiency project: Reduced - Fuel-switch project: Increased
Production of fuel (where applicable)	- Energy efficiency project: Reduced - Fuel-switch project: Increased
Self-generated electricity	- Energy efficiency project: Not applicable - Fuel-switch project: Increased
Electricity generation and distribution	- Energy efficiency project: Not applicable

	- Fuel-switch project: Increased

In addition to this, methodology also includes conditions for the geographical project boundary and specifies need for a .kml file delimiting the geographic area(s) of origin of the biomass fuel used in the project and a description of how that area is defined, in case of nonrenewable biomass fuels.

Hence, the project's physical boundary is clearly and properly defined as all areas that are directly affected by the proposed activities are identified. The sources and types of gases included are also clearly and properly defined in the Methodology; the justification to include or exclude certain types of gases is reasonable. The procedures and diagrams provided for the project boundary are clearly specified and appropriate to the project activities covered by the methodology.

CL#03 was raised and successfully resolved.

3.7 Baseline Scenario

The methodology under assessment not only provides the basis of selection and justification of the baseline scenario, but also elucidates the baseline survey requirements.

The methodology under assessment, utilizes the following steps for determination of the baseline scenario:

a) Step 1: 'Identify alternative baseline scenarios'- Identification of alternative scenarios that could have existed instead of the assumed baseline scenario

b) Step 2: Consider existing and upcoming government policies and legal requirements'- Consistency with Mandatory Laws and Regulations to ensure that the project would not have existed in baseline scenario due to applicable laws or policies in the region impacting improved cooking devices

c) Step 3: 'Assess financial, institutional and information barriers'- Barrier Analysis to identify the hurdles that same activities implemented as part of project activity would have faced in baseline scenario in absence of revenue from carbon credits.

The baseline scenario including the GHG sources must be defined according to the technologies, practices, fuel types and fuel consumption patterns that will be replaced by the project technology in the defined target population.

VVB concludes that the criteria and procedures for identifying alternative baseline scenarios and determining the most plausible scenario can be expected to result in a baseline scenario that reasonably represents the GHG emissions or removals that would occur in the absence of the project activity. The requirements of section 3.4 of VCS Methodology Requirements/9/ are found to be met.

Baseline Scenario Survey Requirements

While baseline survey is conceptualized and conducted in line with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities/19/*, the methodology provides additional requirements to be followed.

This includes the mandatory information that must be captured by the baseline survey or via literature survey; these include, for the target population:

1) Baseline fuel type(s) and the percentage of their use by the target population.
2) Source(s) of each baseline fuel (i.e., if collected, purchased or procured through other means);
3) Baseline technologies for cooking and the percentage of their use by the target population; and
4) Household size ($Hh_{j,k}$) (at the point at which the project implements activities in households)./43/

The methodology also specifies the schedule and medium for baseline survey, with the first survey being conducted pre validation (and should be conducted physically on site) and consequent baseline surveys are conducted every 2 years (either physically or virtually) in control households which resemble the original baseline participants in terms of Baseline fuel type(s) and the percentage of their use by the target population, Source(s) of each baseline fuel, and baseline technologies for cooking. The surveys are to be timed such that they don't coincide with festivals or holidays, further, they must be designed to consider seasonal variability and to thus ensure that they are conservative in approach. The methodology also clarifies the employment of third-party organization for the purpose of surveys.

Further, to ensure uniformity and that minimum necessary information is captured during surveys, a binding questionnaire has also been provided.

Sample size calculations: The proposed methodology requires surveys to be conducted for each target population, ensuring appropriate representation of the target population. Where project devices are distributed within regions or target populations with heterogenous conditions (e.g., regional variations in fuel types or cooking practices), the target population is to be divided into clusters/groups with homogeneous conditions.

The minimum sample size requirements were reviewed and were found on the same lines as requirements of CDM *Standard for sampling and surveys for CDM project activities and programmes of activities.* /19/

With respect to Baseline Scenario Survey Requirements, CL#04 was raised and successfully resolved.

3.8 Additionality

The proposed methodology provisions demonstration of additionality through regulatory surplus, followed by either activity method (positive list) or project method (investment analysis).

Step 1: Regulatory surplus

In line with the VCS Methodology Requirements, section 3.5.3/09/, the project proponent is required to demonstrate regulatory surplus, thus ensuring that 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.

Step 2: Positive list

According to section 3.5.10 of VCS Methodology Requirements/09/, methodology developers may apply one or more of the following methods to determine additionality through positive list:

a) Option A- Activity penetration

b) Option B- Financial Feasibility

c) Option C- Revenue streams

The proposed methodology allows demonstration of additionality through positive list by confirming that project activity's projected gross annual revenue (including cost savings) excluding from the sale of GHG credits does not exceed five percent of capital expenditure. To further ensure qualification under positive list, the methodology also ensures that the project cookstoves are distributed free of cost (no revenue source other than sale of VCUs) and are not implemented as part government schemes or supported by multilateral funds.

The approach is found in line with VCS Methodology requirements /09/ and sufficiently captures the additionality of the project activities, ensuring that the project activities applying this methodology result in emission reductions or removals that are in excess of what would be achieved under a "business-as-usual" scenario and the activity would not have occurred in the absence of the incentive provided by the carbon markets.

Projects that pass the regulatory surplus test (Step 1) and are on the positive list (Step 2) are deemed additional and are not required to apply Step 3.

Step 3: Project method

If the project activity is not on the positive list, it must demonstrate additionality by applying an investment analysis as per the latest version of the *CDM Tool01 for the demonstration and assessment of additionality*. /20/

However, the current methodology specifies additional requirements:

For Investment Analysis:

- Assumptions, data, and conclusions must align with information presented to the company's decision-making management and investors/lenders.

For Barrier Analysis:

- Assumptions, data, and conclusions in the investment analysis must match those presented to the company's management and investors/lenders.

- In benchmark analysis, the financial benchmark must reflect the weighted average cost of capital (or cost of equity) typical for the country, sector, and project type, rather than a company-specific benchmark.

- Additionality is proven if carbon credit revenues significantly enhance the project's economic performance, meeting or surpassing the required financial benchmark.

For projects in Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs), or Small Island Developing States (SIDS), a simplified barrier analysis can be applied, focusing on financial, institutional, or informational barriers, as outlined in the latest CDM Tool for additionality.

In both cases under Step 3, the project proponent must demonstrate that the project activity is not common practice according to the latest CDM Methodological Tool - Common Practice. /25/

Additionality is determined using the "*CDM Too01l for the demonstration and assessment of additionality/*20/ this is found appropriate for the project activities covered by the methodology, and VVB confirms that the criteria and procedures for determining additionality are valid and recognised across the GHG programs.

CL#05 was raised and successfully resolved.

3.9 Quantification of GHG Emission Reductions and Carbon Dioxide Removals

VVB has checked all of the assumptions for baseline emissions, project emissions, and leakage and was able to confirm that they are acceptable. All the equations and parameters for calculating baseline emissions, project emissions, and leakage can also be confirmed as being proper.

CL#06 and CAR#02 were raised and successfully resolved.

3.9.1 Baseline Emissions

The procedures for calculating baseline emissions and removals are given below:

Baseline emissions are calculated as follows:

$$BE_y = \sum_i \sum_j EC_{y,i} \times N_{y,j,k} \times n_{y,j,k} \times \left(EF_{b,i,CO2} \times f_{NRB,i,y} + EF_{b,i,nonCO2}\right) \quad (1)$$

Where:

BE_y = Baseline emissions during year y (t CO2e)

$EC_{y,i}$ = Average energy consumption of baseline device type i in year y (TJ)

$N_{y,j,k}$ =Number of commissioned project devices of type j from batch k in year y

$n_{j,k,y}$ = Proportion of commissioned project devices of type j from batch k that remain operating in year y (fraction)

$EF_{b,i,CO2}$ = CO2 emission factor for fuel used by baseline device type i in the baseline scenario (t CO2/TJ)

$f_{NRB,y}$ = Fraction of woody biomass that is established to be non-renewable used by baseline device in year y (fraction); this variable is not considered for fossil fuels

$EF_{b,i,nonCO2}$ = Non-CO2 emission factor for fuel used by baseline device type i in the baseline scenario (t CO2e/TJ)

i = Baseline device type and its respective fuel type

j = Project device type and its respective fuel type

Further,

$$EC_{y,i} = BC_{b,y,i} \times NCV_{b,i} \quad (2)$$

Where:

$BC_{b,y,i}$	Fuel used per baseline device type *i* during year *y* (tonnes). This parameter corresponds to $BC_{ex\text{-}ante,b,i}$ for the first two years and when the follow-up baseline survey campaign shows that there are no significant changes in the baseline fuel consumption; or to $BC_{b,y,i}$ when the baseline fuel consumption must be updated using a new measurement campaign conducted in control households.
$NCV_{b,i}$	Net calorific value of baseline fuel for baseline device type *i* (TJ/tonne)

The methodology provides two approaches for quantifying the fuel use in baseline scenario

Scenario:	VVB Assessment
Option 1: Measurement campaign A measurement campaign must be conducted following the procedures in the latest version of the *Kitchen Performance Test Protocol*[1]. The sampling	This is considered a Credible and reliable source with reproducible results which can be presented at time of validation.

[1] **Error! Reference source not found.** also may be considered when applying the latest Kitchen Performance Test Protocol.

must comply with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities*. The campaign must achieve confidence and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. The result must be scaled appropriately using the average household size ($Hh_{i,k}$) to obtain the value of $BC_{b,y,i}$. Where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per the latest CDM *Standard for sampling and surveys for CDM project activities and programmes of activities*. Energy consumption calculated using this option must be determined once prior to validation to obtain $BC_{ex\text{-}ante,b,i}$. Follow-up baseline surveys must be conducted every two years in control households that do not participate in the project, established prior to validation as statistically equivalent to the baseline project households in their pre-project fuel consumption. When the biennial follow-up baseline survey campaigns reflect statistically significant changes to the baseline, then baseline energy consumption must be updated using a new measurement campaign conducted in control households to obtain $BC_{b,y,i}$.	The following documenst were referred by VVB to assess the appropriateness of this approach: *1.Kitchen Performance Test Protocol /36/ as prescribed by the Clean Cooking Alliance (https://cleancooking.org/research-evidence-learning/standards-testing/protocols/* 2. CDM *Standard for sampling and surveys for CDM project activities and programmes of activities*./19/ 3. "Community Forestry Field Manual 1: Guidelines For Planning, Monitoring And Evaluating Cookstove Programmes, By Stephen Joseph, edited and designed by Carla R.S. Koppell FAO, Rome 1990,/47/ 4. Guidelines for Woodfuel Surveys. F.A.O, By Keith Openshaw/48/ These are recognized as industry standard references, and hence the approach built upon the same is considered appropriate and credible. Further, the parameters to calculate Baseline Emissions and their measurement campaign process have been assessed in detail in section 3.10 of this report.
Option 2: Default values $EC_{y,i}$ is calculated based on the default value for the average annual consumption of woody biomass per person for cooking. - Firewood: 0.5 tons/capita/year of air-dried wood (From 0.0012 TJ delivered/capita/year with 0.0156 TJ/tons NCV, and thermal efficiency of 15%) - Charcoal: 0.1 tons/capita/year (From 0.00075 TJ/delivered/capita/year with 29.5 TJ/tons NCV, and thermal efficiency of 25%.) When fuels other than firewood or charcoal also are used in the respective baselines, their energy	This is considered a Credible and reliable source with reproducible results which can be presented at time of validation. These values have been referred from the IPCC default values, which is internationally accepted document, and hence this approach is considered appropriate and acceptable. Further, the parameters to calculate Baseline Emissions and their default values have been assessed in detail in section 3.10 of this report.

use must be accounted for within the 0.0012 and 0.00075 TJ delivered/capita/year, respectively. The result must be scaled appropriately using the average household size ($Hh_{i,k}$) to obtain the value of $BC_{b,y,i}$.	

In case of electric devices like electric pressure cooker (EPC) specific energy consumption for both baseline and project scenarios is conducted using a Controlled Cooking Test (CCT) which is conducted as per the standard protocol prescribed Clean Cooking Alliance//The relevant baseline parameters has been assessed in detail in section 3.10.

The following equation has been assessed and deemed appropriate:

$$EC_{y,i} = EC_{p,y,j,k} \times 0.0036 \times \frac{SC_{p,j}}{SC_{b,i}} \quad (3)$$

Where:

$EC_{y,i}$	Average energy consumption of baseline device type *i* in year *y* (TJ)
$EC_{p,y,j,k}$	Annual consumption of electricity by electric project device type j from batch k in year y (MWh)
$SC_{p,j}$	Specific energy consumption of project device type *j* (EPC) in the project scenario (TJ/test/person)
$SC_{b,ji}$	Specific energy consumption of baseline device type *i* in the baseline scenario (TJ/test/person)

$EC_{p,y,j,k}$ is determined as per instructions in project emission and has been assessed in the following section .

Cross-check of $EC_{y,I}$

The methodology as a conservative approach provides cross check for $EC_{y,I}$, wherein the quantity of energy determined by Option 1 or Option 2 must be compared to the project energy $EC_{p,y}$ using back-calculation. The following calculation is employed for same:

$$EC_{est,y} = EC_{p,y} \times \frac{\eta_{new,i,k,y}}{\eta_{old,avg}} \quad (4)$$

Where:

$EC_{p,y}$	Energy used in project scenario during year *y* (TJ)
$EC_{est,y}$	Back-calculated energy consumption of the potential mix of devices and fuels in the baseline in year *y* (TJ)
$\eta_{new,j,k,y}$	Efficiency of project device type *j* from batch *k* in year *y* (fraction)

$\eta_{old,avg}$ Weighted average efficiency of baseline devices *i* that are replaced by project device type *j* (fraction)

$EC_{p,y}$ must be determined as follows, using the parameters determined as per Section **Error! Reference source not found.**.

$$EC_{p,y} = BC_{p,y,j,k} \times NCV_{p,j} \quad (5)$$

Where:

$BC_{p,y,j,k}$ Average quantity of fuel used by project device type j from batch *k* during year *y* (tonnes or m³)

$NCV_{p,j}$ Net calorific value of project fuel used in project device type j (TJ/tonne or TJ/m³)

The following scenarios are identified in case the baseline consumption is higher that back calculation from project scenario:

SCENARIO	VVB ASSESSMENT
Scenario 1 For all devices excluding electric cooking devices with efficiency of 70% or higher: back-calculation results ($EC_{est,y}$) must be applied in equation (1) as a conservative cap	This approach avoids over estimation of emission reductions, given that the lower possible value for baseline fuel consumption is being utilized, it is considered conservative and appropriate.
Senario 2: For electric cooking devices with efficiency of 70% or higher: back-calculation result is considered a reference value and project proponents may justify why it is not an appropriate cap by referring to peer-reviewed literature, third party assessments and/or official data or statistics. Where it is not possible to justify the energy use using these sources of information, then the reference value must be applied as a conservative cap.	Given the high efficiency of project CEP, provision is provided for justifying the baseline fuel consumption in line with recognized, peer reviewed and published data sources. However, in absence of same, the lower value is achieved from back calculation is applied, which is considered conservative and appropriate.

Where the results indicate that baseline consumption is higher than that indicated by back-calculation from the project scenario, then the back-calculation results ($EC_{est,y}$) must be applied in equation (1) as a conservative cap, except for the case where project devices are electric cooking devices with efficiency of 70% or higher. For this case, the back-calculation result is considered a reference value and project proponents may justify why it is not an appropriate cap by referring to peer-reviewed literature, third party assessments and/or official data or statistics. Where it is not possible to justify the energy use using these sources of information, then the reference value must be applied as a conservative cap.

The methodology approach for quantification of baseline GHG emissions builds upon the approach adopted by AMS IIG and provides additional scope for project devices utilizing electricity

whith ancillary components which may affect energy consumption. The procedures for calculating baseline emissions cover all GHG sources, sinks and reservoirs included in the project boundary.
• All equations and formulae used are appropriate and without error. Through review of the quantification requirements, the assessment team found issues/errors in equations, etc., were corrected throughout the process enough to reasonably assure the assessment team that the resulting baseline calculations of the methodology were appropriate and without error.
• All default factors used are appropriate and in conformance with VCS Program requirements or same. The assessment team noted default factors in subject findings, and through the methodology assessment process, the default factors were considered appropriate for the methodology. Through detailed review during the methodology assessment process, the assessment team can confirm with reasonable assurance that all procedures for estimating the baseline emissions are appropriate and without error.

3.9.2 Project Emissions

The equations for project emissions are provided in Section 8.2 and found appropriate.

The procedures for calculating project emissions and removals are given below:

Project emissions are calculated as follows:

$$PE_y = PE_{energy,y} + PE_{others,y} + PE_{pre-project,y} \quad (6)$$

Where:

PE_y	=	Project emissions during year *y* (t CO_2e)
PE_{energy}	=	Project emissions from energy consumption of project devices in year *y* (t CO_2e)
$PE_{others,y}$	=	Project emissions from other sources in year *y* (t CO_2e)
$PE_{pre-project,y}$	=	Project emissions from energy consumption of pre- project devices in year *y* (t CO_2e)

i.$PE_{energy,y}$

To determine project emissions from energy consumption of project devices ($PE_{energy,y}$), one of the following approached are utilized :

1. $PE_{energy,y}$ from Biomass, Fossil Fuels or Bioethanol

.

$$PE_{energy,y} = \sum_{j}\sum_{k} BC_{p,y,j,k} \times N_{y,j,k} \times NCV_{p,j} \times n_{j,k,y} \times \left(EF_{p,j,CO2} \times f_{NRB,y} + EF_{p,j,nonCO2}\right) \quad (6)$$

Where:

$PE_{energy,y}$ = Project emissions from energy consumption of project devices during year *y* (t CO_2e)

$BC_{p,y,j,k}$ = Average quantity of fuel used by project device type j from batch *k* during year *y* (tonnes or m^3)

$N_{y,i,k}$ = Number of commissioned project devices of type *j* from batch *k* in year y

$NCV_{p,j}$ = Net calorific value of project fuel used in project device type j (TJ/tonne or TJ/m^3)

$n_{j,k,y}$ = Proportion of commissioned project devices of type *j* from batch *k* that are still being used in year *y* (fraction)

$EF_{p,j,CO2}$ = CO_2 emission factor for fuel used by project device type j in the project scenario (t CO_2/TJ)

$f_{NRB,y}$ = Fraction of woody biomass established to be non-renewable used by project device in year *y* (fraction or %); this variable is not considered for fossil fuels

$EF_{p,j,nonCO2}$ = Non-CO_2 emission factor for fuel used by project device type j (t CO_2e/TJ)

Herein, parameter $BC_{p,y,j,k}$ is calculated via two approaches :

APPROACH	VVB ASSESSMENT
Kitchen Performance Test:	This is considered a Credible and reliable source with reproducible results which can be presented at time of validation. The following documents were referred by VVB to assess the appropriateness of this approach: *1.Kitchen Performance Test Protocol /36/ as prescribed by the Clean Cooking Alliance (https://cleancooking.org/research-evidence-learning/standards-testing/protocols/* 2. CDM *Standard for sampling and surveys for CDM project activities and programmes of activities*./19/

	3. "Community Forestry Field Manual 1: Guidelines For Planning, Monitoring And Evaluating Cookstove Programmes, By Stephen Joseph, edited and designed by Carla R.S. Koppell FAO, Rome 1990,/47/ 4. Guidelines for Woodfuel Surveys. F.A.O, By Keith Openshaw/48/
Direct Measurement:	The parameter is measured continuously through meter records, for representative sample, in line with CDM Standard for Sampling and surveys for CDM project activities and programmes of activities/19/. This is found in line with section 3.9 of VCS methodology requirements/9/

This parameter has been assessed in detail in section 3.10.1

2. PE $_{energy,y}$ from Electricity

. calculated as follows:

$$PE_{energy,y} = \sum_i \sum_j EC_{p,y,j,k} \times N_{y,j,k} \times n_{j,k,y} \times EF_{el,y} \times (1 + TDL_{j,y}) \quad (7)$$

Where:

$EC_{p,y,j,k}$	Annual consumption of electricity by electric project device type j from batch k in year y (MWh)
$N_{y,j,k}$	Number of project devices of type j from batch *k* commissioned during year *y*
$n_{j,k,y}$	Proportion of commissioned project devices of type *j* from batch *k* that are still being used in year *y* (fraction)
$EF_{el,y}$	Emission factor of the electricity system (t CO_2e/MWh); this is zero for 100 percent renewable sources
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to project device type j in year *y*

Herein, parameter $EC_{p,y,j,k}$ is calculated via two approaches :

APPROACH	VVB ASSESSMENT
Kitchen Performance Test :	This is considered a Credible and reliable source with reproducible results which can be presented at time of validation. The following documenst were referred by VVB to assess the appropriateness of this approach:

	1.Kitchen Performance Test Protocol /36/ as prescribed by the Clean Cooking Alliance (https://cleancooking.org/research-evidence-learning/standards-testing/protocols/ 2. CDM Standard for sampling and surveys for CDM project activities and programmes of activities/19/ 3. "Community Forestry Field Manual 1: Guidelines For Planning, Monitoring And Evaluating Cookstove Programmes, By Stephen Joseph, edited and designed by Carla R.S. Koppell FAO, Rome 1990,/47/ 4. Guidelines for Woodfuel Surveys. F.A.O, By Keith Openshaw/48/
Direct Measurement:	The parameter is measured continuously through meter records, for representative sample, in line with CDM Standard for Sampling and surveys for CDM project activities and programmes of activities/19/. This is found in line with section 3.9 of VCS methodology requirements/9/

This parameter has been assessed in detail in section 3.10.1.

ii. PE $_{others,y}$ from Transportation, Fuel Production, Fugitive Emissions and Backup Generators

The parameter is calculated based on the following equation:

$$PE_{others,y} = PE_{transp,y} + PE_{prod,y} + PE_{fugitive,y} + PE_{backup,y} \quad (9)$$

Where:

$PE_{others,y}$ = Project emissions from other sources in year *y* (t CO_2e)
$PE_{transp,y}$ = Project emissions due to fuel transportation in year *y* (t CO_2e)
$PE_{prod,y}$ = Project emissions due to fuel production in year *y* (t CO_2e)
$PE_{fugitive,y}$ = Fugitive emissions in year *y*
$PE_{backup,y}$ = Project emissions from backup generators in year *y* (t CO_2e)

Apart from Project emissions arising from backup generators, the methodology does not provide equations for measuring emissions from the other components of the above parameter, and refers to other recognized TOOLs and methodologies for tejh same.

VVB has assessed CDM Tool 12 /51/, CDM Tool 16/50 and 15 /53/ and methodology AMS III. K./54/54 for ascertaining appropriateness of calculation of emissions from transportation, fuel

production (biomass derived fuels amd LPG) and Fugitive emissions respectively, These standard documents are found as credible reference sources for the same.

iii.PE pre-project,y

It is to be noted that the energy from pre project cookstoves is included only when the cross check results from baseline parameter $EC_{y,l,}$ showcases that the baseline consumption is more than the back calculation from the project scenario. In these cases, it is to be confirmed if the KPT surveys showcase results for pre-project cookstoves, and if found so, emissions from the same must be accounted for. This is approach is found comprehensive and conservative as it ensures that the prep project devices within the project boundary are also accounted for. The following equation is used for the same:

$$PE_{pre-project,y} = \sum_{j}\sum_{k} BC_{pre-p,y,i,j} \times N_{y,j} \times NCV_{b,i} \times \left(EF_{b,i,CO2} \times f_{NRB,y} + EF_{b,i,nonCO2}\right) \quad (8)$$

Where:

$PE_{pr\text{-}project,y}$	Project emissions from energy consumption of pre- project devices in year *y* (t CO_2e)
$BC_{pre\text{-}p,y,i,j}$	Average quantity of fuel used by pre-project device *i* stacked with project device type j during year *y* (tonnes or m^3)
$N_{y,i}$	Number of commissioned project devices of type *j* from batch *k* in year y
$NCV_{b,i}$	Net calorific value of fuel used in pre- project device *i* (TJ/tonne or TJ/m^3)
$EF_{b,i,CO2}$	CO_2 emission factor for fuel used by pre- project device *i* in the project scenario (t CO_2/TJ)
$f_{NRB,y}$	Fraction of woody biomass established to be non-renewable used by pre-project device in year *y* (fraction or %); this variable is not considered for fossil fuels
$EF_{b,i,nonCO2}$	Non-CO_2 emission factor for fuel used by pre-project device *i* (t CO_2e/TJ)

VVB confirms that all above equations have been thoroughly assessed. The procedures instituted for calculating project emissions and removals are robust and technically appropriate for the activities encompassed within the methodology. The extensive coverage of all relevant GHG sources, sinks, and reservoirs ensures accurate emissions quantification. The clarity of algorithms and formulas, coupled with adherence to VCS Program requirements, underpins the integrity of the emissions calculations.

All default factors used are appropriate and in conformance with VCS Program requirements or same. The assessment team noted default factors in subject findings, and through the methodology assessment process, the default factors were considered appropriate for the methodology.

Furthermore, the methodologies for estimating key parameters related to emissions quantification are rigorously structured and effective. Consequently, this assessment concludes that the existing procedures are suitable for accurately measuring and managing GHG emissions from the project activities, ensuring compliance with environmental standards and contributing to the sustainability objectives of the project.

3.9.3 Leakage Emissions

The methodology provides three project scenarios for possible leakage i.e.:

1. Leakage Emissions Associated with the Reduced or Avoided Use of Non-Renewable Biomass
    a) Use of non-renewable biomass by users not participating in the project
    b) Reuse of technologies replaced by project devices outside the project boundaries
2. Leakage Emissions Associated with the Use of Renewable Biomass
    a) Shift of pre-project activities due to dedicated plantations for renewable biomass supply
    b) Diversion of biomass residues from other uses to the project activity
3. Leakage Emissions Associated with Fossil Fuel Use
    a) Increased emissions from fossil fuels by users not participating in the project

As per standard protocol (refer equation 12 of methodology), Leakage Emissions are subtracted from gross emission reductions, Leakage due to use of non-renewable biomass Increased emissions from fossil fuels, both by users not participating in the project, a net-to-gross adjustment factor of 0.95 is applied to all project activities to account for leakage. This is in line with established practice as per AMS II G /03/; VVB has assessed “Annex 5 - Information note on the rationale for default factors used in AMS-I.E. and AMS-II.G.” /49/of the SSC WG 42 meeting report for assessing the appropriateness of the derivation of the default. In cases where leakage is associated with use of renewable biomass, Leakage emissions arising due to the shift of pre-project activities due to the plantations and from the diversion of biomass residues from other applications is measured through the latest version of CDM TOOL 16 /50/. VVB has assessed the same confirms its appropriateness with regards to calculating leakage from renewable biomass.

It is to be noted that in case of reuse of technologies replaced by project devices outside the project boundaries, only when displaced technology is reused in place of a lower-emitting technology than would have occurred in the absence of the project., leakage emissions are to be accounted for via monitoring surveys and/or by applying conservative assumptions. This approach is found conservative and hence appropriate.

3.9.4 GHG Emission Reductions and Carbon Dioxide Removals

Net GHG emission reductions and removals are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (12)$$

BE_y = Baseline emissions during year y (t CO_2e)
PE_y = Project emissions during year y (t CO_2e)
LE_y = Leakage in project scenario during year y (t CO_2e)
ER_y = Emission reductions during year y (t CO_2e)

VVB can confirm that this approach was acceptable and that the approach has been clearly described.
The net GHG Emissions is provided by single encompassing equation that is used to calculate the number of VCUs for a given monitoring period. This calculation includes summing the calculated VCUs of all project activities housed under the methodology framework, including emissions from energy consumption from project and baseline devices, other sources (Transportation, Fuel Production, Fugitive Emissions and Backup Generators) and energy consumption of pre project devices.

While the underlying processes for calculating the VCUs (including the associated uncertainty) associated with baseline and project activities have been extrapolated upon in previous sections, the assessment team can confirm that the culminating equation i.e Equation 12 (and sub parts) is appropriate and without error and provides an appropriately conservative quantification of net reduction of the net reduction or sequestration of greenhouse gas emissions

3.10 Monitoring, Data and Parameters

Both monitored and ex ante data and parameters used in the emissions calculations are defined in the Methodology clearly and appropriately, making it possible for the emission reductions to be estimated and verified. The data unit, description, and sources of data for each parameter are described clearly.

Parameters available at validation and the appropriateness of data unit, source of data, value applied, justification of choice of data or description of measurement methods and procedures applied, and purpose of data are discussed below in each parameter table:

Data/Parameter	$EF_{b,i,CO2}$ $EF_{p,j,CO2}$ $EF_{fuel,i}$	VVB Assessment
Data unit	tCO_2/TJ	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	CO2 emission factor for fuel used by baseline device type *i* in the baseline scenario CO_2 emission factor for fuel used by project device type *i* in the project scenario Emission factor of the fuel used by backup generator i	NA
Source of data	The following data sources may be used, in order of preference: 1) Project specific value 2) Regional or national default values 3) Default value from the latest version of the IPCC Guidelines for National Greenhouse Gas Inventories	The parameter relies on using project specific value as the preferred source, followed by regional/ national defaults or IPCC defaults/32/ for emission factor, thus ensuring accuracy of emission factors is maintained with respect to the specific project scenario to the extent possible. Only where data sources for calculation of emission factor are not available, other national or IPCC defaults are used.
Value applied	Will depend on the source of data chosen.	Value based on source; no further assessment required.
Justification of choice of data or description of measurement methods and procedures applied	The values must be determined ex ante by using one of the following options: 1) Testing in accredited/recognized laboratories. Measurements must be undertaken in line with national or international fuel standards. 2) Use national default values 3) Use default values from the latest version of the *IPCC*	The sources for all three options are specified clearly in line with section 3.9 of VCS methodology requirements/9/: 1.Testing in accredited labs: Credible and reliable source with reproducible results which can be presented at time of validation 2.National Defaults: Credible and reliable source with reproducible results which can

	Guidelines for National Greenhouse Gas Inventories **Wood:** 112 t CO_2/TJ **Charcoal:** • 112 t CO_2/TJ (combustion only). Apply when renewable charcoal is used in the project and emissions from production of charcoal are estimated as project emissions ($PE_{fugitive.y}$). • 165.22 t CO_2/TJ (combustion and charcoal production emissions). Apply when non-renewable biomass charcoal is used in the baseline, or in the baseline and project. IPCC Guidelines are a recognized source	be presented at time of validation 3. Default IPCC values: Credible and reliable source with reproducible results which can be presented at time of validation. The values provided are consistent with *IPCC Guidelines for National Greenhouse Gas Inventories*/32/ and therefore, acceptable.
Purpose of data	Calculation of baseline and project emissions	Purpose of data is accurately reported.

Data/Parameter	$EF_{b,i,nonCO2}$ $EF_{p,j,nonCO2}$	**VVB Assessment**
Data unit	t CO_2e/TJ	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Non-CO_2 emission factor for fuel used by baseline device type *i* in the baseline scenario Non-CO_2 emission factor for fuel used by project device type *i* in the project scenario	NA
Source of data	The following data sources may be used, in order of preference: 1) Project specific value 2) Regional or national default values 3) Default value from the latest version of the IPCC Guidelines for National Greenhouse Gas Inventories	The parameter relies on using project specific value as the preferred source, followed by regional/ national defaults or IPCC defaults for emission factor, thus ensuring accuracy of emission factors is maintained with respect to the specific project scenario to the extent

		possible. Only where data sources for calculation of emission factor are not available, other national or IPCC defaults are used.
Value applied	Will depend on the source of data chosen.	Value based on source; no further assessment required.
Justification of choice of data or description of measurement methods and procedures applied	The values must be determined ex ante by using one of the following options: 1) Testing in accredited/recognized laboratories. Measurements must be undertaken in line with national or international fuel standards 2) Use national default values 3) Use default values from the latest version of the *IPCC Guidelines for National Greenhouse Gas Inventories* **Wood:** 9.46 tCO_2e/TJ (AR5 GWP) **Charcoal:** 5.865 tCO_2e/TJ (Combustion only -AR5 GWP) 44.83 tCO2e/TJ (includes charcoal production) IPCC Guidelines are a recognized source	The sources for all three options are specified clearly in line with section 3.9 of VCS methodology requirements/9/: 1.Testing in accredited labs: Credible and reliable source with reproducible results which can be presented at time of validation 2.National Defaults: Credible and reliable source with reproducible results which can be presented at time of validation 3. Default IPCC values: Credible and reliable source with reproducible results which can be presented at time of validation. The values provided are consistent with *IPCC Guidelines for National Greenhouse Gas Inventories* /32/and therefore, acceptable.
Purpose of data	Calculation of baseline emissions	Purpose of data is accurately reported.

Data/Parameter	$NCV_{b,l}$, $NCVp,j$ NCV_j	**VVB Assessment**
Data unit	TJ/tonne or TJ/m^3	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Net calorific value of baseline fuel used by baseline device type *i*	NA

	Net calorific value of project fuel used by project device type j Net calorific value of fuel used by backup generator *i*	
Source of data	The following data sources may be used, in order of preference: 1) Project specific values 2) National default value 3) Latest version of the *IPCC Guidelines for National Greenhouse Gas Inventories*	The parameter relies on using project specific value as the preferred source, followed by regional/ national defaults or IPCC defaults for emission factor, thus ensuring accuracy of emission factors is maintained with respect to the specific project scenario to the extent possible. Only where data sources for calculation of emission factor are not available, other national or IPCC defaults are used.
Value applied	Will depend on the source of data chosen.	Value based on source; no further assessment required.
Justification of choice of data or description of measurement methods and procedures applied	The values must be determined ex ante by using one of the following options: 1) Testing using standardized methods (e.g., ASTM D5865-12, ISO 1929) 2) Use regional or national default values 3) Use default values from the latest version of the *IPCC Guidelines for National Greenhouse Gas Inventories* The values for wood and charcoal of the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* are: • **Wood:** 0.0156 TJ/tonne • **Charcoal:** 0.0295 TJ/tonne IPCC Guidelines are a recognized source	The sources for all three options are specified clearly in line with section 3.9 of VCS methodology requirements/9/: 1.Testing using standardized methods: Credible and reliable source with reproducible results which can be presented at time of validation 2.National Defaults: Credible and reliable source with reproducible results which can be presented at time of validation 3. Default IPCC values: Credible and reliable source with reproducible results which can be presented at time of validation. The values provided are consistent with *IPCC Guidelines for National Greenhouse Gas Inventories*/32/ and therefore, acceptable.
Purpose of data	Calculation of baseline emissions	Purpose of data is accurately reported.

Data/Parameter	$\eta_{old,i,j}$	VVB Assessment
Data unit	Fraction	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Efficiency of baseline device *i* that is replaced by project device of type *j*	NA
Source of data	The efficiency must be established using one of the following methods, and the corresponding documentation must be presented: 1) For three-stone fire using firewood or a cookstove with no improved combustion air supply or flue gas ventilation, default value of 15% For other baseline devices: 2) Water Boiling Test surveys in compliance with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities*; 3) Manufacturer-certified value that is determined via the Water Boiling Test; 4) Certification by the host country's national standard body or certifying agency; or 5) Approved default values from the most recent version of CDM TOOL33.	The parameter relies on using default value of 15%, in cases where the baseline stove is a TSF or a cookstove with no improved combustion, air supply or flue gas ventilation. Thlis in line with section 5.6 of the latest version of CDM TOOL 33. /27/ For other baseline devices, the sources for all four options are specified clearly in line with section 3.9 of VCS methodology requirements/9/: Water Boiling Test Surveys: Credible and reliable source with reproducible results which can be presented at time of validation. Representative sample is chosen in line with CDM Standard for sampling and surveys for CDM project activities and programmes of activities; while the WBT is conducted in accordance with atest WBT protocol prescribed by Clean Cooking Alliance/35/, both of which are acceptable reference/guiding documents. Manufacturer-certified value that is determined via the Water Boiling Test/35/; Credible and reliable source with reproducible

		results which can be presented at time of validation Certification by the host country's national standard body or certifying agency: Credible and reliable source with reproducible results which can be presented at time of validation Approved default values from the most recent version of CDM TOOL33/27/. : Credible and reliable source with reproducible results which can be presented at time of validation. This ensured that the concerned parameter has a standardized value.
Value applied		Value based on source; no further assessment required.
Justification of choice of data or description of measurement methods and procedures applied	These are recognized methods and sources	The sources for all three options are specified clearly in line with section 3.9 of VCS methodology requirements/9/: Further all methods and sources are credible, recognized and hence found acceptable. The documents refereed for assessing the same include: 1. The Water Boiling Test Version 4.2.3 (https://cleancooking.org/research-evidence-learning/standards-testing/protocols/)/35/ 2. CDM *Standard for sampling and surveys for CDM project activities and programmes of activities*;/19/

		3. CDM TOOL 33 Ver 2., Methodological tool Default values for common parameters/27 / The approach is found Credible and reliable source with reproducible results which can be presented at time of validation.
Purpose of data	Calculation of baseline emissions	Purpose of data is accurately reported.
Data/Parameter	$Hh_{i,k}$ $Hh_{j,k}$	**VVB Assessment**
Data unit	Equivalent standard male adults	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Average household size of the target population using device type *j* from batch *k*	NA
Source of data	Baseline survey The campaign must achieve a confidence and precision of at least 90/10 for the target parameter of average household size.	The parameter relies on using project specific achieved from the baseline survey, ensuring accuracy of household size.
Value applied		NA
Justification of choice of data or description of measurement methods and procedures applied	Recognized survey methods based on the *CDM Standard for sampling and surveys for CDM project activities and programmes of activities*	Sampling is done as per recognized guiding document 'CDM Standard for sampling and surveys for CDM project activities and programmes of activities'/19/ 'latest version, while the 'equivalent male adults' or household size is determined in line with Procedural Note 5 of the "Community Forestry Field Manual 1: Guidelines For Planning, Monitoring And Evaluating Cookstove Programme",(https://www.fao.org /4/u1310e/U1310e03.htm)/47/ which was prepared by Stephen

		Joseph, edited and designed by Carla R.S. Koppell FAO, Rome 1990, and is a peer reviewed and published piece literature, hence considered appropriate guidance for the exercise. VVB has assessed the Procedural Note 5 defines “standard adult" according to a simplified version of the League of Nations formula given in the “Guidelines for Woodfuel Surveys. F.A.O,” by Keith Openshaw.)/48/ The approach is found Credible and reliable source with reproducible results which can be presented at time of validation.
Purpose of data	Estimation of average energy consumption when applying Option 1: Measurement campaign Cross-checking energy and fuel consumption values	Purpose of data is accurately reported.

Data/Parameter	$SC_{b,i}$ $SC_{p,j}$	**VVB Assessment**
Data unit	TJ/test/person	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Specific energy consumption of baseline device type *i* in the baseline scenario Specific energy consumption of project device type *i* in the project scenario	NA
Source of data	Controlled Cooking Test following the latest version of the Controlled Cooking Test (CCT) Protocol (Clean Cooking Alliance) and in compliance with the CDM Standard for sampling and surveys for CDM project activities and programmes of activities. The campaign must achieve a confidence and precision of at least	The source specified is clearly in line with section 3.9 of VCS methodology requirements/9/: The parameter relies on results of the Controlled Cooking Test conduct, which is a credible and reliable source with reproducible results which can be presented at time of validation. Representative sample is chosen in line with CDM

	90/10 for the target parameter of TJ/test/person. Where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per the latest CDM Standard for sampling and surveys for CDM project activities and programmes of activities, section 3.5 .	Standard for sampling and surveys for CDM project activities and programmes of activities/19/; while the CCT is conducted in accordance with latest CCT protocol/34/ (Prepared by Rob Bailis for the Household Energy and Health Programme, Shell Foundation) prescribed by Clean Cooking Alliance (https://cleancooking.org/research-evidence-learning/standards-testing/protocols/), both of which are acceptable reference/guiding documents. Survey is conducted in line with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities/19/,* which is a credible guiding document, recognized across registries, In cases wherein the target precision is not achieved, appropriate conservativeness deduction is applied, which is in line with section 3.5 the latest CDM Standard for sampling and surveys for CDM project activities and programmes of activities/19/, hence found appropriate approach. It is to be noted that the standardized cooking tasks performed on the baseline stove must also be compatible with the project stoves.
Value applied	N/A	NA
Justification of choice of data or description of measurement methods and procedures applied	This parameter must be estimated ex ante.	
Purpose of data	Calculation of baseline and project emissions	Purpose of data is accurately reported.

Data/Parameter	$BC_{ex\text{-}ante,b,i,}$	VVB Assessment
Data unit	Tonnes	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Ex-ante average quantity of fuel used per baseline device type *i* annually	NA
Source of data	**Option 1:** A measurement campaign following the Kitchen Performance Test protocol must be designed, carried out and analyzed in compliance with the latest version of the CDM Standard for sampling and surveys for CDM project activities and programmes of activities. The campaign must achieve a confidence and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. Where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per the latest CDM Standard for sampling and surveys for CDM project activities and programmes of activities, section 3.5. The result must be scaled appropriately using the average household size to obtain the value of $BC_{ex\text{-}ante,b,i}$. **Option 2**: Calculated based on the default value for the average annual consumption of woody biomass per person for cooking - Firewood: 0.5 tons/capita/year of air-dried wood (From 0.0012 TJ delivered/capita/year with	Option 1: The parameter relies on using project specific value achieved as result campaign conducted in accordance with KPT protocol/36/ as the preferred source. Survey is conducted in line with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities/19/,* which is a credible guiding document, recognized across registries, and the results, consequently, are extrapolated to the project specific average household size. This source is found credible and reliable with reproducible results which can be presented at time of validation Option 2: The second approach is to calculate parameter on basis of the the default value for the average annual consumption of woody biomass per person for cooking. The default values are found in line with CDM Tool 33, Ver 2.0./27/ This source is also found credible and reliable with reproducible results which can be presented at time of validation

	0.0156 TJ/tons NCV, and thermal efficiency of 15%) - Charcoal: 0.1 tons/capita/year (From 0.00075 TJ/delivered/capita/year with 29.5 TJ/tons NCV, and thermal efficiency of 25%.) When fuels other than firewood or charcoal are in the respective baselines, their energy use must be accounted for in the 0.0012 and 0.00075 TJ delivered/capita/year, respectively. The default value must be scaled appropriately using the average household size to obtain the value of $BC_{ex\text{-}ante,b,i}$.	
Value applied	N/A	NA
Justification of choice of data or description of measurement methods and procedures applied	-	NA
Purpose of data	Calculation of baseline emissions	Purpose of data is accurately reported.

Data/Parameter	CF	**VVB Assessment**
Data unit	-	*NA*
Description	Wood-to-charcoal conversion factor	N/A
Source of data	Options: 1) CDM TOOL33 default value, or 2) Field tests - project participants must determine the factor applicable to the geographical area(s) from which the charcoal is sourced, based on the	The parameter relies on using default values as per the latest version of CDM TOOL 33/27/, which is the recognized methodological tool for Default values for common parameters, including that of the charcoal conversion factor. value as the preferred source, followed by Field tests, wherein the survey protocol /field test of kilns must be

		results of the baseline survey described in Baseline Scenario Survey Requirements. The field tests of kilns on a sample basis must follow a method described in peer-reviewed literature, or an accepted standard for such testing, once available. The sampling must comply with the latest version of the CDM Standard for sampling and surveys for CDM project activities and programmes of activities and achieve confidence and precision of at least 90/10 for the target parameter of average dry wood input per ton of charcoal output. Where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per the latest *CDM Standard for sampling and surveys for CDM project activities and programmes of activities, section 3.5.*	in line with peer in peer-reviewed literature, or an accepted standard for such testing thus ensuring accuracy of commission factor is maintained with respect to the specific baseline scenario to the extent possible. Field test is carried out on representative sample in line with the latest version of the CDM Standard for sampling and surveys for CDM project activities and programmes of activities In cases wherein the target precision is not achieved, appropriate conservativeness deduction is applied, which is in line with section 3.5 the latest CDM Standard for sampling and surveys for CDM project activities and programmes of activities/19/, hence found appropriate approach.
Value applied	a)	4 tons of dry wood input per ton of charcoal output. However, a project developer can use a default value of up to 6 tons of dry wood input per ton of charcoal output if the value is substantiated by government approved/endorsed national or regional values.	The value applied is as per source, i.e. either default value or as per field test results. Value of 4 tons of dry wood input per ton of charcoal output is based on source and is in line with section 5.3 of the latest version of CDM TOOL 33/27/, hence found acceptable. Additional provision for use of value up to 6 tons of dry wood input per ton of charcoal output has also been

	b) As per the results of the field tests.	provided, as was stipulated in AMS II G ,version 12/03/, However, as crosscheck, this must be substantiated recognized national or regional values. This is acceptable as it is a credible and reliable source with reproducible results which can be presented at time of validation
Justification of choice of data or description of measurement methods and procedures applied	-	NA
Purpose of data	Calculation of baseline emissions	Purpose of data is accurately reported.

Requirements for data and calculation reviews are clearly defined in the Methodology; these requirements are deemed proper by VVB to allow for uncertainties related to the emission reductions to be reduced in a reasonable manner.

CL#07 was raised and successfully resolved.

3.10.1 Data and Parameters Monitored

Monitored parameters that must be collected and archived are listed below:

Data/Parameter	$N_{y,j,k}$	**VVB Assessment**
Data unit	Number	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Number of commissioned project devices of type i from batch k in year y	NA
Source of data	Monitoring	The parameter relies on using project specific value which is monitored during project implementation.

Description of measurement methods and procedures to be applied	The following data must be recorded during project activity implementation: 1) Number of new devices distributed under the project activity, identified by the type of device and date of commissioning; and 2) Identification information of the recipient of the device distributed under the project activity (e.g., name, address, phone number). Data management and reporting of this information must adhere to both data privacy requirements and good practice.	The data source and its characteristics specified is clearly in line with section 3.9 of VCS methodology requirements/9/and with paragraph 45 of AMS II G v13.0/03/, which is recognized across registries (CDM, GS, VCS) and forms foundation for current methodology: 1) Number of new Devices distributed under project activity, identified by type of device and date of commissioning: Credible and comprehensive source ensuring all device types are inventoried and the number pf project technology days is not over ascertained during verification. 2) Identification information of the recipient of the device distributed under the project activity: Credible and comprehensive source, ensuring unambiguous identification of each CEP.
Frequency of monitoring/recording	Every time that new project devices are distributed	The parameter is updated continuously ensuring accuracy and completeness of data inventory. Also ensures that Emission reductions attributed to each CEP is for accurate duration of implementation.
QA/QC procedures to be applied		NA
Purpose of data	Calculation of baseline and project emissions	Purpose of data is accurately reported.
Calculation method		NA

Data/Parameter	$n_{j,k,y}$	**VVB Assessment**
Data unit	Fraction	The data unit is consistent and appropriate with respect to the equation applying this parameter.

		Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Proportion of commissioned project devices of type *j* from batch *k* that are still being used regularly in year *y*	NA
Source of data	Monitoring	The parameter relies on using project specific value which is monitored during project implementation.
Description of measurement methods and procedures to be applied	**Option 1 (SUMs):** Measured directly using stove use monitors (SUMs) in a sample of users according to the latest version of the CDM *Standard for sampling and surveys for project activities and programmes of activities* and achieving 90/10 confidence precision for the proportion of devices in operation. **Option 2 (surveys):** Based on an adoption rate determined by a survey according to the latest version of the CDM *Standard for sampling and surveys for project activities and programmes of activities* and achieving 90/10 confidence precision for the proportion of devices in operation. The lower end of the 90 percent confidence interval must be used to ensure conservatism. The adoption survey must include: 1) Kitchen observation; and 2) Interview with the primary cook. The project proponent must provide proof of training and supervision to ensure field teams have the capacity required to complete adoption surveys successfully. The average of the responses "yes" (1) to the adoption survey	The sources for both two options are specified clearly in line with section 3.9 of VCS methodology requirements/9/, with option 1 being preferred over Option 2 : Option 1 (SUMs): Credible and reliable source with verifiable results, ascertained from representative sample, with a 90/10 confidence /precision ratio in line with "CDM *Standard for sampling and surveys for project activities and programmes of activities"*/19/ and AMS- II.G/03/ , both of which are accepted and recognized across registries. Option 2 (Surveys): Credible and reliable source with verifiable results, the sampling is carried out in line with CDM *Standard for sampling and surveys for project activities and programmes of activities"*/19/, achieving a 90/10 confidence precision ratio. Minimum questionnaire requirement for the survey are specified ensuring key data are verified via both via verbal testimony of interview and visual observation of interviewee. In cases wherein the target precision is not achieved, appropriate conservativeness deduction is applied, which is in line with section 3.5 the latest CDM Standard for sampling and surveys for CDM

	question "If yes, have you used the stove regularly since you installed it?" (where this response is cross-checked and confirmed with the physical check of the stove and the coherency with the responses to the following questions of the survey), and “no” (0) to the question “do you use the project cookstove?” plus the responses “no” (0) to the survey question "If yes, have you used the stove regularly since you installed it?". For both options 1 and 2, where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per the latest CDM Standard for sampling and surveys for CDM project activities and programmes of activities, section 3.5 .	project activities and programmes of activities, hence found appropriate approach.
Frequency of monitoring/recording	**Option 1: (SUMs):** Continuous **Option 2 (surveys):** Annually	In case of Option 1, the parameter is measured annually, ensuring continuous monitoring, resulting in accuracy of assessment and reliable trend analysis of the usage and associated fluctuations. For Option 2, given the infeasibility of continuous assessment, the data is recorded annually.
QA/QC procedures to be applied	The date on which a sample project device stopped being used should be taken as follows: **Option 1: (SUMs):** The date on which the SUM ceased registering any activity of the project device **Option 2 (surveys):** Where the project device is not working or not being used at the time of conducting the survey, it should be conservatively assumed that	W.r.t option 1 , the end date of use of CEP is simply noted from the date SUM ceases to record data, hence indicating no use of device. For Option 2, wherein it is found during monitoring survey, that household does no longer use CEP, as conservative approach, the end date of use is considered as the date the preceding survey was conducted. Given monitoring is carried out as per designated frequency, this would

	the project device has not been active since the date on which the last adoption survey was conducted.	be a year before. This approach is found conservative and appropriate, minimizing risk of overestimation of emission reduction arising from nonfunctional devices.
Purpose of data	Calculation of baseline and project emissions	Purpose of data is accurately reported.
Calculation method	-	

Data/Parameter	$BC_{b,y,i,}$	**VVB Assessment**
Data unit	Tonnes	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Average quantity of fuel used per baseline device type *i* during year *y*	NA
Source of data	A measurement campaign following the Kitchen Performance Test protocol in control households that do not participate in the project, established prior to validation as statistically equivalent to the baseline project households in their pre-project fuel consumption.	The parameter is measured via the Kitchen Performance Test Protocol /36/ as prescribed by the Clean Cooking Alliance (https://cleancooking.org/research-evidence-learning/standards-testing/protocols/), which is the standardized industry practice for same. While the current version applicable is Version 4.0 (Originally prepared in 2003 by Rob Bailis with input from Kirk R. Smith and Rufus Edwards for the Household Energy and Health Programme, Shell Foundation; Revised in 2018 byRob Bailis, Ryan Thompson, Nicholas Lam, Victor Berrueta, Godfrey Muhwezi and Esther Adams), should there be future revisions, PP to conform to the latest version of the same.
Description of measurement methods and procedures to be applied	Follow-up baseline surveys must be conducted every two years in control households that do not participate in the project,	The source and approach specified is clearly in line with section 3.9 of VCS methodology requirements/9/:

	established prior to validation as statistically equivalent to the baseline project households in their pre-project fuel consumption. Measurement campaign must be updated when changes are reflected in the follow-up baseline surveys show that the fuels, fuel sources, and technologies is not statistically equivalent to the baseline project households in the pre-project. The measurement campaign must be designed, carried out and analyzed in compliance with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities*. The result must be scaled appropriately using the average household size to obtain the value of $BC_{b,y,i}$.	1.Follow up surveys are conducted bi-annually, hence ensuring that change in baseline conditions and consumption patterns are updated and accounted during implementation period. Given this is conducted on a pre-established 'control group', and that the survey design is constantly updated to reflect the developments that are not statistically equivalent to the baseline project households in the pre-project; it ensures accurate and near actual results and consumption patterns. Survey is conducted in line with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities/19/,* which is a credible guiding document, recognized across registries, and the results, consequently, are extrapolated to the project specific average household size.
Frequency of monitoring/recording	Every two years	The parameter is measured biennially, ensuring continuous monitoring, ensuring that the changing baseline landscape is comprehensively captured, resulting in accuracy of assessment and reliable trend analysis of fuel consumption patterns.
QA/QC procedures to be applied	The campaign must achieve a confidence and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. Where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per the latest *CDM Standard for sampling and surveys for CDM project activities*	In cases wherein the target precision is not achieved, appropriate conservativeness deduction is applied, which is in line with section 3.5,the latest CDM Standard for sampling and surveys for CDM project activities and programmes of activities/19/, hence found appropriate approach.

	and programmes of activities, section 3.5 .	
Purpose of data	Calculation of baseline emissions	Purpose of data is accurately reported.
Calculation method	-	NA

Data/Parameter	$BC_{p,y,j,k}$	**VVB Assessment**
Data unit	tonnes/year	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Average quantity of fuel used by project device type *j* from batch *k* during year *y*	NA
Source of data	Monitoring	The parameter relies on using project specific value which is monitored during project implementation.
Description of measurement methods and procedures to be applied	**For renewable and non-renewable biomass:** *Option 1: Kitchen Performance Test* A measurement campaign following the Kitchen Performance Test protocol must be designed, carried out and analyzed in compliance with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities*. The campaign must achieve confidence and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. The result must be scaled appropriately using the average household size to obtain the value of $BC_{p,y,j,k}$.	The sources for all three options are specified clearly in line with section 3.9 of VCS methodology requirements/9/, with option 1 being preferred over Option 2: Option 1 : The parameter is measured via the Kitchen Performance Test Protocol /36/ as prescribed by the Clean Cooking Alliance (https://cleancooking.org/research-evidence-learning/standards-testing/protocols/), which is the standardized industry practice for same. While the current version applicable is Version 4.0 (Originally prepared in 2003 by Rob Bailis with input from Kirk R. Smith and Rufus Edwards for the Household Energy and Health Programme, Shell Foundation; Revised in 2018 by Rob Bailis, Ryan Thompson, Nicholas Lam, Victor Berrueta, Godfrey Muhwezi and Esther Adams), should

	Option 2: Direct measurement Apply continuous direct measurement using equipment calibrated in accordance with national/international requirements. A sample of project devices may be measured in such a way that confidence and precision of 90/10 is achieved for the target parameter of total annual fuel use. The sampling must comply with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities*. *Option 3: Fuel purchase monitoring (only for project devices using fossil fuels or bioethanol)* Keep continuous records of all fuel purchases. Ensure fuel is used only for thermal energy generation by the project device, for example by using a fuel cylinder design that may only be attached to the project device. For any of the options above, where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per the latest *CDM Standard for sampling and surveys for CDM project activities and programmes of activities, section 4 .*	there be future revisions, PP to conform to the latest version of the same. Survey is conducted in line with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities/19/,* which is a credible guiding document, recognized across registries, and the results, consequently, are extrapolated to the project specific average household size. Option 2: Credible and reliable source with verifiable results, ascertained from representative sample, with a 90/10 confidence /precision ratio in line with "CDM *Standard for sampling and surveys for project activities and programmes of activities*"/19/ and AMS IIG/03/, both of which are accepted and recognized across registries. Option 3: Credible and reliable source with verifiable evidence for verification. w.r.t to fossil fuels and ethanol. fuel sources that are purchased, a continuous trail of purchase evidence i.e. receipts /invoices are maintained, caveat being fuel is used only for thermal generation. This approach is found acceptable and appropriate.
Frequency of monitoring/recording	Biennial or annual for KPT (option 1) Continuous and aggregated annually for options 2 and 3	The parameter is measured annually or biennially in case of Option 1 and continuously, aggregated annually for Option 2 and 3, ensuring continuous monitoring, ensuring that the fuel use in project scenario is comprehensively captured, resulting

		in accuracy of assessment and reliable trend analysis of fuel consumption patterns.
QA/QC procedures to be applied	As a crosscheck, compare results to government publications, peer-reviewed literature, third party assessments and/or official data or statistics. When SUMs are used for measuring project stove adoption, the stove usage indicated by the measurements for this parameter $BC_{p,y,i,k}$ must be consistent with the frequency of use indicated by the SUMs measurements.	Crosschecks in the form of news articles and literature review available in the public domain is employed. These are Credible and reliable source with reproducible results which can be used as a yardstick to the actual values achieved.
Purpose of data	Calculation of baseline and project emissions	Purpose of data is accurately reported.
Calculation method		NA

Data/Parameter	$BC_{pre\text{-}p,y,i,j}$	VVB Assessment
Data unit	tonnes/year	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Average quantity of fuel used by pre-project device i stacked with project device type j during year y	NA
Source of data	Monitoring	The parameter relies on using project specific value which is monitored during project implementation.
Description of measurement methods and procedures to be applied	*Kitchen Performance Test* A measurement campaign following the Kitchen Performance Test protocol must be designed, carried out and analyzed in compliance with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities*. The campaign must	The parameter is measured via the Kitchen Performance Test Protocol /36/ as prescribed by the Clean Cooking Alliance (https://cleancooking.org/research-evidence-learning/standards-testing/protocols/), which is the standardized industry practice for same. While the current version

	achieve confidence and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. The result must be scaled appropriately using the average household size to obtain the value of $BC_{pre\text{-}p,y,i,j}$.	applicable is Version 4.0 (Originally prepared in 2003 by Rob Bailis with input from Kirk R. Smith and Rufus Edwards for the Household Energy and Health Programme, Shell Foundation; Revised in 2018 by Rob Bailis, Ryan Thompson, Nicholas Lam, Victor Berrueta, Godfrey Muhwezi and Esther Adams), should there be future revisions, PP to conform to the latest version of the same. Survey is conducted in line with the latest version of the CDM Standard for sampling and surveys for CDM project activities and programmes of activities/19/, which is a credible guiding document, recognized across registries, and the results, consequently, are extrapolated to the project specific average household size.
Frequency of monitoring/recording	Biennial or annual for KPT	The parameter is measured annually or biennially, ensuring continuous monitoring, ensuring that the fuel use in project scenario is comprehensively captured, resulting in accuracy of assessment and reliable trend analysis of fuel consumption patterns.
QA/QC procedures to be applied	-	NA
Purpose of data	Calculation of project emissions	Purpose of data is accurately reported.
Calculation method	-	

Data/Parameter	$EC_{p,y,j,k}$	**VVB Assessment**
Data unit	MWh	The data unit is consistent and appropriate with respect to the equation applying this parameter.

		Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Annual consumption of electricity by electric project device type *j* from batch k in year *y*	NA
Source of data	Monitoring	The parameter relies on using project specific value which is monitored during project implementation.
Description of measurement methods and procedures to be applied	Apply direct measurement by metering. This may be applied to a sample of project devices, following the sampling approach described in the latest version of the CDM *Standard for Sampling and surveys for CDM project activities and programmes of activities* with a confidence level and precision of at least 90/10. Where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per the latest *CDM Standard for sampling and surveys for CDM project activities and programmes of activities, section 3.5 .*	The measures specified is clearly in line with section 3.9 of VCS methodology requirements/9/. The parameter is measured continuously through meter records, for representative sample, in line with CDM Standard *for Sampling and surveys for CDM project activities and programmes of activities/19/.*
Frequency of monitoring/recording	Continuous and aggregated annually	The parameter is measured continuously, aggregated annually for ensuring continuous monitoring, ensuring that the electricity use in project scenario is comprehensively captured, resulting in accuracy of assessment and reliable trend analysis of electricity consumption patterns.
QA/QC procedures to be applied	Measurement must use credible and calibrated equipment. Calibration frequency must be specified by the manufacturer. Attached or in-built data loggers may be used, where they conform with industry standards and are	It is ensured that the equipment used to monitor data are calibrated as per manufacturer's requirement. Further in cases where data recording devices are attached or in built, it is ensured this is calibrated

	calibrated according to relevant national requirements. As a crosscheck, compare measurements to government publications, peer-reviewed literature, third party assessments and/or official data or statistics. Where it is not possible to justify the energy use using these sources of information, the reference value must be used in Equation **Error! Reference source not found.** while the real monitored value should be used in Equation **Error! Reference source not found.**.	as the relevant national requirement. Crosschecks in the form of news articles and literature review available in the public domain is employed. These are Credible and reliable source with reproducible results which can be used as a yardstick to the actual values achieved.
Purpose of data	Calculation of baseline and project emissions	Purpose of data is accurately reported.
Calculation method	-	

Data/Parameter	$\eta_{new,j,k,y}$	**VVB Assessment**
Data unit	Fraction	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Efficiency of project device type *j* from batch *k* in year *y*	NA
Source of data	Monitoring	The parameter relies on using project specific value which is monitored during project implementation.
Description of measurement methods and procedures to be applied	The efficiency must be established using one of the following methods, and the corresponding documentation must be presented: 1) Water Boiling Test campaigns achieving 90/10 confidence and precision levels as per the latest version of the CDM *Standard for sampling and surveys for*	The sources for all three options are specified clearly in line with section 3.9 of VCS methodology requirements/9/: Water Boiling Test Surveys: Credible and reliable source with reproducible results which can be presented at time of verification. Representative sample is chosen in line with CDM Standard for sampling and surveys for CDM project activities and programmes of activities; while the WBT is conducted

	CDM project activities and programmes of activities. 2) Manufacturer-certified value that is determined via Water Boiling Test; or 3) Certification from the host country's national standard body or certifying agency. The loss in thermal efficiency of project device *i* from batch *k* due to aging must be accounted for during the monitoring period, as presented below. For devices using biomass or fossil fuel one of the following options must be selected, in order of preference: a) Standard Water Boiling Test campaigns b) A linear decrease approach, applying a default schedule of linearly decreasing efficiency up to the terminal efficiency (assumed to be 25 percent) through the life span of the project device. c) For all other electric project devices, efficiency loss is calculated by measuring the total heat absorbed by a known mass for a given time and dividing it by the input of electrical energy measured by a power analyzer and comparing to the result of the previous year.	in accordance with atest WBT protocol prescribed by Clean Cooking Alliance/35/, both of which are acceptable reference/guiding documents. Manufacturer-certified value that is determined via the Water Boiling Test; Credible and reliable source with reproducible results which can be presented at time of verification Certification by the host country's national standard body or certifying agency: Credible and reliable source with reproducible results which can be presented at time of verification. Further, loss in thermal efficiency arising in account of age of CEP is reported via the following means, all of which are clearly in line with section 3.9 of VCS methodology requirements/9/: • Standard Water Boiling Test campaigns: Credible and reliable source with reproducible results which can be presented at time of verification, the WBT is conducted in accordance with latest WBT protocol prescribed by Clean Cooking Alliance/35/ • A linear decrease approach for electric CEPs: Credible and reliable source with reproducible results which can be presented at time of verification. Herein a default schedule of linearly decreasing efficiency up to the terminal efficiency is employed. The terminal efficiency i.e. the minimum efficiency of project stove is set at 25% which is in line with recognized

		methodologies AMS II G/03/ and VMR0006/02/. • In case of electric devices, loss of efficiency is given standard practice: $\Delta\eta=\eta_{previous}-\eta_{current}$ Wherein, efficiency (η) is the ratio of Heat Absorbed by Mass (output energy) and the Input Electrical Energy
Frequency of monitoring/recording	Annually	
QA/QC procedures to be applied	-	NA
Purpose of data	Calculation of baseline and project emissions	Purpose of data is accurately reported.
Calculation method	-	NA
Comments	-	NA

Data/Parameter	$f_{NRB,y}$	**VVB Assessment**
Data unit	Fraction or %	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Fraction of woody biomass established to be non-renewable, used by project or baseline device type in year y	NA
Source of data	- UNFCCC Clean Development Mechanism approved values - Tool 30 minus uncertainty (26%)	The parameter gives provision to either be fixed and sourced from the UNFCCC Clean Development Mechanism approved values or be calculated using Tool 30/26/, wherein 26% uncertainty is deducted, in line with current recognized practice as per VCS methodology. Neither approach take precedence over the other, and both are equally acceptable as source.

Description of measurement methods and procedures to be applied	Determined using one of the following options: - Use a default value included in a standard approved by the United Nations Framework Convention on Climate Change (UNFCCC) Clean Development Mechanism or the Paris Agreement Crediting Mechanism. - Calculate a fNRB value as per CDMTOOL30	The sources for both two options are specified clearly in line with section 3.9 of VCS methodology requirements/9/: 1.Use of Default Values: Credible and reliable source with reproducible results which can be presented at time of verification 2. Calculated using CDM TOOL 30/26/: Credible and reliable source with reproducible results which can be presented at time of validation/ verification
Frequency of monitoring/recording	The parameter can be set using the following two options: a. Determined ex-ante and set for a given crediting period, in which case it will include the parameter is included ex-ante in the corresponding VCS Project Description (VCS PD) document. b. Every two years	The value of the parameter can either be fixed ex ante for entire crediting period or revised and updated every two years. This is in line with paragraph 27 of methodology AMS II G/03/, recognized and accepted across registries.
QA/QC procedures to be applied	Values calculated using the CDMTool30 version 4 or earlier must apply an uncertainty deduction of 26%	Where in the value is calculated using CDM Tool 30/26/, in line with VMR0006 V1.2/02/, which is the currently accepted methodology for VCS, a 26% conservative discount factor based on uncertainty for fnrb is applied.
Purpose of data	Calculation of baseline and project emissions	Purpose of data is accurately reported.
Calculation method	-	

Data/Parameter	$EF_{el,y}$	**VVB Assessment**
Data unit	t CO_2e/MWh	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.

Description	Emission factor of the electricity system in year *y*	NA
Source of data	Calculated	The parameter relies on using project specific value which is calculated using Verra's tool ID#M0251/28/ as the preferred source.
Description of measurement methods and procedures to be applied	Must be determined using *Verra's* Tool to calculate emissions from electricity consumption. Where the electricity comes from a renewable source, the emission factor is considered to be zero.	The parameter relies on calculating the value using Tool for the Estimation of Emissions Associated with Electricity Consumption ID#M0251/28/, which is currently under public consultation, for ascertaining Emission factor of the electricity systems. However, where the source of electricity is renewable, the emission factor is fixed as zero.
Frequency of monitoring/recording	Annually	The parameter is measured annually, ensuring continuous monitoring, resulting in accuracy of assessment and reliable trend analysis of the emission factor and its fluctuations.
QA/QC procedures to be applied	Use credible data for the electricity system	The calculation relies on credible data for the electricity system, which is in line with r Tool ID# M0251/28/ ,
Purpose of data	Calculation of project emissions	Purpose of data is accurately reported.
Calculation method	-	NA

Data/Parameter	$TDL_{j,y}$	**VVB Assessment**
Data unit	Fraction	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Average technical transmission and distribution losses for providing electricity to device type j in year *y*	NA
Source of data	Calculated	The parameter relies on using project specific value calculated using Verra's tool ID#M0251, which is currently under

		development, and once approved . will be the /28/ preferred source
Description of measurement methods and procedures to be applied	Must be determined using *Verra's* Tool to calculate emissions from electricity consumption.	The parameter relies on calculating the value using Verra's Tool ID#M0251 /28/, for ascertaining Average technical transmission and distribution losses for providing electricity. The Tool is currently under development, and once approved, the methodology will follow the same.
Frequency of monitoring/recording	Once per monitoring period	The parameter is fixed for the monitoring period and calculated afresh during every monitoring period; this is found in line with Verra's tool ID#M0251/28/.
QA/QC procedures to be applied	Use credible data for the electricity system	The calculation relies on credible data for the electricity system, which is in line with Verra's Tool ID#M0251/28/.
Purpose of data	Calculation of project emissions	Purpose of data is accurately reported.
Calculation method	-	

Data/Parameter	$FC_{i,y}$	**VVB Assessment**
Data unit	Tonnes	The data unit is consistent and appropriate with respect to the equation applying this parameter. Unit complies with para 3.93 of VCS methodology requirements /9/.
Description	Fuel consumption of the backup generator *i* in year *y*	NA
Source of data	Measured	The parameter relies on using specific value measured for the project scenario.
Description of measurement methods and procedures to be applied	The amount of fuel used by the backup generator(s) is determined using one of the following: 1) Apply direct measurement by metering using credible, manufacturer-	The parameter relies on using direct measurement using equipment calibrated by manufacturer itself as the preferred source; where not possible, this is followed by the un interrupted records of fuel purchase, (E.g., invoices/receipts) ,

	calibrated equipment; or 2) Keep continuous records of fuel purchases.	
Frequency of monitoring/recording	Annually	The parameter is measured annually, ensuring continuous monitoring, resulting in accuracy of assessment and reliable trend analysis of fuel consumption patterns.
QA/QC procedures to be applied	-	NA
Purpose of data	Compliance with applicability conditions for project devices using grid electricity	Purpose of data is accurately reported.
Calculation method	-	NA

Requirements for data and calculation reviews are clearly defined in the Methodology; these requirements are deemed proper by VVB to allow for uncertainties related to the emission reductions to be reduced in a reasonable manner.

Further, VVB concludes that the ex-ante and monitored parameters demonstrate adherence to the principles of the VCS Program. The Methodology has been developed in line with the VCS methodology requirements Version 4.4 /09/, VCS standard/8/ and VCS Program Guide/42/, as elaborated above. It is also deemed by VVB that the principles of relevance, completeness, consistency, accuracy, transparency, and conservativeness are properly addressed in the Methodology.

3.11 Uncertainty

Earthood has assessed the approach taken to address uncertainty and find it to be both appropriate and in conformance with VCS Program rules and requirements/08/09/42/. The evaluation encompasses an assessment of how the methodology effectively minimizes both systematic and random errors to the extent practicable, and appropriately deals with uncertainties. Hence, achieving a reasonable level of assurance. As discussed earlier, all findings were addressed satisfactorily and there were no uncertainties identified during the assessment of the methodology.

3.12 Verifiable

Earthood critically assessed the methodology revision to ascertain its level of clarity and specificity and can confirm that the methodology revision effectively mandates project proponents to transparently report project results, thus ensuring compliance with requirements for validation and verification processes with a high degree of confidence. This aligns with

established audit standards and best practices, reinforcing the reliability and integrity of the reported project outcomes.

The methodology under assessment is version 2.0, issued on 05/09/2024.

Furthermore, it is crucial to assess if the methodology encompasses clear guidelines and instructions that enable project proponents to accurately and comprehensively document project outcomes. This not only facilitates a transparent reporting process but also enhances the likelihood of successful validation and verification efforts, instilling a greater level of confidence in the overall assessment. Additionally, a well-defined methodology fosters consistency and reliability in project reporting, aligning with established VCS rules and requirements.

The VVB provides a reasonable level of assurance for the validation of the methodology. This involves a thorough review and assessment to ensure that the methodology meets all relevant standards and requirements. By offering this level of assurance, the VVB helps to confirm the accuracy, reliability, and integrity of the methodology under assessment

The methodology provides the generation of verifiable credits after the utilization of the CEP; no risk of reversal was identified by the assessment team.

4 ASSESSMENT CONCLUSION

The VVB, Earthood Services Private Limited (Earthood) has performed a validation of the proposed methodology “Energy Efficiency and Fuel-Switch Measures in Cookstoves” /01/. The validation was performed based on rules and requirements defined by Verra Standard /08/.

The methodology is falling within Sectoral Scope 3 – Energy demand. The date of issue of the methodology is 05/09/2024, Version 2.0.

Earthood Services Private Limited has informed the methodology developers of the validation outcome through the draft validation report and final validation report. The final validation report contains the information regarding fulfilment of the requirements for validation, as appropriate.

Earthood Services Private Limited applied the following validation process and methodology using a competent validation team.

- the publication of draft version on VERRA for global stakeholder consultation process
- the desk review of documents and evidence submitted by the methodology developers in context of the reference Verra’s guidelines issued,
- reporting audit findings with respect to clarifications and non-conformities and the closure of the findings, as appropriate and
- preparing a draft validation opinion based on the auditing findings and conclusions
- finalization of the validation opinion (this report)

The review of the methodology report and, supporting documentation have provided Earthood Services Private Limited with sufficient evidence to determine the fulfilment of stated criteria.

Earthood Services Private Limited is of the opinion that the proposed methodology "Energy Efficiency and Fuel-Switch Measures in Cookstoves", does meet the stated criteria of Verra's, requirements. Therefore, the proposed methodology is being recommended to VERRA Board for request for registration and approval.

5 EVIDENCE OF FULFILMENT OF VVB ELIGIBILITY REQUIREMENTS

Earthood Services Private Limited is accredited by Executive Board (EB) of Clean Development Mechanism (CDM) as a Designated Operational Entity (DOE). The accreditation has been granted for 11 different sectoral scopes including sectoral scope 3 i.e. Energy demand since 25/06/2014/45/. The information about Earthood Services Private Limited's accreditation and sectoral scope is available at the following UNFCCC interface https://cdm.unfccc.int/DOE/list/DOE.html?entityCode=E-0066/.

Earthood is also accredited by ANSI National Accreditation Board (ANAB) under ISO/IEC 17029:2019, evident from the ANAB official website and valid till 02/09/2029:

https://anabpd.ansi.org/Accreditation/environmental/greenhouse-gas-validation-verification/AllDirectoryDetails?&prgID=200&OrgId=182562&statusID=4

VVB confirms to fulfil the requirements meted out in section 3.5 of the Methodology Development and Review Process Version 4.0/44/ and in Section 5 of the VCS Program Guide/42/. Th validation process has been carried out in accordance with the steps elucidated in section 6.0 of Methodology Development and Review Process Version 4.0/44/. The scope of the VVB assessment is in line with the agreement with developer (Atmosphere Alternative) , and satisfies the requirements charted in the VCS Methodology Submission Form & Agreement version 4.1 /46/.

The personnel who worked on the methodology have sufficient knowledge and experience of working on the projects in sectoral scope 3 including cookstove projects. Short resumes of team members is provided below in Appendix 3.

6 SIGNATURE

Signed for and on behalf of:

Name of entity: Earthood Services Private Limited

Signature: 

Name of signatory: Dr. Kaviraj Singh

Date: 09/10/2024

APPENDIX 1: LIST OF STAKEHOLDER COMMENTS

All the comments raised during the public stakeholder comments period were reviewed by the VVB. The responses to all the comments were found to be satisfactory and where applicable the necessary changes as per the public comments raised have been made in the methodology. The changes made have been reviewed and found to be appropriate. Overall, all stakeholder comments have been thoroughly considered and appropriately addressed.

Comment Number	Comment	Response to Comment & Summary of Change Made
1.	The term "non-renewable biomass" in 4.1 (a) requires clearer definition, since the definition of renewable biomass is unclear - does it extend to "...biomass whose use does not contribute to the decrease in carbon pools. Further, it is doubtful as to whether increasing the efficiency of unsustainable biomass use results in a permanent emission reduction, although it may contribute to a reduction in the rate of depletion of carbon stocks. The emphasis should therefore be on transitioning from non-renewable (unsustainable) biomass use to renewable (sustainable) biomass use.	We are working on the definition separately from the methodology. No action needed.
2.	We suggest that any CS projects that rely on reductions in deforestation and degradation to earn VCUs (i.e. use fNRB in their baseline to calculate VCUs) should NOT be eligible as a CS project under VCS. This is because there are significant accounting loopholes under the current approach including a lack of monitored impacts on carbon stocks and permanence of any claimed VCUs. CS projects that rely on fNRB should be required to use VM0048 - the new REDD methodology for AUD or other REDD methodologies as CS	Not relevant. No action needed.

	projects are already defacto REDD projects but without any of the associated REDD or AFOLU accounting integrity. The first proponents of CS projects argued that reducing non-renewable biomass (NRB) should be a new energy project type under the CDM rather than an AFOLU project because the CDM is limited to AR and did not allow REDD or other types of AFOLU projects. As a reminder, the first CS methodologies were being considered around 2004 - 2006, which is the same time REDD was first getting on the UNFCCC agenda and a number of years before the first VCS REDD methodologies were approved. The importance of reducing emissions from deforestation and forest degradation was therefore high, but there were no other carbon market options to reduce the unsustainable harvesting of fuel wood. This is no longer the case. The VCS has had REDD methodologies since 2010 and Verra should act decisively to close the accounting loophole in CS projects that rely on reducing losses of NRB to generate VCUs and make these projects operate as REDD projects. This would eliminate the loophole that CS projects do not need to account for non-permanence risk, eliminate crediting based on non-spatially specific impacts and also eliminate reliance on highly uncertain fNRB numbers that are little more than guesswork. The current approach to CS projects that rely on fNRB does not meet several of the VCS Program or VCS Standard's criteria. For example, the VCS Program states that all GHG emission reductions and removals must be Real, Measurable, Permanent and Unique (amongst others), and the VCS Standard refers to ISO 14064-2 principles that include Relevance, Completeness, Consistency, Accuracy and Conservativeness (amongst others) - yet treating CS projects that reduce NRB as energy projects rather than AFOLU projects violates all these requirements in one way or another.	
3.	Specific guidelines for Solar Cookstoves	To discuss with AA and decide whether any specific guidelines can be included.
4.	No, the list seems comprehensive.	Ok. No action needed.
5.	The methodology covers all relevant baseline or project scenarios, in our view.	Ok. No action needed.
6.	Scenarios seem fine	Ok. No action needed.
7.	Based on the scenarios (or combinations) provided in the draft methodology, the proposed scope appears to cover a comprehensive range of scenarios related to energy efficiency and fuel-switch measures in cookstoves and other distributed thermal energy generation units. However, plant oil-fired stoves should also be considered in these scenarios in the applicability condition.	Ok. Can discuss the plant oil issue with AA although not sure if there's any demand for that.
8.	Any solid/liquid fuel in the baseline to biogas (standalone/community) in the project scenario could be an alternative that can be explored. Efficient project devices fired by Biogas could be one of the project scenarios under Section 4, item 1 (a) and (b).	Biogases are purposefully excluded from the methodology. They are different from other ICS types included in the methodology in terms of operation and monitoring/quantification. No action needed.
9.	• Yes, There is no mention of biogas fuel including how project developers can claim emission reductions from technologies using biogas. • Clarification needed on how to verify/ justify the requirements under section 4 condition 8 and 9 on the sources for renewable	No action needed for point 1. For points 2 and 3, to discuss with AA if any guidance can be included.

	biomass (charcoal) especially for end users who purchase from different vendors, evidence on how the charcoal is produced (i.e. using improved kiln) may not be known. • Further, since contractual agreements and purchase receipts are not provided by local vendors in most cases, survey responses provided by the end-user should suffice. Is this fixed at the start of the project or is it a monitored parameter?	
10.	We consider the current applicable conditions relevant.	Ok. No action needed.
11.	Considering renewable biomass (i.e. agriculture waste, cattle manure), emissions coming from its decay should be considered in baseline scenario (methodology already applied this option as mandatory applicability condition). Regarding the adoption of gasifier stove in project scenario, we suggest to consider the contribution of biochar (obtained as stove use by-product) utilization as soil amendment at microscale level (i.e. household farming activities) by using simplified approaches (90/10 monitoring sample) and cautelative default values (biochar production per stove).	> Baseline scenario - can discuss with AA > Not sure if it will be within project boundary and whether the meth should consider post fuel uses. Can discuss with AA.
12.	All major relevant baselines and project types seem to be covered	Ok. No action needed.
13.	In the eligibility criteria, all aspects are addressed for both baseline and project scenarios, although some points require additional clarification. Please review the following instances: 1. Point 7 (Renewable biomass can be transformed into fuels like briquettes, wood chips, or charcoal.) - However, there is no specified criterion regarding the age of renewable biomass usage. 2. 14 b (Self-generated renewable electricity, with a requirement that at least 80 percent of the annual generated electricity is utilized by the project devices) - There is a lack of outlined methods or processes for demonstrating compliance with this criterion. 3.If the methodology introduces the option to calculate FNRB through TOOL30, additional criteria need to be incorporated into the applicability requirements. The activity design document must not only establish the utilization of non-renewable biomass in the activity region since 31 December 1989.	AA to check if further guidance can be added to address points 1 and 2.
14.	No	Ok. No action needed.
15.	Based on the scenarios (or combinations) provided in the draft methodology, the proposed scope appears to cover a comprehensive range of scenarios related to energy efficiency and fuel-switch measures in cookstoves and other distributed thermal energy generation units. However, plant oil-fired stoves should also be considered in these scenarios in the applicability condition.	Ok. Can discuss the plant oil issue with AA although not sure if there's any demand for that.
16.	The methodology covers all relevant baseline or project scenarios, in our view.	Ok. No action needed.
17.	It appears to be complete in that respect.	Ok. No action needed.
18.	We note that the applicability of the methodology likely does not extend to (i) water purification devices and (ii) biodigesters. We acknowledge that the quantification mechanics of these project types is likely sufficiently different from that of, e.g., cookstove projects that it warrants a separate methodology to address those project types. However, since some of the more impactful proposals under this M0174 are to utilize newly-developed fNRB values and novel MRV approaches, we recommend ensuring consistency across project types that would have the option to utilize the same. For example, other CDM methodologies that include fNRB may continue to use historic tools for calculation purposes, which could create an inconsistency with this M0174. We would recommend that Verra	Not relevant. No action needed.

	elevate these requirements to the standard level, rather than the methodology level, to ensure consistency across all project types that would apply these parameters and MRV approaches.	
19.	Guidance should be clearer on how baseline and/or project parameters are assessed in case of multiples fuels/project technologies with a sound example.ie project replacing both charcoal and firewood inefficient whether with 1 stove using both, or 1 stoves using one of the baseline fuels	Section 6.1 contains a requirement for multiple fuels. AA to check if it is sufficient.
20.	We consider this to be a reasonable end date for validity. Possibly it can be reviewed as we get closer to 2035 and amended if necessary, but giving a target date is a good goal. With regard to the transition to cleaner fuel, some guidance should be given regarding what this could look like (transition to bio-LPG or RDME?, expansion of the grid to allow electric cooking to be more realistic?). While it is a good overall goal, it it's current form it is vague and hard for project developers and VVB's to determine whether this requirement has been met.	Guidance on clean transition routes (to bio-LPG or RDME) is a good idea. Should be considered by AA for inclusion.
21.	In our view, the appropriateness of liquified petroleum gas (LPG) crediting periods should somewhat align with the net-zero pathways for the country in which the LPG carbon project is located. In less economically developed countries, household variables such as income may restrict transition from LPG to electricity. It may take longer than the current 10-11 year period until 2035 (depending on the start date of the project), considering the widespread transition to more efficient biomass stoves is still in progress. In our view, this maximal crediting date could be based on the net-zero target of a country. For example, for a target of net zero emissions by 2050, we could expect a maximum crediting date of 2040-2045 to allow for a solid transition within the country to take place and the potential for affordability of the cleaner technology to increase, but also leave a buffer of 5-10 years in order for the project become more aligned with country net zero. We acknowledge that a transition to cleaner technologies should be a priority, however, the sustainability of projects (e.g. the continued use of LPG and not switching back to polluting fuels) and their ability to penetrate as many end-users as possible needs to be considered.	Many cookstove countries (typically in SSA) have set a net zero target by 2050 or later. It doesn't seem appropriate to keep supporting LPG projects a few years prior to that (this would mean close to a 20 year window for LPG support). Maybe extending till 2040 is fine. To discuss with AA.
22.	Looks sensible	Ok. No action needed.
23.	The methodology mentions allowing Thermal energy devices of the same type using LPG in the project area have a penetration level below 20 percent in the project region and that The project does not issue any carbon credits for periods after 31 December 2035. We would respectfully submit that instead of stopping the crediting period (CP) in 2035, the energy transition for cooking could be assessed after the 1st crediting period which is expected to be completed prior to 2035. If by the end of 1st CP, majority of HHs in the project area have shifted to cleaner and efficient cooking, then the end date of the maximal crediting date can be 31st December 2035, and if majority HHs are yet to transition to clean cooking, then the subsequent CP should be allowed to continue beyond 2035.	The suggested approach does not seem appropriate as it fails to provide any certainty about project's future and crediting ability (after 1st CP). Project investments are not made on uncertain outcomes. Should not consider this.

24.	Including a maximal crediting date of 31 December 2035 for LPG project devices is inappropriate and should not be considered. Crediting periods for a recognized project activity type should follow the 7 year, twice renewable structure of the broader program. For projects commencing within the 7 year period prior to this date, this deadline will reduce the carbon revenue from offset sales for the project and may not make the project activity viable well before the maximal crediting date. This may result in emission reductions not being achieved in the late 2020's or early 2030's as a result of this date and projects may not be implemented despite their still being need for a transition to clean burning stoves during this time. The risk of 'carbon lock-in' for the clean cookstoves project is very minimal risk for this activity type. LPG cookstoves do not require significant infrastructure investment in and of themselves and do not remain in operation for decades. In addition, the fuel demand LPG cookstoves create is not material enough to impact the decision of whether or not to build dedicated LPG infrastructure. Furthermore, in the transition to net zero, emphasis has been placed on the transition away from fossil fuels for energy systems. Thus LPG cookstoves can still be considered in alignment of the net zero future. Requesting a transition plan to cleaner technologies to be prepared by the project developer is inappropriate. The future energy mix of a country is to be determined by the government and for the government to implement. Offset project developers support the implementation of the transition. Thus, LPG cookstoves can only be implemented in regions that have identified LPG as part of its transition energy mix, and is not the responsibility of the developer to plan the transition to a different energy mix on behalf of the region or country. Furthermore, a transition plan to cleaner technology may fall outside the area of expertise of the developer to create especially when considering 10 - 15 years into the future energy mix of the region. Implementation of the transition plan may or may not be within the expertise of the developer, and presumes that an alternate energy supply is available for the region which may not be realised at the time the crediting period expires. There is significant potential for diverse changes in the energy mix and technology supply given evolving regional socio-economic, geopolitical conditions, and technological availability and the eleven-year span writing a transition plan would be additional time and effort on the developer and will not be relevant at point of implementation.	Can consider the value of extending the date from 2035 to accommodate slow movers in LPG space (LDCs, resource starved/disadvantaged countries) + alignment with net zero commitments and providing more guidance on transition routes/plans. To discuss with AA.
25.	13(c) The date of 31 December 2035 is very optimistic. SSA countries may not be able to match 2050 Net-Zero target date and may need more time considering their current development. LPG penetration in LDC / developing countries is very less. Hence, they may need more investment on LPG as transitional fuel. As per WRI (https://www.wri.org/insights/carbon-lock-in-definition) the average lifetime of residential cooking system is 14 years hence this will not affect immediate carbon lock-in. LPG penetration will take few more years. Hence, maximum crediting date should be delayed (may be up to 31 December 2040).	Same as above
26.	We consider these measures appropriate.	Ok. No action needed.
27.	• Decision to transition to clean technologies ok, however, the maximum crediting date being 2035 could potentially discourage LPG project developers since that offers a maximum crediting period of about 10 years from now. • Since the net-zero target is 2050, clarify the criteria used to determine the period to 2035? can this be extended to a longer period, set from the date the methodology comes into force?	Can consider the value of extending the date from 2035 to accommodate slow movers in LPG space (LDCs, resource starved/disadvantaged

		countries) + alignment with net zero commitments
28.	Given the policy changes, market changes and resources required for the transition to electricity and/or ethanol, and their significant variation from country to country, we are uncomfortable with picking a single year as the final crediting date for all locations. With respect to the requirement for a transition plan to cleaner technologies, given the policy changes, market changes and resources required for a transition from LPG to electric and/or ethanol stoves, the word "vision" may be more appropriate than "plan". Especially since the project developer for the next generation of cookstoves after LPG may well be different than the LPG cookstove project developers. For example, in Ghana an eventual transition away from LPG will require large scale investments in the electricity grid and/or ethanol infrastructure. While project proponents can describe what a transition away from LPG would entail, it is not reasonable to expect that they will undertake the large capital investments necessary to implement these infrastructure changes.	Consider providing more guidance on transition routes/plans. To discuss with AA.
29.	It is not the responsibility of the PD to develop a countries infrastructure. If the country has not developed in such a way to that will allow for cleaner/more efficient cooking methods than LPG, then it will be appropriate. However, this cannot be assumed and in most cases will not be reality. Thus, this should not fall on the shoulders of the project developer.	Consider providing more guidance on transition routes/plans. To discuss with AA.
30.	We consider these measures appropriate	Ok. No action needed.
31.	Ideally, we would phase out LPG or phase to bio-LPG by 2035 AND provide universal access to stoves that meet the World Health Organization's standards; however, this is highly unrealistic frankly. Peer-reviewed literature has modeled that LPG used for cooking beyond 2035 provides net climate benefits (Floess et al. 2023). This is therefore not an appropriate maximal crediting date. For improved or clean cookstoves projects that address women cooking over open fires, limiting the scale of LPG is unethical.	Can consider the value of extending the date from 2035 to accommodate slow movers in LPG space (LDCs, resource starved/disadvantaged countries) + alignment with net zero commitments and providing more guidance on transition routes/plans. To discuss with AA.
32.	As per section 2.6 of the VCS Methodology requirementv.4.4, we agree on the importance of a transition from fossil fuel technologies to cleaner cooking methods or renewable biomass fuel, however: there is a huge cultural firewall, which is not easy to overtake, and most of the communities don't have the willingness and the resources to pay for electricity or pellets, this is why we think that the technology switch has to be done in a transitional way, from traditional stoves to ics, to fuel substitution, to solar. Furthermore, carbon lock-in is composed by several elements (economic-technology lock-in, institutional lock-in, over-commitment in CO2 lock-in); it would be necessary to identify specific characteristics to evaluate the lock-in; transition plan is not directly related to carbon lock-in.	Consider providing more guidance on transition routes/plans. To discuss with AA.
33.	As per the Verra methodology requirement Version 4.4 "Methodologies shall include an analysis of the risk of carbon lock" & project lifetimes against the risk of entrenching consumer behavior, business practices, or physical infrastructure that increases or prolongs unabated fossil fuel consumption". The utilization of LPG comes with increased impacts on fossil fuel depletion, posing risks for consumers. Therefore, the prudent choice is to integrate carbon lock criteria and establish a project activity deadline within the methodology.	Ok. No action needed.

34.	The methodology mentions allowing thermal energy devices of the same type using LPG in the project area have a penetration level below 20 percent in the project region and that The project does not issue any carbon credits for periods after 31 December 2035. We would respectfully submit that instead of stopping the crediting period (CP) in 2035, the energy transition for cooking could be assessed after the 1st crediting period which is expected to be completed prior to 2035. If by the end of 1st CP, majority of HHs in the project area have shifted to cleaner and efficient cooking, then the end date of the maximal crediting date can be 31st December 2035, and if majority HHs are yet to transition to clean cooking, then the subsequent CP should be allowed to continue beyond 2035.	The suggested approach does not seem appropriate as it fails to provide any certainty about project's future and crediting ability (after 1st CP). Project investments are not made on uncertain outcomes. Should not consider this.
35.	We support the requirement in line with Section 2.6 of the VCS Methodology Requirements. However, we recommend that Verra include the flexibility to permit a project to continue where it can be shown that adoption of cleaner technologies has not been achieved at sufficient pace. Certain economies may not be in a position to move away from fossil fuel technologies at such a pace, meaning it is possible that continuation of such projects is a benefit over reverting to the baseline scenario. Individual projects operating at the scale of typical voluntary carbon projects are likely not in a position to influence macroeconomic policy and direction and therefore should not be penalized if their economies have not followed an accelerated energy transition pathway.	Can consider the value of extending the date from 2035 to accommodate slow movers in LPG space (LDCs, resource starved/disadvantaged countries) + alignment with net zero commitments and providing more guidance on transition routes/plans. To discuss with AA
36.	The radius of 5km seems arbitrary. Projects that seek to reduce emissions by replacing non-renewable biomass sources are effectively a type of REDD+ project, they should have a geographic boundary and their effectiveness at maintaining or increasing carbon stocks as a result of reduced fuel demand should be monitored at the ecosystem or landscape level.	Not too helpful.
37.	Benefits: It is good that Verra is recognizing and addressing double counting between REDD and cookstoves. Challenges: There are a number of challenges with the proposed approach: - The approach only requires the risk of double counting be assessed, but it does not state when / how often this assessment is done, or who does the assessment. - The double counting assessment should also include other cookstove projects that may overlap. Also overlap between Gold Standard cookstove projects and VCS cookstove projects and even Gold Standard cookstove projects and VCS REDD projects. - REDD projects receive offsets for identified areas of avoided deforestation (and degradation) that are monitored and accounted for, whereas cookstove projects receive credits as a result of an assumption that that they have a positive impact based on a broadly estimated national-level fraction of non-renewable biomass (fNRB) and other estimated parameters. The fNRB and other parameters play a critical role and the fNRB number in particular is highly uncertain. As a result cookstove offsets are inherently uncertain - with no understanding at all where the reductions in NRB occur within a country. As a result, wherever overlaps may occur, REDD projects should take precedence in any consideration of allocation of reductions in greenhouse gas emissions as there is higher certainty regarding the physical location of emission reductions from REDD. - Where a cookstove is in an urban or peri urban area, then the application of ten hours of road travel will encompass much or even all of many smaller countries. This will exclude future cookstove projects or REDD projects OR will require new projects to take only a	AA to check the value of arguments (in red) and make changes accordingly. Suggests burden on cookstoves projects.

	proportion of calculated offsets. If our suggested reduction in applicability conditions above is not followed, we would suggest urban and peri urban projects should be limited to projects that achieve emission reductions from improved fuels rather than from an impact of reduced consumption of woody biomass from an impossible to identify locale. - How would the proposed approach work with grouped projects (grouped REDD or grouped CS projects)? Should double counting risks be assessed from the entirety of the group area identified in the initial PDD? Or only from identified instances? If from instances then there is a risk that the REDD project will be limited in its expansion by the existence of a cookstove project 2 km or even 10 hours from the area planned to be added. To have a REDD project physically protecting pixels of forest displaced by a cookstoves project which may or may not be having an impact in the identified area seems highly faulty. The existence of a cookstove project may omit the potential for all future REDD projects if VCUs are allocated between project types. In a country with aggressive distribution of stoves it may be impossible to implement any REDD projects (projects that seek to actually work with local communities to protect remaining areas of forests), or at a minimum such projects would be required to take deductions to their emission reductions as a result of possible double counting with the cookstove project that may render the REDD projects non-viable.	
38.	Benefits are minimal, risk is that you increase the complexity (and cost) of implementation and discourage smaller projects and less capitalized market participants.	Suggests that current method insufficient. Do not seem to be in favor of this approach.
39.	While double counting is always a valid concern, more onus should be put on the REDD+ projects to avoid double counting. Cookstove programs a primary reducers of deforestation by reducing fuel usage. These are measured and monitored. REDD+ programs are secondary reducers of deforestation, through protection. The REDD+ programs should bear the burden of having to show that their programs resulted in lack of deforestation, vs, cookstove programs that directly measure impact.	Suggests burden on REDD+ projects
40.	We find that the benefits of this proposed method may drive more accurate data collection by projects. For example, when distributing project stoves, we would expect projects to have a sales record including the locations of where stoves will be used, and possibly a map which displays with the boundary of the REDD+ project and the cookstove project stove distribution in the area. Challenges may exist where project technologies are distributed by third parties and the end user not recorded. Similarly, under scenario b there are still risks that biomass is imported from beyond a 10 hour distance. As such, we would suggest additional surveys of vendors and sellers in the project area to ascertain where fuel is collected from, which would enable the project to provide a more accurate scenario of where end-users acquire their fuel.	Suggests that current method insufficient. Suggest stringent assessment and monitoring, might further enhance burden on project developers.
41.	The effort and intent to remove any possibility of double counting comes across as a step towards right direction. However, while we believe the issue of double counting of credits for possible overlap of ICS and REDD+ projects may exist in some geographies, but it cannot be uniformly assumed across all geographies globally. This is because the cooking practice, and the firewood collection process is largely dependent on existing practice of logging and the local/national law. For example in India, logging is not a prevalent practice for firewood collection for cooking purpose, moreover logging is not allowed under Indian laws. Hence, having	Suggests assessment be carried out on case basis (based on local practices and existence of legal/regulatory framework). AA to consider.

	improved cookstove projects and REDD+ carbon project activities may be seen as independent projects wherein the condition of double counting may not apply. Hence, we would humbly request to have such boundary conditions (5 KM or 10 hours of motorized vehicle travel to identify REDD+ activities) subjectively and only in countries where logging is a prevalent practice with local law permitting the same.	
42.	* How will it be demonstrated that the wood is coming only from these source? * Not easy to guarantee that 90%	Suggests source determination is hard. The assumption is that demonstration of source of wood fuel is not necessary, the overlap itself poses a reasonably high risk of double counting. AA to consider if more guidance/measures can be prescribed in the methodology.
43.	Benefits: Issued credits will be real and transparent with no risk of double counting. Challenges: Difficult to identify if any REDD+ projects are active in the specified 5km radius from the location of the thermal energy generation units. (Relevant issues have been highlighted in the "General Comments Sheet")	Identification could be carried out through on ground surveys and reviewing standard registries. Could increase monitoring burden.
44.	Please provide guidelines for a scenario where a new REDD project is established adjacent to an existing cookstove project.	Not helpful. But there don't seem to be many documented cases of both project types existing adjacent.
45.	• Hard to determine source of charcoal/ firewood considering that some end-users might be getting the fuel from 3rd parties. if an existing REDD+ project has been around, do you assume the charcoal in the baseline is sustainably harvested if there is a REDD+ project 10 hrs away? Do these applicability criterion basically make it more favorable to do LPG or electric cooking and therefore exclude a big population that don't have access to this infrastructure? There are cases where both projects can exist but are not related, e.g. where communities gather firewood from other areas that are not under REDD+, in such cases, ERs should be calculated individually from each project without the issue of double counting. Source of fuel can be checked through baseline surveys.	Suggests source determination is hard.
46.	How is it determined whether the existing REDD+ programme has impact on the Cooking practices in the region? Also, a REDD+ programme in the region could be focused on mitigating other drivers of deforestation/degradation such as timber extraction or clearance for agriculture or grazing etc. and might not have impact on the ICS project. There is no clarity if only REDD+ projects operational at time of start of project activity should be assessed. What if a REDD+ programme is introduced at any given point of time once the ICS project is operational: does the methodology require double counting to be	Suggests more guidance is needed on determining overlaps. Do not seem to be in favor of this approach.

	assessed for future monitoring periods? This could introduce lot of uncertainty for project developers and investors.	
47.	How can anyone prove that wood/charcoal is being harvested from a specific REDD project. If a charcoal project is situated within a REDD+ area, it will be near impossible to decern if the charcoal is sourced from within the REDD+ area or outside. It is common that charcoal is produced elsewhere and then transported over great distances to where it is finally consumed, wood fuel, especially within the urban context has similar issues. How will the PD have to account for this? It is a near impossible task.	Suggests source determination is hard. Do not seem to be in favor of this approach.
48.	Please provide guidelines for a scenario where a new REDD project is established adjacent to an existing cookstove project. If the REDD project was after Project validation how does this impact? Is there scope for the PP to assess whether the REDD project is stopping wood being harvested.	Suggests more guidance is needed on determining overlaps
49.	We see the possibility of double counting with REDD+ projects, but applying a pure geometric constraint could not be the optimal solution (i.e. woody biomass can be sourced from other areas even if the cookstoves are distributed at less than 10-hours distance from REDD+ project). A proper way to track the wood's source and assess whether it belongs to a REDD+ project area or not should be evaluated and applied.	Suggests more guidance is needed on determining overlaps
50.	It is important to avoid double counting of emissions reductions from over-lapping projects by reducing the number of credits generated by the REDD+ project or the cookstoves project equal to the credits generated by reducing CO2 emissions from non-renewable biomass from the cookstoves project. It appears that this is what the methodology as proposed will do. We think that this overall approach makes sense and could work. A key challenge is identifying when reductions claimed by projects overlap. Cookstoves projects often claim to cover the whole country. We recommend requiring cookstoves project developers to provide granular data on where stoves are located to facilitate identifying double counting, and also for greater transparency.	Suggests that current method insufficient. Suggest stringent assessment and monitoring, might further enhance burden on project developers.
51.	We just see benefits for REDD+ project proponents. On the other hand this change on the methodology might affect many cookstove projects developer that could decide to stop their activities with a huge negative impact on the communities. With the high growth of rate of the population and the lack of access to clean energy, the demand for charcoal will keep on raising year after year. AS REDD+ projects are willing to cut down the production of charcoal, cookstoves projects are willing to cut down the demand side. Cookstove's projects have direct social, environmental, and economic benefits for the most vulnerable communities. However, the proposed changes could potentially harm these communities and benefit organizations that have previously shown non-compliance with rules and methodologies. Cookstoves projects are crucial in reducing carbon emissions, easing health and economic burdens, and promoting financial security and female empowerment. Any alterations that do not consider these benefits could lead to detrimental effects on the communities that rely on them.	Do not seem to be in favor of this approach.

52.	Benefits of REDD+ for No Double Counting: Enhanced Forest Policies, Adaptation and Risk Minimization, Improved Forest Quantity and Quality, Community Involvement (a sense of ownership), more Carbon Sequestration, and biodiversity Conservation. Challenges in Implementing No Double Counting in REDD+: Measurement Systems and Tools, Historical Data Accuracy, Natural Disturbances, Data Sharing and Transparency.	Suggests that current method insufficient. Suggest stringent assessment and monitoring, might further enhance burden on project developers.
53.	Benefits: It will act as a cross-check mechanism for both the projects types Challenges: It may be difficult to establish and validate the supply chain for cases where the firewood or charcoal is being purchased.	Suggests source determination is hard.
54.	The effort and intent to remove any possibility of double counting is a step in the right direction. However, while we believe the issue of double counting of credits for possible overlap of ICS and REDD+ projects may exist in some geographies, it cannot be uniformly assumed across all geographies globally. This is because the cooking practice, and the firewood collection process is largely dependent on existing practice of logging and the local/national law. For example in India, logging is not a prevalent practice for firewood collection for cooking purpose, moreover logging is not allowed under Indian laws. Hence, having improved cookstove projects and REDD+ carbon project activities may be seen as independent projects wherein the condition of double counting may not apply. Hence, we would humbly request to have such boundary conditions (5 KM or 10 hours of motorized vehicle travel to identify REDD+ activities) subjectively and only in countries where logging is a prevalent practice with local law permitting the same. Please provide guidelines for a scenario where a new REDD project is established adjacent to an existing cookstove project. If the REDD project was after Project validation how does this impact? Is there scope for the PP to assess whether the REDD project is stopping wood being harvested.	Suggests more guidance is needed on determining overlaps
55.	It should also provide guidelines for a scenario where a new REDD project is established whereas an existing cookstove project is already in place.	Suggests more guidance is needed on determining overlaps
56.	The benefit of including such a requirement is of course that it will intend to avoid a scenario where reduced deforestation achieved by an overlapping REDD project is not double counted with the reduction in fuel wood demand achieved by an energy efficiency project. The challenge of course is determining (i) whether the reduced deforestation achieved by the REDD project is indeed impacting the same carbon stocks that are being impacted by the energy efficiency project (e.g., an APD project addressing a particular forest type may not impact deforestation rates of another forest type that is being impacted by the energy efficiency project, and vice versa) and (ii) how to allocate emission reductions to the overlapping activities. We strongly advise that Verra must conduct a further stakeholder consultation on its proposal for addressing this issue as it is very complex and potentially very impactful to projects' MRV processes.	Suggests that current method insufficient. Suggest stringent assessment and monitoring, might further enhance burden on project developers.
57.	We fear excessive additional costs & efforts for project developers to trace and document the cooking fuels geographical origins may deter most new carbon projects Emission Reductions certification§	Do not seem to be in favor of this approach.

58.	Par 18 (b), the 10 hours of motorized transport can cover the entire country and for local transport vehicles, that is a distance of more than 300-400km. That distance can bring into coverage any REDD+ project within range in most countries. How will the PP deal with that?	Suggest time duration is not appropriate as it could cover an entire (small-sized) country
59.	The distances and travel times seem reasonable for identified projects areas, but we note that this is a different approach to the risk mapping under VM0048 that identifies areas under threat from deforestation. Drawing a 5 km or 10 hr boundary around a CS project does not provide any insight into where the NRB is being sourced from in the CS baseline, or where CS driven reductions in NRB use will occur over time. The amount of overlap with any REDD project is unknowable based on the current CS methodology and any attempted allocation under the current CS methodology would be guesswork. To fix this fNRB analysis would need to be spatially explicit - similar to some of the WISDOM analysis - but this would only be a partial solution as CS projects would still need to identify which areas are impacted by their activities. As noted above we are also concerned what will be the implication for grouped REDD projects (and for REDD projects not yet registered). Will this process create an inadvertent land rush with REDD projects and cookstove projects rushing to claim as much area as they can to retain their future offset potential? This will need to be addressed in the allocation procedures in a way that won't create perverse incentives and won't potentially penalize future REDD projects. This will be most extreme for projects in urban and peri urban areas where the impact region will be tens of thousands of square kilometers.	Distance and time is okay however more assessment needs to be done to determine the source of NRB and impact of cookstove projects
60.	Methodology should allow for justification of by project fuel source boundary based on local fuel supply chain realities.	Country-wise assessment should be carried out to account for local factors and conditions
61.	For 18(a), we find that 5km is likely to be a suitable range for rural households. However, in our view, it is important that this is depicted in project documents, for example using a map, which shows the locality of the nearest forested areas and the boundaries of the REDD+ project. In a case where the REDD+ boundary is the closest forested area to an end-user, it could be perceived that this is where fuel is sourced, and as such, double counting could exist. For 18(b), we agree that a 10 hour travel time to a REDD+ boundary is likely to be a reasonable timeframe. However, we would also expect this to be depicted in project documents, stating the techniques used which explain the distance to the REDD+ boundary.	Distance and time are okay but the methods used to determine them should be clearly mentioned in the PD.
62.	(Same answer as above)	Country-wise assessment should be carried out to account for local factors and conditions
63.	The radius of 5km may be to low (2.5 km is a half hour walk approximately) in some regions are registered 2 hours walk to get the wood.	Suggested distance of 5km is low due to sparse availability of fuel.
64.	For the urban or peri-urban population, the distance and travel times seem fine. But, for the rural population as per accessibility and availability of fuelwood, the household member(s) may travel greater than 5 km for collection of fuel as per cooking requirements.	Suggested distance of 5km is low due to sparse availability of fuel.
65.	Methodology needs to account for national contexts that may disrupt movement of charcoal across long distances	Country-wise assessment to account for disruptions in charcoal supply

66.	• Distances are too long, 10 hours drive is equivalent to about 500kms distance. 10 10-hour drive seems a lot as it is unlikely that stakeholders using motorized vehicles would travel that far just to gather fuelwood/charcoal. 5 km from the location of the units seems reasonable for rural areas, but we would not support that all emission reductions have a double-counting issue, as explained above. This makes it a challenge to implement cookstoves projects within that radius. Existence of REDD+ programs a few hundred kilometers away shouldn't be an undue burden for charcoal and firewood projects.	Distance for rural areas is okay but for urban areas the time duration is very high.
67.	Methodology needs to account for national contexts that may disrupt movement of charcoal across long distances	Country-wise assessment should be carried out to account for local factors and conditions
68.	Methodology needs to account for national contexts that may disrupt movement of charcoal across long distances	Country-wise assessment should be carried out to account for local factors and conditions
69.	A proper way to track the wood's source and assess whether it belongs to a REDD+ project area or not should be evaluated and applied. Applying a fixed distance could not be the most suitable option to represent the effective condition on site.	Need better assessment to determine source of fuel, a fixed distance approach is not appropriate.
70.	The 5km for firewood collection is reasonable. For projects that reduce the use of charcoal, since charcoal is often a national and even cross national business, the larger boundary described in section 18b of the proposed methodology should be used instead of 5km.	The time duration boundary of 10 hours should be applied throughout (both urban and rural areas).
71.	The distances and travel times prescribed on condition 18 of the section. 4 are extremely inappropriate. If every cookstove project would be double counted if developed within 10 hours away from a REDD+, it means that most of the projects wouldn't be eligible. Charcoal is transported to big cities due to the lack of proximity to forests. It is absolutely not applicable to all areas and should be determined by the baseline and by the presence or not of forest in the nearby area. In Zambia, in the area in which we operate, hundreds of people come back from the forest with bicycles loaded with 1 to 200 hundred kgs of charcoal every day, it is not transported with big tracks hours away from the compounds. If double-counting is something relevant to address the risk of over-crediting of projects, the imposed boundaries do not look like to be a real solution and can block several projects with positive social impacts. We suggest improving the metric as "10-hour distance" is not acceptable.	Suggested distance and travel times are inappropriate/unacceptable.
72.	The appropriateness and reasonability of distances and travel times prescribed for different project circumstances in assessing the risk of double counting with REDD+ activities depend on various factors. Here are considerations: The geographical context of the project area should be tailored to the specifics of each country. Distances and travel times will be contingent upon the project scale, taking into consideration the intricacies of the ecosystem, land-use patterns, and the potential for double counting. Additionally, periodic reviews during the crediting period are essential to ensure ongoing relevance and effectiveness.	Country-wise assessment should be carried out to account for local factors and conditions
73.	Methodology needs to account for national contexts that may disrupt movement of charcoal across long distances	Country-wise assessment should be carried out to account for local factors and conditions

74.	Charcoal is often a regional and even transnational product, and should be treated accordingly.	Country-wise assessment should be carried out to account for local factors and conditions
75.	We have no comment.	NA
76.	It would be better to understand the rational behind the value of 5km. How this value is derived? Noting that it can be really challenging for project developers to ensure that a project is distance from 5 km? What happen in a case of a biomass stove project and a REDD+ project are being listed on same time by 2 different project developers? How can one knows that an other project will take place? What if a project take place less than 5 km but project proponent can ensure that users are not supplied by REDD areas? A clear map and insights of REDD project location (ongoing and expected) should be provided by the standard to help project developer better designing their projects	The distance is inappropriate and current guidance is insufficient as it does not allow proper demonstration of double counting avoidance.
77.	Projects need to address this between themselves. Ideally they should collaborate at an operational level to reverse declines in terrestrial carbon stocks through a combination of improved land management and reduced / managed offtake of resources. The overall impact should be measured at the landscape or ecosystem level than via the number of cookstoves adopted. If there is no reversal of carbon stock declines then it is difficult to assert a positive outcome.	Developers to work out the arrangement between themselves.

78.	We have attempted to work out how to do an allocation and have identified numerous issues with CS projects that rely on fNRB in their baseline: - How to prioritize allocation between overlapping claims - e.g. if a REDD project is first to register, does that prevent a CS project from subsequently claiming credits where there is overlapping double counting (or vice versa), or does the later project only receive a reduced allocation? The risk of a later CS project claiming a potentially significant portion of an already registered REDD project's credits (or vice versa) creates a significant risk to the first project and its ongoing viability. - How to deal with an increase in deforestation or forest degradation c.f. the baseline for a REDD project/jurisdictional program that has an overlapping CS project. Should that CS project receive any credits associated with an increase in forest loss in a REDD project or jurisdiction? If the REDD baseline is assumed to be accurate, then arguably the CS project should also not receive credits. - How to deal with different verification and issuance periods between overlapping REDD and CS projects / programs. - Current approaches to estimate fNRB do not differentiate between unsustainable collection of fuelwood that causes degradation vs deforestation, or how the two may interact. E.g. charcoal production as an initial driver of forest degradation and possibly deforestation, which then leads to other actors or activities that produce a change in land use. As a result it is impossible to assess double counting between CS and RED or REDD. - How to deal with baseline allocation in REDD projects under the new VM0048 where this overlaps with CS projects (noting that it is arguably impossible to determine a correct overlap in the first place). - How to differentiate between double counting from a CS project in a REDD project's leakage belt and project area - i.e. VCUs generated by a CS project in a leakage belt should in theory be added to leakage belt emission estimates, and VCUs generated in a REDD project area should be deducted from the REDD project's VCUs. - How to deal with the lack of accounting for non-permanence / reversals in CS projects that overlap with REDD - i.e. REDD projects will have an ongoing obligation and liability to ensure C stocks remain protected whereas CS projects do not. If CS projects are allocated a portion of VCUs associated with reduced emissions within a REDD project, the ongoing obligation to protect these stocks only rests with the REDD project. Verra would need to work out how to deal with an observed reversal in forests that have VCUs from CS projects. - How a successful REDD project affects the fNRB value of a cookstove project. E.g. if a REDD project is successfully protecting a forest from deforestation, fuel wood collection pressure may shift elsewhere - or alternatively some REDD projects also incorporate wood lots to provide sustainable fuel wood to local communities. How a successful REDD project affects the fNRB of an adjacent CS project is unknown - and likely exceedingly difficult to estimate. We are also aware of REDD projects planning to implement CS projects as part of their project strategy (without claiming VCUs from these projects). - How to reconcile CS accounting that is not spatially explicit (i.e. there is no effort to track where reductions in NRB occur across a landscape) with REDD accounting which is spatially explicit - especially with the new approach in VM0048 that includes risk mapping and identification of forests at risk of deforestation. Drawing a 5 km or 10 hr boundary around a CS project with a national fNRB number does not provide any insight into where the NRB is being sourced from in the CS baseline, or where CS driven reductions in NRB use will occur over time, or whether the reductions are	Not helpful.

	reductions in forest degradation or reductions associated with reduced deforestation. The amount of overlap with any REDD project is unknowable based on the current CS methodology, and any attempted allocation under the current methodology would be guesswork. We think the current cookstove approach to estimate VCUs and REDD+ GHG accounting are incompatible, that the current approach to estimate VCUs for CS that rely on fNRB is fatally flawed and inconsistent with how VCUs are accounted for in AFOLU projects, and it is not possible to develop a suitable method to allocate VCUs between the two approaches. We suggest the following approach should be considered: - CS projects that rely on fNRB to estimate VCUs should be treated as AFOLU projects rather than energy projects and have the same baseline and MRV obligations as a REDD project. Deforestation should follow the national allocation as under VM0048 allowing these project to align and nest. This will close the current accounting loophole in CS projects that do not have any obligation to monitor impacts on the underlying carbon stocks they purport to protect. - Verra should stop allowing any new "AFOLU" CS projects (or new instances of existing grouped projects) and existing "AFOLU" CS projects should be given a reasonable amount of time to transition to VM0048 - e.g. 24 months. - Once fNRB CS projects are treated as a type of REDD project, they would be required to establish project boundaries and the same double counting requirements as other REDD projects will apply, which removes the need for an allocation between overlapping CS and REDD projects. - A new "CS module" or similar is not necessary under VM0048 - project proponents that want to reduce NRB using CS are able to develop a REDD project and implement a CS program as part of the activities carried out by that project to reduce deforestation.	
79.	The risk of this is over-rated, and it's also virtually impossible to implement without significantly hindering or under-crediting a cookstove project. We discourage including requirements for this since the impact is minimal.	Seem to disagree with the overall approach.
80.	As with question 3, cookstoves are primary reducers of deforestation. Therefore those measured reductions should be considered first and REDD+ programs should need to prove that they are not double counting cookstoves reductions.	Burden of proof on REDD+ projects, cookstove projects take precedence
81.	Deforestation can be driven by various agents, depending on the location of the REDD+ project. It could be difficult to assess if deforestation in a REDD+ boundary was due to biomass being sourced as fuel for cookstoves, unless on the ground monitoring exists. Furthermore, it also depends on the extent to which the REDD+ project has been effective in preventing deforestation. To be conservative in the case of a cookstove project, we would suggest that any emission reductions associated with overlapping areas of REDD+ projects should be attributed to the REDD+ project, and not the cookstove project.	REDD+ projects take precedence
82.	When there are overlapping areas of REDD+ and cookstove projects, in the absence of clarity on which project has been registered earlier,	Equal allocation

	we recommend the cookstove credits for the overlapped area may be shared equally with the REDD+ project proponents.	
83.	Integrating a geolocation-based technology component can define project boundaries, preventing double counting and facilitating accurate allocation of emission reductions. However, consider allocation does not need to occur. Harvesting biomass for cookstoves can occur regardless and in addition or despite of forest conservation activities, especially at low collection rates. Consider if these two activities are stacked together? Is there opportunity for the cookstoves model to provide more accurate information for avoided deforestation due to monitoring at the demand side? Allowing for options for allocation at a project specific level should be considered. Allocation can be assessed on a project specific basis if agreements are in place between developers, consider materiality of the cookstoves avoided biomass component to the overarching REDD++ project if it materially changes the assertion or is included with the uncertainty range of the model, or exclusion of the avoided biomass component to the project type.	Developers to work out the arrangement between themselves.
84.	Verra should provide an example for a sample case to understand the REDD+ implication and associated points as per points 3 to 5.	Seem to disagree with the overall approach. Not helpful.
85.	Please clarify how these requirements will work with jurisdictional REDD+ programs.	Not helpful.
86.	• There would be a need of conducting another analysis to determine if the deforestation counterfactual of REDD+ projects is related to illegal logging and fuelwood consumption by the same communities involved in the cookstoves project. Additionally, some questions would be included in the cookstoves baseline survey to gather information about where the wood is being harvested or gathered. This will help establish if the wood is coming from forest or non-forest land. • If no relationship is found between both types of projects (no deforestation agents link and gathering on non-forest land), then both projects should have their own 100% allocation of emissions reductions. • Determining the fraction of non-renewable biomass in that specific region to claim ERs. FNRB applied for such cases should not be country specific but rather region specific with regards to the project boundary.	To be determined based on the nature of relationship and impacts between the two projects - case by case basis
87.	Whichever project was first should have right of way.	Earlier project should have right of way
88.	Please clarify how these requirements will work with jurisdictional REDD+ programs. This is the first time this has been in the methodology and as such we would require more time to review and revert in detail with rationale.	Seem to disagree with the overall approach. Not helpful.
89.	They should be allocated to cookstove projects. The reason is that the effects of a cookstove project is more granularly and specifically calculated. REDD+ projects measure changes in rates of deforestation and degradation in total. If there is a cookstoves project in the same region, a portion of those benefits can be attributed specifically to the cookstoves project, and the rest can be claimed by the REDD+ project.	Cookstove projects take precedence

90.	The cookstove projects should NOT be allowed to overlap areas of REDD+ projects, because it is too complex to allocate emission reductions between these two types of projects. There is virtually no way that can justify such allocation scientifically. As result, the overlapping will lead to the emissions reductions of both types being subject to criticism and this will further damage the reputation of both project type, which are already casualties of negative media coverage.	Very difficult to establish fair, unbiased procedures and requirements for allocation
91.	We think that the project boundary needs to be revised. In the broader context of VCM, the double-counting risk should be assessed in Forestry projects' methodologies, modifying the baseline when there is a local community accessible in 10 hours or less of travel in motorized vehicles (maybe translated in a radius kms), and not in community-based projects. Furthermore, an improved monitoring methodology should prevent the over-crediting in a better way. A paired KPT (Kitchen performance test) in situ is a particularly rigorous method of quantifying a stove's biomass savings in the baseline scenario and in subsequent monitoring periods.	Forestry methodologies need to be revised to account for this possible double counting occurrence.
92.	The allocation should be determined based on a comprehensive assessment of the specific contributions of each project type within the overlapping areas. This involves evaluating the unique impact of REDD+ initiatives in preserving and enhancing forest carbon stocks and the distinct benefits of cookstove projects in reducing emissions from household energy use. Rationale: 1. Project-Specific Contributions 2.Additionality and Permanence: The degree of additionality and permanence achieved by each project type in the overlapping areas should be considered.	To be determined based on the nature of relationship and impacts between the two projects - maximal crediting date of 31 December 2035
93.	Please clarify how these requirements will work with jurisdictional REDD+ programs. This is the first time this has been in the methodology and as such we would require more time to review and revert in detail with rationale	Not helpful.
94.	How those regulations/ specifications will be done with REDD+, please clarify.	Not helpful.
95.	Given the much lower bar to prove beneficial impact, they should be allocated to the cookstove projects.	Cookstove projects take precedence
96.	We suggest that a quantitative assessment must be undertaken to determine the proportional impact of the different project activities and allocate the emission reductions associated with those accordingly. We believe it would be too simplistic, for instance, to assign an automatic 50/50 spilt (or similar) since different project activities will undoubtedly have greater/lesser impacts than others. Additionally, if a default allocation was assigned, it could unfairly penalize existing projects which are 'encroached upon' by other projects. Finally, we caution that Verra must be very explicit about the processes which must be followed by projects which may overlap with others (e.g., mandatory communication between projects, pre-assessment of projects in the same proximity, Verra's processes for allocating emission reductions between projects). Again, we reiterate the importance of Verra hosting another stakeholder consultation process on its proposal for addressing this issue, even if it were an isolated consultation only on this issue.	Further assessment and consultation are needed to solve this issue of allocation
97.	We believe it will be tremendously difficult to establish fair, unbiased procedures and requirements for allocation of emission reductions to the REDD+ and cookstove projects..	Very difficult to establish fair, unbiased procedures and requirements for allocation

98.	For projects replacing unsustainable biomass use with sustainable biomass use	Already covered. No action needed.
99.	Yes	Ok. No action needed.
100.	We find that the emission sources included in the project boundary which are proposed in the methodology are clearly described. In our view, the project proponent should explain how significant each GHG source is for the project. However, we find that one the upstream emission sources are missing from the methodology. For example, proponents are not required to include the emissions associated with the development and manufacture of the project stoves. The inclusion of this would provide more accurate carbon accounting.	Including the suggested upstream source would be a step too far and hard to determine/monitor. Suggest we leave this for now.
101.	As per detailed comments, I think the non-CO2 emissions should be included for electricity	Can consider in line with GS metered meth
102.	Based on the information provided in the draft methodology about the project boundary, it appears that the emission sources included in the project boundary and GHG quantifications are complete and clearly described since it can assumed that the non renewable biomass has been procured from REDD project areas.	Ok. No action needed.
103.	Yes, no comments	Ok. No action needed.
104.	The provided information with respect to the project boundary is clear.	Ok. No action needed.
105.	Whereas, Table 1, page 9, does provide for charcoal production emissions, the non-CO2 emission factor default provided, does not. The default emissions factors need to allow developers to incorporate charcoal production emissions to avoid significant under crediting risks. The same holds true for the wood to charcoal conversion factor. The methodology provides no guidance on whether or not, an applicable conversion factor can be applied in the computation of emissions reductions from charcoal based ICS projects.	Should include charcoal production emissions for the sake of uniformity.
106.	• Yes, relevant sources have been included.	Ok. No action needed.
107.	Not Sure but we believe a qualifying stove should be tested to Tier 4 to 5 status as per world bank requirements. Anything less should not be qualified. Also we think a true monitoring system must be deployed as we have done in Colombia.	AA to determine the validity of the first part of the comment (Tier based requirements) and act accordingly Second part of comment not clear.
108.	Based on the information provided in the draft methodology about the project boundary, it appears that the emission sources included in the project boundary and GHG quantifications are complete and clearly described.	Ok. No action needed.
109.	We consider these complete and clearly described	Ok. No action needed.
110.	See answer to question 1	
111.	Yes	Ok. No action needed.
112.	Yes, it encompasses all scenarios.	Ok. No action needed.

113.	Whereas, Table 1, page 9, does provide for charcoal production emissions, the non-CO2 emission factor default provided, does not. The default emissions factors need to allow developers to incorporate charcoal production emissions to avoid significant under crediting risks. The same holds true for the wood to charcoal conversion factor. The methodology provides no guidance on whether or not, an applicable conversion factor can be applied in the computation of emissions reductions from charcoal based ICS projects. To be noted that the specific sourcing area might not be known, for example in case of charcoal, which makes it challenging to evaluate related transportation and production emissions. For example in case where baseline use of non-renewable biomass is replaced with the used of bioethanol, it might be difficult to have enough information on the baseline related transportation and production emissions.	Should include charcoal production emissions for the sake of uniformity.
114.	The methodology should take into account the emission factor for the wood to charcoal conversion factors. This element is key for actors as charcoal can travel.	Should include charcoal production emissions for the sake of uniformity.
115.	Yes.	Ok. No action needed.
116.	Description of the monitoring Plan Data recording: it is stated, “Technologies that have aged beyond their useful lifetime, as established in the usage survey, are removed from the project and are no longer credited”. The meth should be clear on how lifetime of the project devices is determined and enforced. Surveys should not be used to determine the lifetime, instead, the life of the device should be fixed in the design document based on manufacturer specs or design specifications. If we allow PP to carry out surveys, they will extend their life to earn more credits. Note: measures must be put in place to prevent PPs from exaggerating the stove's life by having long extended life. The meth should have a requirement for VVB to check and provide their remarks at each site visit verification to check on the physical quality of stove devices and compare with their stated age in years and provide an opinion of the lifetime chosen corresponds with their physical checks.	Technical lifetime is determined by the manufacturer, a third-part certified agency, field tests etc. (can refer to GS TPDDTEC meth). Should include this guidance in the methodology.
117.	For projects where the default (baseline) fuel is biomass, a survey is required to determine the extent to which continued usage of biomass in the baseline case will contribute to the depletion of terrestrial carbon stocks. This requires sampling of the biomass source areas to understand whether there is a decline in biomass over time. This could be done in several different ways (further discussion required).	Not helpful.
118.	If Verra decides to continue to allow the fNRB loophole, any use of fNRB should require a spatially explicit assessment of fNRB and project boundary that encompasses forests that are being unsustainably used for fuel wood. Project proponents should be required to monitor these forests over time to demonstrate a positive climate impact and ensure permanent reductions.	Not under the purview of this methodology.
119.	While direct measurements are a good idea and should be adopted, the entire process of how to do this is fairly new and rapidly evolving. Flexibility should be included to allow for evolving technologies and analysis of data, that will undoubtedly improve rapidly over the coming years.	Ok. No action needed.

120.	We find that for using SUMs, the methodology may be lacking some clarity. For example, the methodology does not dictate the quality of the SUMs, and what metrics qualify for this quality. In addition, there is no guidance on whether the project should be conduct tests on SUMs to ensure their quality remains throughout their usage. We would suggest that evidence of calibration and verification is available in project documents. In addition, we suggest that if a project were to use alternative literature or third party assessments to justify the higher project energy use, then this should be based on evidence which does not precede the project start date by 3-5 years, for example. We are of the opinion that sampling should be adjusted to improve the accuracy of monitoring, otherwise using more technological forms of monitoring (SUMs and metering) may still suffer from previous limitation. We find that sample sizes can be very small (<0.1% in some cases), and there is little stratification of the population, with projects assuming homogenous end user demographics. We would suggest that projects should identify sampling frames (different location, income, education etc), and apply appropriate sample sizes to each for use of SUM. We find that this approach, used in conjunction with SUMs and metering (see comments below), is likely to heed more accurate results, due to the greater sampling sizes, frames, and technology.	More specific guidance is needed on use of direct monitoring/measurement techniques and sampling framework design (for eg. Number of SUMs required). AA to consider this feedback.
121.	Overall, yes. But some specific comments in other tab	OK. Refer to the other tab.
122.	Based on the information provided in the draft methodology about the direct measurement approach (including metering/remote monitoring) to ascertain the values of various baseline and project parameters are sufficient enough for the use and verification of such measurements by the project proponents and VVBs.	OK. No action needed.
123.	Yes, no comments	Ok. No action needed.
124.	The inclusion with respect to the use of direct measurement approaches (including metering/remote monitoring) in the proposed methodology is an initiative to DMRV. However, the feedback on such measurements and monitoring approaches have been provided in points 8 and 9 below for consideration.	OK. Refer to the other section.
125.	While direct measurement of electric devices should be encouraged, the methodology references direct measurement of biomass stoves, without explanation of what this would entail. Further guidance is required to help VVBs audit direct measurements Please link all the referenced documents in the published version	More specific guidance is needed. AA to consider this feedback.

126.	• Both project proponents and the VVBs should be provided with guidelines on how to ascertain and ensure the equipment being used is giving accurate measurements (either providing calibration certificates, 3rd party endorsements for the equipment, beyond the manufacturer specifications and independent testing from 3rd parties). • Parameter ηold,i,j (Fraction) and ηnew,i,j,y (fraction) - there are various options provided as the source of data (water boiling tests, manufacturers values, host country standards and approved values by CDM too 33). Based on this, one can go for the most aggressive value, need to provide maximum CAP and need to provide evidence. • Parameter Hhi,j (Equivalent standard male adults)- other sources of data can be included like literature review e.g. census for countries.	More specific guidance is needed on use of direct monitoring/measurement techniques and sampling framework design (for eg. Number of SUMs required). AA to consider this feedback.
127.	VERRA should provide Usage Rate Guidelines similar to GS. The PD will have the option to conservatively assess the CS usage rate in the project activity or use SUMs to enhance the accuracy of monitoring data.	Should be part of a separate/broader discussion. Can ignore for now.
128.	Sufficient guidance is not provided on the direct/remote monitoring of project devices. More explanation around sample sizes, season/monitoring timelines and how the VVBs are to check sensors and data needs to be provided.	More specific guidance is needed on use of direct monitoring/measurement techniques and sampling framework design. AA to consider this feedback.
129.	No - significantly more guidance is required. We are all for using stove use monitors but there needs to be some methodology guidance about how this actually relates to wood usage and stove usage. In addition, it is not clear what sample is required and additional guidance would be welcome. We would be keen to understand how many stove monitors for the total population would be required (a calculation would be valuable) and how this data is actually meant to be used to support stove usage calculations.	More specific guidance is needed on use of direct monitoring/measurement techniques and sampling framework design (for eg. Number of SUMs required). AA to consider this feedback.
130.	For calculation of parameter ηold,i,j (section 9.1, page 26) option 1 Water Boiling Tests it is not clear which is the minimum number of tests to be carried out and the testing conditions (i.e. to be performed in certified labs or on field?) in case of three stone fire or rudimental baseline devices. Not clear what is included in "Option 3: Direct measurement" for BCp,y,i,j calculation (section 9.2, page 31-32) and for which kind of devices this option is applicable.	More specific guidance is needed on use of direct monitoring/measurement techniques and sampling framework design (for eg. Number of SUMs required). AA to consider this feedback.
131.	Yes	OK. No action needed.
132.	Further guidance is required for remote sensor measurements, safety criteria for household equipment, IoT system criteria, metering monitoring criteria, and the formulation of a monitoring plan. Additionally, enhancements are needed in areas such as data validation and quality assurance, training and capacity building, as well as documentation requirements.	More specific guidance is needed on use of direct monitoring/measurement techniques and sampling framework design (for eg. Number of SUMs required).

		AA to consider this feedback.
133.	On the direct measurement for renewable/non-renewable biomass, there should be an option added on fuel purchase monitoring especially for projects where briquettes will be used as a fuel in project scenario.	AA to consider this feedback.
134.	While direct measurement of electric devices should be encouraged, the methodology references direct measurement of biomass stoves, without explanation of what this would entail. We need more clarity/guidance on how the direct measurement of fuel consumption can be done in practice in case of "Renewable or Non-renewable Biomass" referred in page 18 of the methodology. Also, we need further guidance regarding different technologies, e.g. in case of bioethanol stoves which options can be applied for monitoring (similar as for LPG stoves?) Further guidance is required to help VVBs audit direct measurements There needs to be some methodology guidance about how this actually relates to wood usage and stove usage. In addition, it is not clear what sample is required and additional guidance would be welcome. We would be keen to understand how many stove monitors for the total population would be required (a calculation would be valuable) and how this data is actually meant to be used to support stove usage calculations. Based on the information provided in the draft methodology about the direct measurement approach (including metering/remote monitoring) to ascertain the values of various baseline and project parameters are sufficient enough for the use and verification of such measurements by the project proponents and VVBs. Please link all the referenced documents in the published version	More specific guidance is needed on use of direct monitoring/measurement techniques and sampling framework design (for eg. Number of SUMs required). AA to consider this feedback.
135.	The best way to determine the baseline is to ask every user individually what their current usage is. Especially with fuel switch projects where the project developer is already planning to have an ongoing relationship with the customer, asking for individual baseline data is a much more accurate method that generalized surveys, and the resulting improved data and carbon value should cover the additional expense.	Ok. No action needed.

136.	No. In particular, Option 2 on page 18 describes the use of stove sensors to "determine the total duration of use per year". By this, presumably the stove sensors are simply determining whether the stoves are in use, and for how long. Option 2 then goes on to state that one must "multiply by the stove fuel use rate to obtain project fuel use" and that "fuel use rate must be taken from the performance evaluation following...". It is not clear what "performance evaluation" is being referenced here. In addition, it is not clear how "Option 3: direct measurement" is distinct from "Option 1: KPT". It would be useful if Verra could provide additional guidance as to what constitutes a direct measurement approach and provide examples of same.	More specific guidance is needed on use of direct monitoring/measurement techniques.. AA to consider this feedback.
137.	No sufficient guidance for the use of metering devices. Is there any list of approved SUMs, any studies or protocol that can be shared to assess monitoring parameters? Which parameters to be monitored? How usage rate should be monitored. Any example? Although introduction of metering devices is a good point, it should ensure clear guidance are given and examples on how projects successfully used those devices especially for biomass stoves.	More specific guidance is needed on use of direct monitoring/measurement techniques and sampling framework design (for eg. Number of SUMs required). AA to consider this feedback.
138.	LPG and ethanol stove fuel consumption and ER claim LPG and ethanol stove can displace either charcoal, firewood, kerosene, or coal stoves in the baseline. However, their consumption across the year might not be 100% for households as some households might lack enough money to refill the cylinders and within those few days, they use the baseline stove. The meth should guard against PP claiming for all the 365 days in a year of baseline stove displacement. Therefore, I suggest that PP should establish the daily baseline and fuel consumed and its equivalent baseline emissions per day (BE,d). At project scenario, PP shall also measure amount of LPG or ethanol required by household per day to provide their daily energy needs (equivalent energy displaced). Using the formula provided, PP shall then calculate the emission reductions per day (ERday) for the project. The ERday shall also be calculated to be equal to x grammes/litre of LPG or ethanol used. This must be made compulsory for any project using the methodology and implementing a project which involves LPG or ethanol. During monitoring, the PP shall record the total amount of LPG cylinders exchanged and their total litres of fuel/gas or ethanol in litres sold for any given monitoring period for each baseline scenario identified. Using the pre-determined ERday per litre of LPG/ethanol, the PP can then calculate the equivalent emission reduction realized by the project activity within the period based on the total volume of LPG/ethanol sold. This countercheck will guard against overclaiming of ERs by the PPs.	The current prescribed approaches of direct measurement and fuel purchase based monitoring approaches should address this issue. Not sure if daily baseline determination if feasible. AA to consider.
139.	The main element missing is monitoring of the sustainability of the biomass supply and its effectiveness at reducing biomass depletion in the project area.	Outside the purview of the methodology.

140.	In our view, the use of a Stove Use Monitor (SUMs) is likely to be much more accurate than end-user surveys which are conducted through observation or interviews. We find that there are inherent risk with these types of monitoring, and although uncertainty still exists whilst using SUMs to some extent, their use is much more reliable. To better encourage SUMs, the methodology could cap the usage rates in which projects can apply depending on monitoring approach, such that those that adopt SUMs are able to declare higher usage rates.	Suggest GS type approach. Should be part of a separate/broader discussion. Can ignore for now.
141.	Overall I am very positive about use of SUM and how that is implemented here.	Ok. No action needed.
142.	The proposed use of Stove Use Monitors (SUMs) to measure the usage rate is a positive step towards increasing the accuracy of measurements. SUMs can help provide more accurate and reliable data on stove usage, which is essential for determining the accurate emission reductions. To further encourage or improve the use of SUMs, it is important to provide training and technical support to those who will be using them. This will help ensure that the monitors are used correctly and that the data obtained is accurate and reliable.	Ok. No action needed.
143.	Yes, CarbonAi is supportive of Stove Use Monitors. To promote the utilization of SUMs, an implementation of a usage rate can be introduced, contingent on the monitoring method applied. As a point of reference, the Usage Rate is implemented in the Gold Standard Methodology - Simplified Methodology for Clean and Efficient Cookstoves - with monitoring data and information requirements identified by Parameter ID SMEC 16. These usage levels have a direct impact on the Emission Reduction (ER) equation, with higher ER being achieved as the usage rate increases. The higher percentage of claimable usage rate corresponds to monitoring using monitors.	Suggest GS type approach. Should be part of a separate/broader discussion. Can ignore for now.
144.	The proposed methodology is unclear on how to directly measure the stove usage using stove use monitors (SUMs). The type of technology to be used, how accurate its results would be, calibration methods for sensors/IOT devices, etc., are not provided in the methodology. The use of SUMs should follow standard guidelines and the devices to be employed should be certified by a recognized organization/laboratory and calibrated in accordance with national/international requirements/IS.	More specific guidance is needed on the usage of SUMs and the various types allowed under the meth. AA to consider.
145.	We welcome the use of SUMs to enhance quantification of usage in cookstove projects. However, the use of SUMs is still in early testing by most cookstove companies, and further research is needed to establish how best they can be used to improve quantification. We recommend that Verra consult in detail with projects undertaking SUM trials to inform better, more detailed, guidelines for SUM use in this methodology. In particular, we have concerns about the sampling requirements for SUMs in Section 8.2.1.1. This implies that SUMs would be fixed at manufacture and remain on a device for the full product lifetime. This jeopardizes the randomness of the sample and creates opportunity for PDs to intervene with households who have SUM stoves. Instead, we recommend SUMs be added to a random sample of different devices for each monitoring period, for a fixed period of no less than three months. In addition, please ensure that the sample	Random application of SUMs to prevent intervention by project developers. A good suggestion. AA should consider this and add a provision in the methodology.

	requirements include a minimum number per product batch, and that this sample will meet the requirements of VCM ratings agencies.	
146.	• SUMs improve the accuracy in determining the usage rate for the biomass stoves. Are there certification bodies that can certify the accuracy of the SUMs especially in developing countries? • The major challenges are costs associated with purchase and the devices are not locally available.	Practical challenges related to the cost of purchase, use by developers and certification of SUMs by VVBs. No action is needed.
147.	We believe that Stove Use Monitors provide increased accuracy over surveys. Because the desired information needs to be extracted from the raw data we recommend project developers be required to describe their approach to signal extraction and provide certifying bodies with access to the underlying data.	Ensuring access of complete data to VVB is crucial. Can include this as a requirement in the meth. AA to consider this feedback.
148.	Yes, we produce a qualified thermoelectric generator that uses analytical Data linked to the cloud that can monitor usage base lines for regional deployments. This will verify usage claims with analytic data back-up and allow for a true mean level to be verified !	Ok. No action needed.
149.	This goes in the right direction but devil is in the details. We advise you to use cooking days instead of cooking time. This is a lot more robust. SUMs should be used in conjunction with KPT not with lab test consumption rate (which is not accurate and depends on the stove power level). With KPT you can get daily fuel consumption at the household level and combine nicely with the cooking days metric from SUMs.	AA to consider this feedback.
150.	VERRA should provide Usage Rate Guidelines similar to GS. The PD will have the option to conservatively assess the CS usage rate in the project activity or use SUMs to enhance the accuracy of monitoring data.	Suggest GS type approach. Should be part of a separate/broader discussion. Can ignore for now.
151.	SUMs are a great tool which can be used to increase accuracy of monitoring. However, it is still a relatively new field and lots of work still needs to be put in. In the guidance of the methodology it is stated that SUMs should be fixed at manufacturing. Although this could be good, it might take away from the "randomness" required when conducting surveys. If the SUMs are only on a set sample for the lifetime of the project, one could only increase monitoring at said households, which would skew the monitoring results. Thus it is advised the SUM monitoring should follow a similar guideline as the Gold Standard i.e. at least 100 SUMs on a randomly selected sample, operating for at least 90 days. Guidance on how the VVB's will assess the usage of SUMs is also required.	Random application of SUMs to prevent intervention by project developers. A good suggestion. AA should consider this and add a provision in the methodology.

152.	We welcome the use of SUMs to enhance quantification of usage in cookstove projects. However, the use of SUMs is still in early testing by most cookstove companies, and further research is needed to establish how best they can be used to improve quantification. We recommend that Verra consult in detail with projects undertaking SUM trials to inform better, more detailed, guidelines for SUM use in this methodology. In particular, we have concerns about the sampling requirements for SUMs in Section 8.2.1.1. This implies that SUMs would be fixed at manufacture and remain on a device for the full product lifetime. This jeopardizes the randomness of the sample and creates opportunity for PDs to intervene with households who have SUM stoves. Instead, we recommend SUMs be added to a random sample of different devices for each monitoring period, for a fixed period of no less than three months. In addition, please ensure that the sample requirements include a minimum number per product batch, and that this sample will meet the requirements of VCM ratings agencies. There also needs to be acknowledgement that cooking practices vary between seasons and seasonal variations need to be incorporated into the sampling set and timelines.	Random application of SUMs to prevent intervention by project developers. A good suggestion. AA should consider this and add a provision in the methodology.
153.	Include a definition of Stove Use Monitors (SUMs) in Definitions paragraph. We consider appropriate the inclusion of the possibility of using SUMs to define ny,i,j and ty,i,j parameters.	AA to consider this feedback.
154.	The methodology should require SUMs/metering, robust longitudinal surveys, KPTs (with Hawthorne effect), or literature derived defaults. This will increase the quality of the credit and encourage use of direct measurement as the least intensive option behind literature defaults. Our article and supplemental materials -- Pervasive Over-Crediting from Cookstove Offset Methodologies -- provides detailed factor-by-factor analysis and guidance on cookstove offset estimation, including related to survey design and each of the major elements of the calculation equation. Please refer to that article and its supplemental materials for a thorough analysis.	AA to consider this feedback.
155.	We agree. Measuring the stoves through s technology such a sensor, might lead to a better transparency on the actual usage of the stove and the relative issuance of credits.	Ok. No action needed.
156.	As recommended earlier, additional criteria, an enhanced monitoring plan, increased safety measures for sensors, and expanded training capacity are essential for achieving greater accuracy in the results of the project activity.	More specific guidance is needed on the usage of SUMs and the various types allowed under the meth. AA to consider.
157.	Yes	Ok. No action needed.

158.	We welcome the use of SUMs to enhance quantification of usage in cookstove projects. SUMs can help provide more accurate and reliable data on stove usage, which is essential for determining the accurate emission reductions. However, the use of SUMs is still in early testing by most cookstove companies, and further research is needed to establish how best they can be used to improve quantification. We recommend that Verra consult in detail with projects undertaking SUM trials to inform better, more detailed, guidelines for SUM use in this methodology. In particular, we have concerns about the sampling requirements for SUMs in Section 8.2.1.1. This implies that SUMs would be fixed at manufacture and remain on a device for the full product lifetime. This jeopardizes the randomness of the sample and creates opportunity for PDs to intervene with households who have SUM stoves. Instead, we recommend SUMs be added to a random sample of different devices for each monitoring period, for a fixed period of no less than three months. In addition, please ensure that the sample requirements include a minimum number per product batch, and that this sample will meet the requirements of VCM ratings agencies. To further encourage or improve the use of SUMs, it is important to provide training and technical support to those who will be using them. This will help ensure that the monitors are used correctly and that the data obtained is accurate and reliable. There also needs to be acknowledgement that cooking practices vary between seasons and seasonal variations need to be incorporated into the sampling set and timelines. Page 35, the SUM is is referred only applicable for electric stoves. Further clarification needed for the use of SUMs with different devices using other fuels	Random application of SUMs to prevent intervention by project developers. A good suggestion. AA should consider this and add a provision in the methodology.
159.	SUMs should be used wherever possible. Projects using universal SUMs should generate more highly validated emissions reductions and should receive recognition for data accuracy and verifiability. The cost of SUMs continues to plummet as does the cost and complexity of real time data collection. There are very few places and circumstances where the additional verifiability and resulting carbon income wont be more than sufficient to cover the additional cost.	Ok. No action needed.
160.	We applaud the proposed use of SUMs. We note, however, that the first reference to 'SUMs' in the methodology only occurs on page 30 in the parameter table for ny. However, we would encourage Verra to make this reference earlier on in the methodology, e.g., under Option 2 (page 18) where first mention is made of stove sensors (which presumably is referring to SUMs).	AA to consider this feedback.
161.	Use of SUMs needs first an harmonized usage procedure, how the different parameters should be assessed with SUMs, what is definition of usage and non usage rate with SUMs? Without clear guidance, SUMs results may still bring as much uncertainties as paper based surveys. From our first trial of SUMs (trial on-going) we have noticed that usage of SUMs are quite expensive (buying/renting the devices, training surveyors, getting users consent, travels for intermediary visits, replacement of broken/lost SUMs) but most important, usage rates can be defined and assessed in different manners hence a need of a protocol/clear methodology. Also to note that SUMs can bring different results based on the type of SUMs and the way it is parametered. Last but note the list systematic use of	Practical challenges related to the cost of purchase, use by developers and certification of SUMs by VVBs. No action is needed.

	SUMs may have other types of impacts (electronic waste) that should also be taken in consideration	
162.	Yes, it can be used for time in use, but I would caution against applying those results to fuel savings rather than usage, since one has to then qualitatively apply kitchen-wide KPT results to each device in the kitchen rather than just the device with a SUMS installed, which can be subject to bias.	Yes, SUMs are useful but are more relevant for determination for fuel usage than savings. AA to consider this feedback.
163.	Further guidance will required to help VVBs audit direct measurements	More guidance is needed for VVBs.
164.	The real-time approach to measuring stove usage by using SUMs, in our view, is more accurate than using survey techniques. Surveys are vulnerable to various biases, whether from observers or from end-users. SUMs can minimize these risks as continuous monitoring can occur, collecting real-time data. As stated previously, the methodology does not refer to the quality of SUMs or metering, which may be detrimental to the quality of data collection. In our view, the methodology requires guidance on the quality of SUMs which can be used, in addition to information regarding their calibration throughout the project.	More specific guidance is needed on the usage of SUMs (monitoring plan, consistency with cooking conditions) and the various types allowed under the meth. AA to consider.
165.	As per detailed comments, I don't think time of use and some average or stated fuel/electricity usage rate can be an accurate method.	Not clear
166.	Yes, SUMs can accurately estimate the amount of time that a stove is using fuel. This is because SUMs are equipped with data loggers that collect physical data such as temperature, heat flux, electrical current, motion, or pollutant concentrations. By analyzing this data, SUMs can accurately determine the amount of time that a stove is using fuel. So, if you are looking to monitor the fuel usage of your cookstove, SUMs can be an effective solution.	Ok. No action needed.
167.	This will be design specific and wouldn't affect the accuracy of the methodology.	Ok. No action needed.
168.	During the simmering phase of cooking, the SUMs may not accurately record the amount of time as the sensor may not achieve the threshold to trigger the datapoints because of low heat during the cooking process. In addition, a stove may remain hot enough to continue to trigger a cooking event after the fuel has been put out by the user, therefore inaccurately adding time to a cooking event that should not have been added.	More specific guidance is needed on the usage of SUMs (monitoring plan, consistency with cooking conditions) and the various types allowed under the meth. AA to consider.
169.	Most SUMs are unable to measure more than temperature and time. This means they can be used to record "cooking events," but need to be linked to field studies to establish average fuel consumption per cooking event. We recommend that project developers undertake multi-day Kitchen Performance Tests (KPTs) to establish average fuel consumption per cooking event. Combined, this can provide more accurate project stove usage data	SUMs+other monitoring methods (KPT) is most accurate
170.	• Calibration would be needed to ensure accuracy. The equipment should be certified by independent bodies to ensure credibility of the results obtained.	Calibration is crucial. AA to consider this feedback.

171.	No, I do not believe the SUM method can be used. Too much variations in usage depending on family size and acceptance of stove.	No. Practical challenges prevent its usage.
172.	Unfortunately, not really. Cooking time is hard to measure precisely with SUMs because the stove often stay hot after the end of cooking and the end of cooking is subject to interpretation. We recommend that you use cooking events (number of time the stove is used) or cooking days (number of days the stove is used at least once) instead which is lot more robust (not subject to interpretation). Cooking days works well with the KPT where daily fuel consumption is measured.	SUMs+other monitoring methods (KPT) is most accurate
173.	VERRA should provide Usage Rate Guidelines similar to GS. The PD will have the option to conservatively assess the CS usage rate in the project activity or use SUMs to enhance the accuracy of monitoring data.	Suggest GS type approach. Should be part of a separate/broader discussion. Can ignore for now.
174.	Yes, SUMs can be used to estimate the time that a stove is in operation. However, it cannot determine what fuel is being used. SUMs are effective for monitoring usage, i.e. stove A was used 3 times on day x with each cooking event lasting on average 1 hour. Furthermore, in the guidance of the methodology it is stated that SUMs should be fixed at manufacturing. Although this could be good, it might take away from the "randomness" required when conducting surveys. If the SUMs are only on a set sample for the lifetime of the project, one could only increase monitoring at said households, which would skew the monitoring results. Thus it is advised the SUM monitoring should follow a similar guideline as the Gold Standard i.e. at least 100 SUMs on a randomly selected sample, operating for at least 90 days.	OK. Random application of SUMs to prevent intervention by project developers. A good suggestion. AA should consider this and add a provision in the methodology.
175.	Most SUMs are unable to measure more than temperature and time. This means they can be used to record "cooking events," but need to be linked to field studies to establish average fuel consumption per cooking event. We recommend that project developers undertake multi-day Kitchen Performance Tests (KPTs) to establish average fuel consumption per cooking event. Combined, this can provide more accurate project stove usage data	SUMs+other monitoring methods (KPT) is most accurate
176.	We consider appropriate the use of SUMs to evaluate the amount of time that a stove is using fuel. The methodology shall better define SUMs eligible types and minimum technical requirements taking into consideration the type of cookstove.	More specific guidance is needed on the usage of SUMs (monitoring plan, consistency with cooking conditions) and the various types allowed under the meth. AA to consider.
177.	Metering and sales data is better, but SUMs are much better than surveys. See above.	OK. No action needed.
178.	If followed by an accurate time calculation	OK. No action needed.
179.	The methodology lacks an additional monitoring plan specifically addressing the use of SUMs. While continuous operation is outlined in the method, there is a need for further details on how the monitoring of SUMs will be conducted.	More specific guidance is needed on the usage of SUMs (monitoring plan, consistency with cooking conditions) and the various types allowed under the meth. AA to consider.

180.	SUMs can measure temperature and time. However, it is not necessarily possible to infer fuel consumption from these metrics. The accuracy of SUM timing data depends on how the SUM device is programmed. For example, SUMs can be programmed to only measure above a certain temperature. Once the set temperature is reached they begin monitoring time, but a family may have already been cooking (and consuming fuel) for 15+ minutes before the temperature was reached. In order for SUMs to match what is happening in the field, clearer protocols are required. Including linking SUMs to field studies to establish average fuel consumption per cooking event. We recommend that project developers undertake multi-day Kitchen Performance Tests (KPTs) to establish average fuel consumption per cooking event. Combined, this can provide sufficiently accurate project stove usage data. Further guidance and protocols are required to standardise how SUMs are programmed to define "cooking events". PDs using SUMs need clear protocol for determining these events.	More specific guidance is needed on the usage of SUMs (monitoring plan, consistency with cooking conditions) and the various types allowed under the meth. AA to consider.
181.	Yes, along with temperature. This can generate an accurate summary of fuel used. SUMS + fuel sales data + individual baseline surveys is the most accurate approach.	SUMs+other monitoring methods (KPT) is most accurate
182.	Yes.	OK. No action needed.
183.	SUMs can be used to estimate time saving, but these need measurement on both baseline and project stoves for a basked of meals cooked and a good number of participants. Hence, bearing more cost and monitoring time for project developers	OK. No action needed.
184.	This is an interesting approach. The blanket 5% leakage adjustment is not justified - is it based on any research? It seems counterintuitive to penalize emission reduction projects for effects of external actors increasing their emissions. There are parallels with indirect land use change arguments. I suggest it deserves wider discussion by market stakeholders.	The leakage discount factor is not appropriate. Wider discussion is needed.
185.	We find that there may be a risk of increased fossil fuel burning by the population that does not participate in the project. However, there is little evidence to justify if the net-to-gross adjustment factor of 0.95 to account for this is appropriate. In our view, the best practice approach would be a leakage assessment which identifies any fossil fuel usage outside of project end-users, and any other source of leakage. If the level of increased fossil fuel usage was deemed under the five percent based on the leakage assessment, the use of a 0.95 adjustment factor may be considered reasonable as a means of conservativeness.	Not sure if the suggest approach is feasible. Can skip.
186.	Yes, the current provisions in the methodology effectively account for such risk by requiring a net-to-gross adjustment factor of 0.95 to be applied. This adjustment factor helps to account for the emissions that may result from increased fossil fuel use by those not participating in the project. However, it is important to note that there may still be some level of uncertainty in estimating the magnitude of such emissions and that ongoing monitoring and verification are necessary to ensure that the risk is effectively managed.	Ok. No action needed.

187.	No, there is no risk for leakage emissions as described. Leakage is considered as market leakage, activity shifting or ecological supply for increases in emissions that are both measurable and directly attributable to the project. The leakage scenario as considered represents a behavioral change, and has many other unmeasurable and conditional requirements to be plausible. For example, for this scenario of leakage to be plausible, there would have to be proven a constraint in supply of the non-renewable biomass or fossil fuel source in addition to the cleaner fuel, whereby the fuel savings from the project activity are combusted due to an increase in the level of consumption activity of other users. This leakage furl switch would also have to consider the cost of the fuel, technology availability to combust the fuel, and access to the fuel supply. In addition the linkage of the project activity in fuel savings while it may be correlated, does not directly in and of itself cause an increase in fuel consumption activity by other users and this is not therefore leakage as considered in the traditional three categories and as defined in the VCS methodology standard. This is an over design that weakens the methodology and activity accuracy based upon speculation that cannot be substantiated with reasonable efforts by the project developer or registry.	No leakage risk. Argues against there being a causation. No action needed.
188.	The current provisions in the methodology effectively account for such risk	Ok. No action needed.
189.	We do not consider this a significant risk. Family fuel consumption is based on need, not fuel availability, and is not linked to what other families consume elsewhere.	No leakage risk. Argues against there being a causation. No action needed.
190.	• Yes, there is a potential leakage, however there should be a provision for the project developers to evaluate possible sources of leakage with evidence. Currently, the proposed methodology only provides for a discounting factor of 5% on the total GHGs. • Possible sources of leakage include: 1. Displaced project technologies being reused outside of the project boundary. 2. People in the project boundary who do not have the project technology use the fuel saved by project users due to increased availability of the fuel yet they previously used lower emitting technologies. 3. Project has significant impact on NRB reduction in a project boundary where other GHG projects are also claiming GHG reductions. 4. Population compensates for space heating previously provided by the inefficient technology using other forms of heating. 5. Households previously using lower emitting technologies e.g. electric cookstoves substitute with the new technology with higher emissions e.g. efficient charcoal stove due to promotion and marketing.	Leakage consideration is not comprehensive enough and other potential sources of leakage exist that have not been covered. AA to consider this feedback.
191.	We do not believe there is a risk associated with this. The population who are not part of the project will not have access to the infrastructure. If this is the logic applied, surely the same will apply for biomass based fuels.	No leakage risk. Argues against there being a causation. No action needed.
192.	We do not consider this a significant risk. Family fuel consumption is based on need, not fuel availability, and is not linked to what other families consume elsewhere. We recommend no leakage.	No leakage risk. Argues against there being a causation. No action needed.

193.	See our thoughts on leakage from our article.	AA to review the article and consider the feedback.
194.	Yes, it will help for leakage assessment through burning of fossil fuel outside the project boundary.	Ok. No action needed.
195.	We do not consider this a significant risk. Family fuel choice is based on price, and fuel consumption is based on need, not fuel availability. Neither is linked to what other families consume elsewhere. We consider a 0% leakage to be appropriate	No leakage risk. Argues against there being a causation. No action needed.
196.	We do not believe that to be a significant risk.	No leakage risk. Argues against there being a causation. No action needed.
197.	Yes, there is a risk of leakage emissions due to the increased burning of fossil fuels by the population that does not participate in the project. Yes, the current provisions in the methodology effectively account for such risk.	Ok. No action needed.
198.	This will mostly depend on the cost of the fossil fuels. If fossil fuels are available but at a higher cost than project fuel, risk of leakage are really low. However if the price of fossil fuels becomes lower (this is not actual scenario in most African countries) then yes risk of leakage as well as project users switching back to fossil fuel can be considered. However having those data or estimating these leakage, maybe very challenging. The methodology doesn't give clear guidance,	Leakage depends upon the price/availability of fossil fuels. The methodology does not provide sufficient guidance on leakage determination. AA to consider this feedback.

APPENDIX 2: DOCUMENTS REVIEWED

S.No.	Title of document	Version	Provided by
1.	M0174-Energy Efficiency and Fuel-Switch Measures in Cookstoves	2.0, dated 05/09/2024	Verra
2.	VMR0006 Energy Efficiency and Fuel Switch Measures in Thermal Applications	1.2	Others
3.	AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass	13.0 12.0	Others
4.	AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user	13.0	Others
5.	Public Stakeholders Comments	-	Developer
6.	GHG emission factors hub (EPA, 2021)	-	Others
7.	U.S. Environmental Protection Agency (EPA)	-	Others
8.	VCS Standard	4.7	Others
9.	VCS Methodology Requirements	4.4	Others
10.	Methodology Form Template	4.2	Others
11.	https://www.climateactionreserve.org/	-	Others

12.	https://cdm.unfccc.int/	-	Others
13.	https://www.goldstandard.org/	-	Others
14.	https://www.globalcarboncouncil.com/	-	Others
15.	https://verra.org/	-	Others
16.	https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020	-	Others
17.	CDM AMS-III.K. Avoidance of methane release from charcoal production	5.0	Others
18.	CDM General guidelines for SSC CDM methodologies	23.0	Others
19.	CDM Standard for sampling and surveys for CDM project activities and programmes of activities	9.0	Others
20.	CDM TOOL01 Tool for the demonstration and assessment of additionality	5.2	Others
21.	CDM TOOL03 Tool to calculate project or leakage CO2 emissions from fossil fuel combustion	2.0	Others
22.	CDM TOOL12 Project and leakage emissions from transportation of freight	1.1.0	Others
23.	CDM TOOL15 Upstream leakage emissions associated with fossil fuel use	2.0	Others
24.	CDM TOOL16 Project and leakage emissions from biomass	4.0	Others
25.	CDM TOOL24 Common Practice	3.1	Others
26.	CDM TOOL30 Calculation of the fraction of non-renewable biomass	1	Others
27.	CDM TOOL33 Default values for common parameters	2	Others
28.	VCS Tool to calculate emissions from electricity consumption [DRAFT] TOOL ID #M0251 https://verra.org/wp-content/uploads/2023/12/VCS-Electricity-Tool-Public-Consultation-Draft_Clean.pdf	Version: Draft for Public Consultation Draft Date: 15-December-2023	Others
29.	CDM Definition 'Clarifications on Definition of Biomass And Consideration of Changes in Carbon Pools Due to A CDM Project Activity' Annexure 8	-	Others
30.	ASTM D5865-12, ISO 1929	-	Others
31.	ISO/TR 19867-3:2018	Edition 1	Others
32.	2006 IPCC Guidelines for National Greenhouse Gas Inventories	-	Others
33.	WHO 'Tools and toolkits' – 'Defining clean fuels and technologies'	-	Others
34.	CCA 'Controlled cooking test protocol'	2.0	Others

35.	CCA 'Water Boiling Test Protocol'	4.2.3	Others
36.	CCA 'Kitchen Performance Test Protocol	4.0	Others
37.	CCA 'Venture Catalyst'-Lean Data Insights, May 2023	-	Others
38.	Isle Ruiz Mercado, The Stove Adoption Process: Quantification Using Stove Use Monitors (SUMs) in Households Cooking with Fuelwood, University of California, Berkeley.	-	Others
39.	'Techno-economic comparison of the FUEL sensor and Kitchen Performance Test to quantify household fuel consumption with multiple cookstoves and fuels' by Jennifer Ventrella, Olivier Lefebvre and Nordia MacCarty	-	Others
40.	IEA - "Access to Clean Cooking'	-	Others
41.	The Energy Progress Report-'Tracking SDG 7', 2019	-	Others
42.	VCS Program Guide	V4.4	Others
43.	Households size		
44.	Methodology Development and Review Process	Version 4.0	Verra
45.	https://verra.org/validation-verification/earthood-services-private-limited/	Last accessed on 04/10/2024	Verra
46.	VCS Methodology Submission Form & Agreement	Version 4.1	Verra
47.	"Community Forestry Field Manual 1: Guidelines For Planning, Monitoring And Evaluating Cookstove Programmes"https: //www.fao.org/4/u1310e/U1310e03.htm	By Stephen Joseph, edited and designed by Carla R.S. Koppell FAO, Rome 1990,	FAO
48.	Guidelines for Woodfuel Surveys. F.A.O,"	By Keith Openshaw	FAO
49.	Annex 5 - Information note on the rationale for default factors used in AMS-I.E and AMS-II.G" of the SSC WG 42 meeting report	Version 01.0	CDM
50.	CDM Tool 16- Methodological tool Project and leakage emissions from biomass	Version 04.0	CDM
51.	CDM TOOL 12 *Project and leakage emissions from transportation of freight*		CDM
52.	CDM TOOL 16 - *Project and leakage emissions from biomass*		CDM
53.	CDM TOOL 15- *Upstream leakage emissions associated with fossil fuel use*		CDM
54.	AMS III. K.- *Avoidance of methane release from charcoal production*	Version 5.0	CDM

APPENDIX 3: COMPETENCE STATEMENT

Competence Statement			
Name	Shifali Guleria		
Education	M.Sc. (Environmental Studies and Resource Management), TERI University		
Experience	6+ year		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	YES (AMS-I.A., AMS-II.G., AMS-II.E., AMS-III.A.V., AMS-I.D, ACM0002)		
Local expert	YES		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (1.2, 3.1)		
Reviewed by	Deepika Mahala	**Date**	18/02/2022
Approved by	Ashok Gautam	**Date**	18/02/2022

Competence Statement			
Name	Akanksha Sengupta		
Education	M.Sc Environmental Studies, University of Delhi B.Sc Zoology, Hans Raj College, DU		
Experience	2 + year		
Field	Environment Science and Policy		
Approved Roles			
Team Leader	YES (VM)		
Validator	YES (VM)		
Verifier	YES (VM)		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	YES (T.A. 3.1)		
Reviewed by	Shifali Guleria (Quality Manager)	**Date**	22/08//2024
Approved by	Deepika Mahala (Technical Manager)	**Date**	22/08/2024

Competence Statement

Name	Kishlay Singh		
Education	B.Tech (Civil Engineering) M.Tech (Environment Engineering)		
Experience	1 Year +		
Field	Climate Change & Environment		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	NO		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Trainee	YES		
Reviewed by	Shifali Guleria (Quality Manager)	**Date**	08/07/2024
Approved by	Deepika Mahala (Technical Manager)	**Date**	10/07/2024

APPENDIX 4: FINDINGS OVERVIEW

MD is referred as “Methodology developer”

CAR: Corrective Action Request
CL: Clarification Request
FAR: Forward Action Request

Table 1. FARs FOR VVB REVIEW STAGE

Finding 1: EF value of renewable charcoal

Reference: 9.1 – Data and Parameters Available at Validation **Type of findings**: Forward Action Request
Description of finding **Date:** 18/06/2024
Please clarify how the CO_2 emission factor value for renewable charcoal (i.e., 112 tCO_2/TJ) is appropriate from the point of view of: • the ER benefits of avoided CO_2 emissions from displacement of non-renewable charcoal by renewable charcoal and • considering the fNRB value to be zero.
Methodology Developer Response **Date:** 06/08/2024
The ER benefits of avoided CO_2 emissions from non-renewable charcoal will be captured by the calculation of baseline emissions from this source.

The fNRB value represents the fraction of biomass that is non-renewable. If fNRB is zero, it means that all the biomass used to produce the charcoal is renewable, i.e., sourced from sustainably managed forests or plantations where the carbon emitted during combustion is offset by the carbon absorbed during the growth of the biomass. The value of 112 tCO_2/TJ is appropriate as a gross emission factor for renewable charcoal. However, from a carbon accounting perspective, if fNRB = 0, the net CO_2 emissions would be considered zero because the renewable biomass cycle offsets the emissions from burning the biomass. No change.
VVB Response **Date:** 26/08/2024
Methodology developer has clarified that ER benefits of avoided CO_2 emissions from non-renewable charcoal in baseline will be captured by default in the in calculation of baseline emission sources, which is an appropriate approach. Additionally, it is noted that since charcoal is a renewable source in this case, the fNRB value 0 is an accurate reflection of the parameter. The emission factor value is found appropriate and therefore, this finding is closed.

Finding 2: KPTs for parameters $SC_{b,i}$ and $SC_{p,j.}$

Reference: 9.1 – Data and Parameters Available at Validation **Type of findings**: Forward Action Request
Description of finding **Date:** 18/06/2024
Please clarify why (3-day) KPTs have not been included as another valid source of data (in addition to CCTs) for determination of the parameters $SC_{b,i}$ and $SC_{p,j}$. KPTs are much easier to administer than CCTs and are very accurate methods of determining fuel consumption in the baseline and in the project case.
Methodology Developer Response **Date:** 06/08/2024
CCTs are designed to measure fuel consumption under controlled conditions, allowing direct and accurate comparison between different cooking technologies' performance under the same conditions. On the other hand, although KPTs are practical and can reflect the actual fuel usage in a household, it exhibits variability due to differences in user behavior and environmental conditions. The CCT is specific for the cooking events that can be replaced by EPC and other devices with additional characteristics that affect energy consumption (i.e. pressure), seeking to reflect only the baseline cooking activities that are capable of being replaced by the EPC and requiring controlled conditions to achieve this direct comparison. No change.
VVB Response **Date:** 26/08/2024
CCT has been considered an appropriate approach for project devices using electricity with additional characteristics (e.g. pressure in case of EPCs) since these tests allow obtaining direct comparison between the cooking events in baseline which can be replaced by the project devices with characteristics additional to thermal energy. The approach is acceptable due to the higher accuracy level achieved. Finding is closed.

Finding 3: Updating the baseline measurement campaign

Reference: 9.1 – Data and Parameters Available at Validation **Type of findings**: Forward Action Request
Description of finding **Date:** 18/06/2024
In row "Source of data" for parameter $BC_{b,y,i}$, the following statement has been recorded: *Determined once at validation and cross-checked every two years. Measurement campaign must be updated when changes are reflected.* The above statement is not entirely clear. Please clarify what you mean by – "cross checking every two years" and "updating the measurement campaign" . Please consider rewording the statement to provide more clarity on these aspects.
Methodology Developer Response **Date:** 08/08/2024

A baseline KPT sample must be performed every two years and compared to the initial values. If there are variations with respect to the KPT sample performed at validation, the parameter $BC_{b,y,I}$ must be updated.
For better understanding, the average quantity of fuel used per baseline device has been separated in two parameters, one determined ex ante and another one as an ex-post monitoring parameter for the biannual reassessment.

VVB Response **Date:** 26/08/2024

The methodology has been updated such that parameter BCb,y,i has been reported twice, once under fixed ex-ante parameters and once under monitored parameters list to indicate when measurement campaign is to be updated. However, this approach can lead to further confusion for the users of methodology since same parameter with same notation, description and referring to same equation has been reported as two separate parameters in the monitoring plan. Methodology developer is requested to reconsider this approach and apply a clear approach for presenting and determining this parameter. Open

Methodology Developer Response **Date:** 05/09/2024

The ex-ante parameter has been modified to $BC_{ex\text{-}ante,b,i}$ to avoid confusion. Moreover, in section 8.1.1 the parameter explanation was adjusted to explain that this parameter can be either $BC_{ex\text{-}ante,b,i}$ when the follow-up baseline survey shows that there are no significant changes in the baseline scenario; or $BC_{b,y,i}$ when the survey reflects a significant change, and the baseline fuel consumption must be updated.

VVB Response **Date:** 20/09/2024

VVB has assessed the revisions made and confirms that the ex ante parameter has been modified to '$BC_{ex\text{-}ante,b'}$, Further section 8.1.1 has also been revised to clarify the conditions wherein the parameter is to be consider as '$BC_{ex\text{-}ante,b,}$' and where, as '$BC_{b,y,i}$'. The finding stands closed.

Finding 4: Option 2 for determining $BC_{b,y,i}$

Reference: 9.1 – Data and Parameters Available at Validation
Type of findings: Forward Action Request

Description of finding **Date:** 18/06/2024

For determination of parameter $BC_{b,y,i}$, it is not clear how "Option 2: Baseline field test" is different from "Option 1: Measurement Campaign" (other than the fact that it is meant for distributed thermal energy generation units other than cookstoves). If the difference is type of technology only, then please consider merging both options. Otherwise, please provide more information in the methodology (possibly section 8.1.1) on the differences between the two options for promoting clarity and ease of adoption.

Methodology Developer Response **Date:** 08/08/2024

The methodology scope has been limited to cookstoves, and option 2 has been removed. This ensures the methodology will be applied optimally, only for activities for which its rules and procedures have been developed and that represent the vast majority of projects.

VVB Response **Date:** 26/08/2024

The removal of option 2 has successfully addressed the raised finding by limiting the scope of methodology to cookstoves only. Therefore, the finding is closed.

Finding 5: Sampling using SUMs

Reference: 9.2 – Data and Parameters Monitored
Type of findings: Forward Action Request

Description of finding **Date:** 18/06/2024

Option 1 for determination of the parameter $n_{j,k,y}$ requires the direct measurement of a sample of households and achieving 90/10 confidence/precision levels. This level of sampling (and achieving the required confidence/precision levels) could be a huge expense for the project developer. If this is the case, please consider relaxing the sampling requirements, possibly for small scale projects.

Methodology Developer Response **Date:** 13/08/2024

The cost of implementing SUMs for the determination of $nj_{,k,y}$ has been estimated considering a cost of 10 to 40 USD per SUM (see file SUMs Simple Random Sampling M0174_130824.xlsx). Results show an implementation cost between 1,700 to 7,500 USD for projects with more than 10,000 cookstoves (sample size of around 180) every five years to replace SUMs when they reach end of life.
We consider that these costs are not huge, but rather proportional for these types of projects and given the improved confidence they can provide in project results. At a cost well below $1 per stove, as reflected in the estimates, it seems likely that projects will be able to recoup this expense with higher carbon credit sales prices thanks to increased integrity of the results. No change.

VVB Response **Date:** 26/08/2024

The justification regarding the cost is found reasonable. Finding is closed.

Finding 6: Figure 2 and household type distribution

Reference: Appendix 2
Type of findings: Forward Action Request

Description of finding **Date:** 18/06/2024

Please clarify in the text the distribution of the household types (rural, peri-urban or urban) that were surveyed to produce the results provided in Figure 2 of the methodology. From page 9 of the referenced CCA report it seems like 32% are rural, 29% are peri-urban and 39% are urban.

Methodology Developer Response **Date:** 25/07/2024

Text has been included to clarify the distribution of the household types (rural, peri-urban or urban) that were surveyed to produce the results provided in Figure 2 of the methodology.

VVB Response **Date:** 26/08/2024

The information regarding figure 2 has been appropriately provided, which is consistent with the reference CCS report- https://cleancooking.org/wp-content/uploads/2023/07/Clean-Cooking-Alliance_Lean-Data-Insights-Aggregate-Report.pdf
The finding is closed.

Finding 7: Meals prepared last week (Baseline survey Questionnaire)

Reference: Appendix 3
Type of findings: Forward Action Request

Description of finding **Date:** 18/06/2024

This finding is with reference to section 1.4 of Appendix 3 and the following survey question – *How many meals did you prepare last week?*
It could be very difficult for households to remember the number of meals prepared last week. The most they could recall, at maximum, be the last 3 days. This could bring in considerable margin of error/uncertainty in the final survey results.
Please consider introducing a smaller duration (last two days or so) and then extrapolating the results based on that.
Please implement another approach entirely if deemed more suitable.

Methodology Developer Response **Date:** 13/08/2024

To improve the quality of responses, the question has been modified to "*How many meals did you prepare yesterday? Is this a typical value? Is there any difference with the number of meals prepared during a typical weekend day?"*
Also, it is important to clarify that these questions provide input for the determination of the baseline scenario but not the quantitative fuel consumption in the baseline scenario.

VVB Response **Date:** 26/08/2024

Although the revised question can reduce the margin of error, it is noted that there are two questions being asked i.e., "How many meals did you prepare yesterday? and "Is this a typical value?", while the response is required in 'meals/day'. Methodology developer is requested to review this section for the following aspects-

a. The second part of the question requires a yes or no answer, which is not reflected in the right-side column of the table.

b. There is no follow up question or guidance in case the response to question "Is this a typical value" is 'no' Finding remains open
Methodology Developer Response **Date:** 05/09/2024
a. For the question "Is this a typical value?", a yes/no answer option is added in the right column. b. A follow-up question is added, in case the answer to the question "Is this a typical value?" is no. Please refer to Appendix 3: Binding survey questionnaire of the methodology document.
VVB Response **Date:** 20/09/2024
Appendix3 has been updated to provide 'yes/no' responses to the question regarding 'typical value'. Further clarifying follow-up question has also been included for cases where typical value is not found. This approach is found appropriate and comprehensive and Finding stands closed.

Table 2. CL from this verification

CL ID	01	**Section**	Definitions	**Date :** 15/07/2024
Description of CL				
1) Under section 3 of Draft Methodology "*Definitions*" page number 4, "*Improved thermal energy generation unit*". The MD is requested to clarify and confirm whether heating refers space heating/ room heating as well and if the methodology also covers space heating devices. If so, please clarify the method that will be used for determining the efficiency of the space heating devices.				
MD response				**Date :** 13/08/2024
Space heating has been removed from the methodology and therefore this is no longer relevant.				
Documentation provided by MD				
VVB assessment				**Date:** 26/08/2024
Methodology Developer has removed space heating from the methodology. Therefore, this finding is **closed.**				

CL ID	02	**Section no.**	Applicability Conditions	**Date :** 15/07/2024
Description of CL				
1) Under section 4 of Draft Methodology "Applicability Conditions" page number 7, point number 12 it has been mentioned "*Electric project cookstoves have an initial thermal efficiency of at least 40 percent, and maximum risk factor scores of 15 on the Cookstove Durability Protocol."* The MD is requested to clarify how the thermal efficiency is interpreted in this case. Usually, Electrical energy is considered as a high-grade energy that can be fully converted into heat without any loss. 2) Under section 4 of Draft Methodology "Applicability Conditions" page number 7, point number 13d it has been mentioned "*The project proponent presents a plan to support its target population to transition from LPG to lower-GHG-emissions alternative(s) beginning, at the latest, during the first year of the final project crediting period and reserves a percentage of carbon credit revenues for this purpose. The transition plan and appropriate lower-GHG-emissions alternative(s) will vary depending on factors including the target population, type of project device, national circumstances, and local circumstances in the project area, including resource availability. Project proponents may consider transition toward alternatives such as, inter alia, electric-powered devices, renewable biomass fired devices, and bioethanol fired devices.*" However, it is not clear whether the transition plan is to be submitted at the time of initial validation or at the time of last renewal. Additionally, this text in methodology does not confirm the applicability of this requirement in case of projects applying a fixed crediting period. 3) Under section 4 of Draft Methodology "Applicability Conditions" page number 8, point number 16 it has been mentioned "*Project proponents implement a method for the distribution and identification of*				

project devices that avoids double counting of emission reductions by other mitigation actions, and includes unique product identification at the time of distribution/sale (e.g., program logo, alpha/numeric ID*) and end-user locations (e.g., geographic coordinates, complete address information*"
The methodology text does not clarify whether the identification should be on the stove itself. In several cases, the ID may only be available on a piece of paper without any identification mark on the actual stove, due to various limitations on the stove surface. However, not having the identification mark on the stove itself may have potential risks for double counting. Please review.

4) Under section 4 of Draft Methodology "Applicability Conditions" page number 8, point number 18 it has been mentioned "*Projects located in rural areas where the baseline survey demonstrates that at least 90% of households collect wood as the fuel for cooking, must consider a radius of at least 5 km from the location of the thermal energy generation units when checking for overlapping REDD+ activities*"
The MD is requested to clarify
a) For projects covering the entire country as project boundary, it is unclear how this requirement will be applied and validated at the time of validation (when specific regions of distribution might not be known).
b) It is also not clear whether this requirement will be applicable and established at the time of validation, or also at each verification to re-confirm establishment of a new REDD+ project in the 5km radius.
c) Please further clarify the steps required in case a REDD+ project is established during the crediting period of the project

5) Under section 4 of Draft Methodology "Applicability Conditions" page number 9, point number 18 b it has been mentioned "*Projects located in rural areas that do not fulfill the previous requirements as well as projects located in (peri-)urban areas and/or where thermal energy generation units are used by SMEs must consider whether there are overlapping REDD+ activities in the area within national boundaries that are accessible in 10 hours or less of one-way travel in motorized vehicles, considering that non-renewable biomass and charcoal may be purchased from third parties located far from where the thermal energy generation units are located "*
The methodology developer is requested to provide clarification regarding the validation process for the criterion of "10 hours or less of one-way travel in motorized vehicles." This condition warrants further elaboration due to its significant dependence on local factors, including but not limited to road infrastructure development in the area, which could result in difficulty measuring and verifying.

Project participant response | **Date :** 25/07/2024

1) Thermal efficiency is defined for all cookstoves as the useful energy in relation to the energy provided by the source, as measured for example via a water boiling test. Even for devices powered by electricity this is generally not 100%. For clarity, footnote 10 indicates that this threshold is considering hot plates and electric hobs which have lower efficiency due to its configuration; however, there are electric devices that can have efficiency higher than 70%.
2) The text has been complemented to indicate that the project proponent must present the transition plan at first validation and follow the implementation beginning in the final crediting period. Also, to indicate for fixed crediting periods, project proponent present plan to transition from LPG to lower GHG emissions alternatives at the same time and begin implementation at the latest at the 3rd year.
3) Ideally the identification should be on the stove itself. This has been added to applicability condition #16.
4) This applicability condition has been modified to provide the general indication of referring to the double counting section of VCS Standard, since Verra has been discussing a double counting tool where all the guidelines for assessing the overlapping of thermal energy generation units with REDD+ activities and the subsequent allocation of emission reductions will be provided.
5) See previous answer.

Documentation provided by MD

VVB assessment	Date: 26/08/2024

1. The clarification provided by MD is found to be sufficient. The thermal efficiency of electric stoves has been determined based on useful energy in relation to the energy provided by the source. **Closed.**

2. The methodology text has been updated in section 4 point 13d to reflect clearly that the transition plan will be presented for validation at the time of registration and that in case of fixed CP, the plan will be implemented at the 3rd year of the CP. The revised text is found to provide clear instructions on the steps to be applied. **Closed.**

3. The methodology text in section 4 point 16 has been updated to clarify that the identification marks shall be on the project device. **Closed.**

4. The methodology text in section 4 point 18 has been updated to include reference to VCS requirements and guidance. Since the tool being discussed is not yet officially released, this finding is being closed based on confirmation received from Verra regarding expected release of the tool **. Closed.**

5. Same as above. **Closed**.

CL ID	03	Section no.	Project Boundary	Date : 15/07/2024

Description of CL

1) Under section 5 of Draft Methodology "Project Boundary" page number 9 it has been mentioned "*The project boundary includes the thermal energy generation unit(s), the geographical site where they are located and the locations from which the baseline and project fuels are sourced*". With respect to "*locations from which the baseline and project fuels are sourced", t*he MD is requested to clarify:
   a) In some cases, the fuels might be sourced from a different region or even country. Further clarification is required to confirm whether the fuel source country will be part of the project boundary.

   b) If the country from which the fuel is sourced is part of the project boundary, the subsequent impact on the relevant parameters and applicability conditions shall be discussed in further detail.

2) Under section 5 of Draft Methodology "Project Boundary" page number 9 it has been mentioned "*minimis criterion in the latest version of the VCS Methodology Requirements to determine which sources must be included*"

As per the VCS requirements on GHG sources, the methodology doesn't provide specific conditions or criteria on which sources are to be included. As per the VCS requirements document section 3.3.3: In identifying GHG sources, sinks and reservoirs relevant to the baseline scenario, methodologies shall:

   a) Set out criteria and procedures used for identifying the GHG sources, sinks and reservoirs relevant for the project.
   b) Where necessary, explain and apply additional criteria for identifying relevant baseline GHG sources, sinks and reservoirs.
   c) Compare the GHG sources, sinks and reservoirs identified for the project with those identified in the baseline scenario, to ensure equivalency and consistency.

It is not conclusive enough how the methodology is meeting requirement

MD response	Date : 25/07/2024

1)

   a) Yes, fuel source country is part of the project boundary. It has been added to the section that the Project is encouraged to provide a kml file delimiting the source area of the

biomass fuel used in the project and, in the PD, the description of how those area is defined.

b) Relevant parameters would be mainly fNRB and emission factor.

In the report for UNFCCC CDM "Updated fNRB values for Woodfuel Interventions" by Adrian Ghilardi and Rob Bailis dated 20 June 2024, default fNRB values determined through the MoFuSS are conservative values and include the case where biomass is sourced from a nearby country, so sourcing from a neighboring country would be addressed by these values.
On the other hand, emission factor needs to be determined using one of the provided options (project specific value, regional or national default value or IPCC default value).

2)

a) To be completed.

Documentation provided by MD

VVB assessment	**Date:** 26/08/2024

1.

a) MD has clarified that the project boundary shall include all geographic regions where project and baseline fuels are sourced from, which may be supported with KML files of the regions to clearly identify and delimit these regions. **Closed.**
b) The parameters impacted by geography have been appropriately identified as emission factor and fNRB. MD has demonstrated that both these parameters can be determined for a specific geographic regions. Therefore, the finding is **closed.**

2. Response awaited. Open

MD response	**Date :** 05/09/2024

2. Criteria and procedures used for identifying the GHG sources, sinks and reservoirs relevant for the project have been added in section 5, addressing the three requirements: Set out criteria and procedures used for identifying the GHG sources, sinks and reservoirs relevant for the project; where necessary, explain and apply additional criteria for identifying relevant baseline GHG sources, sinks and reservoirs; and, compare the GHG sources, sinks and reservoirs identified for the project with those identified in the baseline scenario, to ensure equivalency and consistency. Furthermore, some of the emissions sources previously included in Leakage Emissions were moved to the Project Emissions calculations for consistency in the project boundary definition.

Documentation provided by MD

VVB assessment	**Date:** 20/09/2024

Section 5 of Draft Methodology has been revised to update upon the criteria and procedure employed to determine the "Project Boundary". The section now provides explicit instructions as to how GHG Source, sinks and reservoirs are identified, and also expands upon the list of project emissions.

Finding stands CLOSED.

CL ID	04	**Section no.**	Baseline Scenario Survey Requirements	**Date :** 15/07/2024

Description of CL

1.Under section 6.2,"Baseline Scenario Survey Requirements" it has been mentioned "*The objective of the baseline survey is to collect critical information related to existing baseline technologies, services, fuel types and fuel sources in the target population. The survey must be designed, carried out and analyzed in line with the latest version of the CDM Standard for sampling and surveys for CDM project activities and programmes of activities*"

It is to be noted that several requirements in CDM sampling standard are scale specific i.e., micro-scale, large-scale and small-scale projects have different confidence/precision requirements when determining the sample size. However, definition and categorization of scale in VCS standard is quite different, as defined in section 3.10- where projects are identified as either 'project' or 'large project' based on amount of ERs. Therefore, the application of CDM standard across the methodology, especially clauses related to determining confidence/ precision is not clear.
MD response **Date :** 13/08/2024
The methodology requires at least 90/10 confidence and precision level regardless of the project scale. The methodology allows project proponents to provide a higher confidence and precision level, where possible. These requirements have been clarified throughout the methodology.
Documentation provided by MD
VVB assessment **Date:** DD/MM/YYYY
MD has clarified that the methodology requires at least 90/10 confidence precision level to be met regardless of scale. Since CDM sampling standard requires the specified confidence precision level to be met only in cases where there is no specific guidance in applied methodology (para 11 of CDM standard for sampling and surveys), therefore the approach has been accepted. However, according to methodology, for parameters monitored biennially ($BC_{p,y,j,k,}$ $BC_{b,y,i,}$) the same 90/10 confidence precision level has been applied. MD is requested to clarify the reason and references used for considering 90/10 confidence precision level appropriate for these parameters when monitored biennially, considering that the reference methodology AMS-II.G (on which this methodology is based as per section 1 of the draft methodology) states that "*When biennial inspection is chosen a 95 per cent confidence interval and a 10 per cent margin of error shall be achieved for the sampling parameter*". **Finding remains open.**
MD response **Date :** 05/09/2024
This methodology M0174 is based on AMS-II.G in a broad sense, but it differs significantly from AMS-II.G in its methods and requirements due to a variety of weaknesses in the reference methodology that did not ensure accuracy and conservativeness. AMS-II.G offered the option of annual or biennial measurements of the proportion of project stoves that remain operating, with the idea that if measurement was only undertaken every two years, then higher confidence/precision should be achieved for that case. Under M0174, proportion of stoves that remain operating must be measured at least annually (or continuously). This is more stringent than AMS-II.G. Also under M0174, the measurement of quantity of fuel used by the project device must be undertaken, and the frequency may be yearly, every two years, or continuously, all of which are required to achieve a 90/10 confidence/precision threshold. Some methods in AMS-II.G do not require measurement of project fuel consumption at all. Another method in AMS-II.G requires it to be measured once (with no specification for accuracy requirements), and another method in AMS-II.G requires it to be measured annually. So, the methods of M0174 for measuring project fuel use surpass AMS-II.G in stringency in almost all cases. The expectation is that the combination of more measurement, at equal or higher frequency than AMS-II.G, will lead to higher accuracy outcomes overall, and in this context the biennial measurement of project fuel use achieving 90/10 confidence precision is good enough for a satisfactorily accurate final outcome.
Documentation provided by MD
VVB assessment **Date:** 20/09/2024
Given that the as percurrent methodology, parameter must be measured annually (continuously) and has no provision for biannual measurement, as was with the case with AMD II G, the data measurement and recording process is much stricter than in case of AMS II G, and hence does not warrant higher confidence/precision to make up for the same. The approach is found appropriate and finding stands closed.

CL ID	05	**Section no.**	Additionality	**Date :** 25/07/2024

Description of CL	
Under section 7 of Draft Methodology "Additionality" under Step 2: "Positive list" point number 2 "*The project activity installs or distributes improved thermal energy generation units at zero cost to the end-user and has no revenue source other than from the sale of verified carbon units (VCUs)*" As per the VCS methodology Requirements page number 44 "*Option C: Revenue Streams". "The project activity's gross annual revenue (including cost savings) excluding from the sale of GHG credits shall not exceed five percent of capital expenditure (see the VCS Program Definitions for definition of capital expenditure). All capital expenditures incurred during the project crediting period shall be accounted for and where the project activity involves capital expenditure subsequent to year zero, an appropriate discount rate shall be applied.*" As per the above, selling Thermal energy generation units at zero cost is not an exhaustive condition. The MD is requested to further clarify the condition in line with the stated requirement.	
MD response	**Date :** 13/08/2024
The following text is included, "and demonstrates that the project activity's projected gross annual revenue (including cost savings) excluding from the sale of GHG credits does not exceed five percent of capital expenditure."	
Documentation provided by MD	
VVB assessment	**Date:** 26/08/2024
The updated text in methodology is found to be meeting the requirement stated in VCS methodology Requirements. Therefore, the finding is found to be satisfactorily addressed and is **closed.**	

CL ID	06	**Section no.**	Quantification of Ghg Emission Reductions and Removals	**Date :** 15/07/2024
Description of CL				
1) Under section 8.1 equation 1 $BE_y = \sum_i \sum_j EC_{y,i} \times N_{j,k} \times n_{y,j,k} \times \left(EF_{b,i,CO2} \times f_{NRB,i,y} + EF_{b,i,nonCO2}\right)$ According to section 1 of the methodology, this methodology is based on CDM AMS-II.G and VMR0006. AMS-IIG does not include emissions from non CO2 gases in the emission reduction calculation. Meanwhile, in case of VMR0006, fNRB was multiplied across both CO2 and non-CO2 emsision factors. As per the equation 8.1 in the proposed methodology, $EF_{b,i,nonCO2}$ is not being multiplied with $f_{NRB,i,y}$. The MD is requested to clarify a) The rationale behind inclusion of emission from non-CO2 gases for calculation of emission reduction, which results in higher emission reductions compared to the calculations in AMS-II.G. b) The rationale behind fNRB applicability only to $EF_{b,i,CO2}$ and not $EF_{b,i,nonCO2}$. (which was the case in previous versions of VMR0006) 2) Under section16es4w32`1 8.1.1 "Average Energy Consumption of the Baseline Device (ECy,i,)" . The average energy consumption of baseline device type *i* is calculated as follows: $EC_{y,i} = BC_{b,y,i} \times NCV_{b,i}$ The MD is requested to clarify how efficiency of baseline device is accounted in this equation and whether the equation is implying that the total energy content within the biomass is completely converted into useful heat. 3) Under section 8.1.1 "*Average Energy Consumption of the Baseline Device (ECy,i)" page number 16 it is stated that "A measurement campaign must be conducted following the procedures in the latest version of the Kitchen Performance Test Protocol. The sampling must comply with the latest version of the CDM Standard for sampling and surveys for CDM project activities and programmes of activities. The campaign must achieve confidence and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. The result must be scaled appropriately using the average household size ($Hh_{i,k}$) to obtain the value of $BC_{b,y,i}$. Where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per the latest VCS Methodology Requirements.*"				

a) The methodology developer is requested to discuss the appropriateness of referencing the VCS methodology requirements document in relation to uncertainty deduction, considering that the VCS methodology requirements document requires the uncertainty deduction to be established in the methodology.
b) Additionally, clarification is requested on the procedures to be followed if the target precision is not achieved. In case of target precision not being met, CDM sampling standard version 9.0 provides alternative steps as defined under para 18 of that document. Since this standard is referred above as the document to be complied with while for sampling, the steps to be followed in case the target precision is not met are not clear.

4) Under the section 8.2.3 page number 22 equation number 9
"For project devices using electricity from a mini-grid with backup generators, emissions from fuel consumption must be determined as follows
$PE_{backup,y} = \sum_i FC_{i,y} \times NCV_i \times EF_{fuel,i}$. "
Since the back-up generators are used for the entire minigrid, the text in the methodology does not seem to provide sufficient information on whether the fuel consumption is expected be proportioned to the amount of electricity used for only thermal devices, since the electricity might also be used for other electrical requirements at the facility.
5) The proposed methodology discusses the incentive mechanism for discontinuing use of traditional thermal energy devices. However, in cases where the baseline devices are still in use after implementation of the project in spite of these mechanisms, the GHG quantification section does not seem to discuss how continued use of pre-project devices will be accounted for.

MD response | **Date :** 25/07/2024

1)

a) NonCO_2 emissions are relevant especially for projects that involve the use of wood or charcoal, and including these emissions in the baseline (and project, where relevant), better captures the impact of the project, including its reduction of the short-lived climate forcer methane.
b) The fNRB value only affects CO_2 emissions. Non-CO_2 emissions still need to be accounted for regardless of the renewability of biomass since non-CO_2 emissions from biomass are not compensated by maintenance of stocks of biomass.

2) The methodology is based on total energy consumption rather that useful energy consumption and therefore thermal efficiencies are not needed.
3)

a) Text has been modified to refer to section 4 of the CDM Standard for sampling and surveys for CDM project activities and programmes of activities, for determining the deduction when the 90/10 confidence and precision levels are not achieved.
b) See previous.

4) The fuel consumption is not expected to be proportioned to the amount of electricity used for only thermal devices, since there is an applicability requires that at least 80 percent of the annual electricity generated and consumed by the project device.
5) To be completed.

Documentation provided by MD

VVB assessment | **Date:** 26/08/2024

1) It has been clarified that non-CO2 emissions have been accounted to better account for ancillary emissions including short lived methane, this provides a more comprehensive account of emissions and hence considered appropriate by VVB. **CLOSED.**

2) It is clarified that the methodology under development considers total energy consumption and not useful energy, the same has also been incorporated in the text hence negating the need of accounting for thermal efficiencies. **CLOSED.**

3) MD has assessed the updated methodology document and confirms that section 8.1.1 has been revised and now provides reference to the latest CDM Standard for sampling and surveys for CDM project activities and programmes of activities in place of the VCS Methodology Requirements, hence considered appropriate**. CLOSED.** 4) In line with the cookstove characteristics stipulation for electric project devices, the following electricity sources is eligible: Self-generated renewable electricity, where at least 80 percent of the annual electricity generated is consumed by the project devices. Since, this is already part of the applicability conditions, the finding is **CLOSED** 5)AWAITING MD RESPONSE
MD response **Date :** 05/09/2024
5) The variable "$PE_{pre-project,y}$" has been added to the project emissions equation (now Eq. 6) to account for the emissions related to the continued use of pre-project cookstoves used during the project implementation, when this usage results in an overall increase in cooking energy. Section 8.2.4 was added to provide guidance on when to include these emissions.
Documentation provided by MD
VVB assessment **Date:** 20/09/2024
Parameter "" has been included as part of project emissions and accounts for emissions arising for continued use of baseline device. This approach is found comprehensive and includes all possible emission sources . Finding stands CLOSED.

CL ID	07	**Section no.**	Data and Parameters available at validation	**Date :** 15/07/2024
Description of CL				
1) Under the section 9.1 "Data and Parameters available at validation" under the Data/Parameter table for "$BC_{b,y,}$" "Average quantity of fuel used per baseline device type *i* during year *y"*, Option 1 under the parameter is required to be cross-checked through follow-up surveys every two years. Considering that the follow up baseline surveys are to be conducted every two years, please review appropriateness of identifying this parameter as "Data and Parameters Available under validation" i.e., fixed parameter. As a fixed parameter, in case of any statistical difference identified at the time of follow-up surveys would result in design change of the project. 2) Under the section 9.1 "Data and Parameters available at validation" under the Data/Parameter "ηnew,j,k,y" under "Description of measurement methods and procedures to be applied", MD is requested to consider the following points: a) Water Boiling Test campaigns are to be conducted in compliance with the latest version of the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities.* However, the CDM sampling standard does not specify requirements of water boiling tests. The document is limited to providing guidance on sampling (other than under Table 1, which only provides examples of records to be considered by VVBs/ DOEs). Considering limited verifiability of the WBT results, please review and further clarify the reliable sources of efficiency from WBTs in the methodology. b) For devices using biomass or fossil fuel, three options have been provided for determination of the efficiency. However, the text does not clarify if all listed options are to be applied or any one of them. Further clarification is required on whether the list is in order of preference to determine the efficiency, or any of the options is allowed for use.				
MD response **Date :** 25/07/2024				
1) The average quantity of fuel used per baseline device has been separated in two parameters, one determined ex ante and another one for the biennial reassessment. *2)*				

a) Requirements from CDM Standard for sampling and surveys for CDM project activities and programmes of activities are considered in the campaign design, not for the WBT itself. Text corrected
b) Text has been modified to provide more clarity.

Documentation provided by MD

VVB assessment	**Date:** 28/08/2024

1.The methodology has been updated such that parameter BCb,y,i has been reported twice, once under fixed ex-ante parameters and once under monitored parameters list to indicate when measurement campaign is to be updated. However, this approach can lead to further confusion for the users of methodology since same parameter with same notation, description and referring to same equation has been reported as two separate parameters in the monitoring plan. Methodology developer is requested to reconsider this approach and apply a clear approach for presenting and determining this parameter. **Open**

2.

a) VVB confirms that the requirements for conducting WBT for parameter 'ηnew,j,k,y' has been duly revised to clarify that while the WBT campaign should achieve 90/10 confidence and precision levels as per the CDM *Standard for sampling and surveys for CDM project activities and programmes of activities,* Standard Water Boiling Test campaigns will be done for conducting the WBTs. **CLOSED**

b) VVB confirms that the text has been revised to clarify that that only one of the three provided options are to be applied. The text also clarifies that the options have been provided in order of preference, hence resolving the prior ambiguity. **CLOSED**

Finding CL#07 stands OPEN.

MD response	**Date :** 05/09/2024

1. The ex-ante parameter has been modified to $BC_{ex\text{-}ante,b,i}$ to avoid confusion. Moreover, in section 8.1.1 the parameter explanation was adjusted to explain that this parameter can be either $BC_{ex\text{-}ante,b,i}$ when the follow-up baseline survey shows that there are no significant changes in the baseline fuel consumption; or $BC_{b,y,i}$ when the survey reflects a significant change, and the baseline fuel consumption must be updated.

Documentation provided by MD

VVB assessment	**Date:** 20/09/2024

Parameter '$BC_{b,y,l'}$ is now revised to to be represented as either "$BC_{ex\text{-}ante,b,i}$" or' $BC_{b,y,i}$', depending on whether the follow up baseline survey has no significant change or represents a significant deviation. This alleviates the earlier noticed confusion in the parameters. Finding stands closed.

Table 3. CAR from this verification

CAR ID	01	**Section no.**	Sources, Definitions	**Date :** 15/07/2024

Description of CAR

In section 1 of Draft Methodology "Sources", on page number 3 "*This methodology is based on the following methodologies*", 1st reference "*CDM AMS-II.G. Energy efficiency measures in thermal applications of non-renewable biomass, v13.0*". As per https://cdm.unfccc.int/methodologies/DB/GNFWB3Y6GM4WPXFRR2SXKS9XR908IO the latest version is 13.1
The MD is requested to clarify the reason for using an older version of the methodology.

MD response	**Date :** 25/07/2024

Version of CDM AMS II G methodology has been corrected.
Documentation provided by MD
VVB assessment **Date:** 28/08/2024
VVB has assessed the updated document (Ver. 02) and confirms that the discrepancy in the version number of methodology 'CDM AMS-II.G. Energy efficiency measures in thermal applications of non-renewable biomass, v13.0' has been rectified .Section 1 has been updated to correctly reflect the latest version i.e. Ver13.1 of methodology'. **Finding CAR#01 stands CLOSED**.

CAR ID	02	**Section no.**	Quantification of Ghg Emission Reductions and Removals	**Date :** 15/07/2024
Description of CAR				
1) Under section 8.1.1 equation 3 $EC_{est,y} = PE_{energy,y} \times \frac{\eta_{new,i,k,y}}{\eta_{old,avg}}$ The MD is requested to add the description for $PE_{energy,y}$ in Draft methodology under equation 3. 2) Under section 8.1.1.1 $EC_{y,i,k} = EC_{p,y,j,k} \times 0.0036 \times \frac{SC_{p,j}}{SC_{b,i}}$ The MD is requested to add the description for ECy,ik and ECp,y,j,k in Draft methodology.				
MD response				**Date :** 25/07/2024
1) Included parameter description 2) Included description of the parameters				
Documentation provided by project participant				
DOE assessment				**Date :** 18/08/2024
1)VVB has assessed the revised document (Ver.02) and confirms that section 8.1.1 has been updated to provide the description of parameter '$PE_{energy,y}$', utilized in equation 3. 2) Likewise, VVB confirms that Section 8.1.1.1 has been updated to describe parameters ECy,ik and ECp,y,j,k under equation 4. **Finding CAR#02 stands CLOSED.**				

Table 4. FAR from this validation

FAR ID	01	**Section No.**		**Date :** DD/MM/YYYY
Description of FAR				
NA				
MD response				**Date :** DD/MM/YYYY
NA				
Documentation provided by project participant				
NA				
DOE assessment				**Date:** DD/MM/YYYY
NA				