BANGLADESH APON CHULA IMPROVED COOKSTOVE PROGRAM II

Document Prepared by Earthood Services Limited

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Report Title	Bangladesh Apon Chula Improved Cookstove Program II
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Summary:

- **A brief description of the project activity**

  Earthood Services Limited, formerly known as "Earthood Services Private Limited" (hereafter referred to as Earthood) has been contracted Guangzhou Iceberg Environmental Consulting Services Co., Ltd. to conduct the validation of the project – "Bangladesh Apon Chula Improved Cookstove Program II", VCS ID 3168 regarding the relevant requirements of VCS program guidelines and standard (VCS Standard Version 4.4, & VCS Program Guide Version 4.3).

  The project has applied VCS methodology, VMR0006 (Version 1.1). The project entails distribution and installation of energy efficient Apon Chula Improved Cookstoves (ICS) in Bangladesh's households thereby reducing the consumption of fuelwood used in the baseline stoves i.e., Three stone stove or conventional mud stove.

- **The purpose and scope of validation**

  Purpose: The objective of validation is to perform a complete and independent review of the proposed project activity against the applicable VCS requirements, including the baseline, monitoring plan and compliance with the relevant VCS and host country criteria. These are validated to ensure that the project design, as documented, is sound and reasonable, and that it fits the established standards. Validation is a prerequisite for all VCS projects, and it is viewed as vital to give stakeholders assurance about the project's quality and expected emission reductions. The VVB's aim is to perform a complete, independent evaluation of the project activity's validation.

  Scope: The scope of validation is described as an objective and independent review of the Project Description (PD). The PD is compared to the relevant criteria and guidance documents provided by VCS, including the VCS Program Guide (v4.3, dated 21/12/2022), VCS Standard (v4.4, dated 21/12/2022), Program Definitions (v4.3, dated 21/12/2022), and the Registration & Issuance Process (v4.3, dated 21/12/2022) in order to ensure that the project

meets the applicability conditions of the chosen baseline and monitoring methodology, applied VMR0006 Methodology for Installation of High Efficiency Firewood Cookstove, v1.1.

- **The method and criteria used for validation**

  The validation process is divided into 4 stages:

  i. Document review, involving:

     a) Review of data and information

     b) Cross-checks between information provided in the PD and information from sources using all available resources without regard to the project proponent's information.

  ii. Follow-up actions (e.g., site visit and telephone or email interviews), including:

     a) Interviews with relevant stakeholders in the host country during onsite visits with individuals having expertise of the project design and implementation.

     b) Cross-checking the information provided by interviewed people with the information provided by the project proponent using all available means.

  iii. Reference to publicly available information about projects or technologies that are similar to the proposed project under validation and review, depending on the approved methodology being used to ensure that formulae are acceptable, and calculations are accurate.

  iv. The final validation report and opinion, as well as the resolution of lingering difficulties.

- **The number of findings raised during validation**

  A risk-based approach has been followed to perform this validation. During the validation process, a total of 15 findings were raised, which includes 7 Corrective Action Requests (CARs), 8 Clarification Requests (CLs) and no Forward Action Requests (FARs).

  The Project Proponent has successfully closed all raised issues.

- **Any uncertainties associated with the validation**

  The PD, emissions reduction calculations, and accompanying documents provided are all in compliance with VCS criteria. The validation was completed with a reasonable level of assurance and no uncertainties were found related with the project activity validation.

- **Summary of the validation conclusion**

  Earthood Services Private Limited (hereafter referred to as Earthood) certifies that the project meets the requirements of the VCS PD template Project Description, v4.2, the VCS Standard (v4.4, dated 21/12/2022), and the VMR0006 Methodology for Installation of High Efficiency Firewood Cookstoves v1.1. The estimated annual average and total emission reductions from the project activity, for the crediting period 24/06/2022 to 23/06/2032 are expected to be **5,195,362 tCO_2e and 519,536 tCO_2e** annually and has thus been successfully validated under

the VCS program. Earthood issues a positive validation opinion, certifying that the project meets the applicable VCS rules and requirements and thereby proposing that it be registered.

CONTENTS

1 INTRODUCTION

1.1 Objective

Earthood Services Limited, formerly known as "Earthood Services Private Limited" (hereafter referred to as Earthood) has been contracted by Guangzhou Iceberg Environmental Consulting Services Co., Ltd.to conduct the validation of the proposed project activity – "Bangladesh Apon Chula Improved Cookstove Program II", VCS ID 3168 regarding the relevant requirements of VCS programme guidelines and standard (VCS Standard Version 4.4/1/ & VCS Program Guide Version 4.3/2/).

The purpose of this validation is to have an independent third-party assessment of whether the project activity conforms to the qualification criteria set out in the VCS Standard, version 4.4/01/ to attain real, measurable, additional, and permanent emission reductions. The validation statement opinion is a written assurance that:

- The project complies with all the applicable VCS requirements and can generate the emission reductions stated over the project's crediting period.
- The validation followed the requirements of the current version of the VCS Standard, version 4.4/01/ and VCS Program Guide, version 4.3/02/ to ensure the quality and consistency of the validation work and the report.
- The project shall result in emission reductions as declared by the organisation or GHG project's GHG assertion.
- The data reported is accurate, complete, consistent, transparent, and free of material error or omission.

In order to fulfil the above objectives, the VVB assigned the task of assessment to validation team that is collectively qualified as per Annex A.2.3.3 of ISO 14064-3 and other internal requirements.

The validation is an independent assessment of the project by a validation/verification body that determines whether the project complies with the VCS rules.

1.2 Scope and Criteria

The validation scope of this assignment is defined as an independent and objective review of the VCS Project Description (VCS PD) and supporting annexures, which is reviewed by the assessment team against the relevant criteria and decisions by the VCS Board, including but not limited to, the approved baseline and monitoring methodology, applicable tools, VCS standard and guidance. The assessment team has, based on the recommendations prescribed in the latest version of VCS Validation and Verification Manual/05/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of VCUs.

The scope of this assignment is to:

- Conduct validation in accordance with Earthood's own QMS that is based on the VCS VVM along with the guidance provided by the VCS board to determine if the project meets all applicable VCS requirements, including those specified in the VCS standard, relevant methodologies, tools, and guidelines and processing the same with VCS Program Guide.

- Assess the accuracy, conservativeness, relevance, completeness, consistency, and transparency of the information provided by the project proponents.

- Determine whether information provided by the project proponents is reliable and credible.

- Present information in the form of validation report in a factual, neutral, coherent manner and referencing the sources and assumptions, other forms of validation mean employed.

- Report the findings and conclusions in an objective manner and conduct all validation & verification in accordance with VCS rules and procedures.

- Apply consistent validation criteria in providing expert judgments to the requirements of applicable approved methodologies, tools, and also cross check the same.

- Safeguard the confidentiality of all information obtained during validation and

- Adhere to the principles of independence, ethical conduct, fair presentation, and due professional care in assessment process.

1.3 Reasonableness of Assumptions

☒ Limited level of assurance

☒ Reasonable level of assurance

The approach used by Earthood for validation of the crediting period is built on a thorough understanding of the risks associated with reporting data on GHG emissions and the controls used to mitigate them. Earthood conducted the validation by reviewing substantiating evidence and other relevant information and explanations from sources to provide reasonable level of assurance that estimated GHG emission reductions are fairly reported.

In the validation report (prepared by assessment team), the information provided is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by Earthood were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable VCS requirements as appropriate. The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of the technical review team are independent of the validation team. The report approved by the Technical Manager is endorsed by the Managing Director, who is overall responsible for ensuring quality, before the final release. Further details of applicable procedures and responsibilities concerning the ESL Quality Management System (QMS) are available on its website (www.earthood.in).

In our opinion the estimated and actual GHG emissions reductions were calculated correctly based on the approved baseline and monitoring methodologies VMR0006 'Methodology for Installation of High Efficiency Firewood Cookstoves v1.1/07/. The assessment result has a reasonable level of assurance in validation that GHG assertions are free of material errors, omissions, and misrepresentations. The document reviewed are included under Appendix I of this report.

1.4 Summary Description of the Project

A summary description of the project activity has been illustrated in section 1.1 of the PD/06/which is found to appropriate and in line with the template guideline provided in the VCS PD template version 4.2/12/. The proposed VCS project activity entails distribution and installation of approximately 100,000 fuel-efficient Apon Chula improved cookstoves (ICS) in Rangpur Division, Khulna Division, Rajshahi Division and Barisal Division of People's Republic of Bangladesh. The distribution of the ICS will happen in two phases. In the first phase from 24/06/2022 to 25/06/2023, 46,991 ICSs were distributed in Rangpur Division and Khulna Division, this information was cross checked with the distribution data base provided by the PP/16/ and in the second phase from 24/06/2025 to 23/06/2026, the remaining 53,009 ICSs will be distributed and will be confirmed during the subsequent verification of the project, The ICSs disseminated through this project will replace the old lesser efficient baseline cookstoves in rural area of Bangladesh. Before the implementation of the project, local people mostly used non-renewable biomass for cooking with baseline stoves i.e., Three stone stove or conventional mud stove without grate or chimney. The baseline three stone cooking devices utilises higher amount of firewood due to their low combustion efficiency, hence local people spend plenty of time to collect firewood every day. The ICSs will burn wood more efficiently thereby improving thermal transfer to pots, hence saving firewood. The project will reduce the GHG emission by less consumption of non-renewable firewood as well as slowing the rapidly progressing deforestation in Bangladesh. The implementation of the project will reduce greenhouse gas emissions, forest conservation leading to long-term climate change mitigation, as well as improved health conditions for ICS users due to increased indoor air quality and reducing time consumption in everyday cooking. Furthermore, women and children will spend less time collecting firewood. The usage of ICS creates carbon finance, which is then utilised to recover the cost of ICS and project implementation costs.

The validation team has confirmed from the technical specifications/13/ and project database/16/ that the technology distributed under the project activity is Apon Chula improved cookstove. The ICS is thermally efficient (in accordance with the methodological requirements) and lifetime of Apon Chula is 7 years/13/. The efficiency of the ICS distributed under the proposed project activity as 36% is verified from stove efficiency test report by Institute of Fuel Research and Development of Bangladesh/44/. In the sixth year after ICSs distribution, the project proponent will provide a new ICS to Households without cost, so that households will have access to them for the full crediting period.

Sr. No.	Parameter	Value
1	High power thermal efficiency	36.0% (The thermal efficiency was tested by manufacturer following Water Boiling Test, version 4.2.3)
2	Life span	7 years

3	Dimensions	28 CM Height (+/- 0.5 cm) Diameter Higher/Top 30 CM (+/- 0.5 cm) And Lower/Down 35 cm (+/- 0.5 cm)
4	Weight	25 Kg (+/- 1Kg)
5	Material	1.Combustion chamber made by metallic lining 2. Stove body mainly made by cement

The Guangzhou Iceberg Environmental Consulting Services Co., Ltd., the project proponent owns the right to VERs generated from the implementation of the project activity, declarations/21/31/ for the same has been submitted by the PP to the assessment team. It has also been verified that individual households using ICS will sign an agreement with PP/32/, under which the end users will certify the use of ICS and transfer the VCUs right to the project proponent.

It was verified through the project database/16/ that the start date of the proposed project activity is 24/06/2022 which is the date of installation of first ICS under the project activity. Moreover, to confirm the start date evidence VVB reviewed the First ICS Donation and Carbon Transfer Agreement-Program/19/ and concluded that the evidence provided by the PP to substantiate the start date is found to be appropriate. The duration of the crediting period is fixed at 10 years, beginning on 24/06/2022 to 23/06/2032. The average estimated amount of annual emission reduction is 519,536 tCO_2e and a total of 5,195,362 tCO_2e for the entire crediting period.

2 VALIDATION PROCESS

2.1 Method and Criteria

Earthood Services Limited (hereafter referred to as Earthood) has been contracted by Guangzhou Iceberg Environmental Consulting Services Co., Ltd.to conduct the validation of the project – “Bangladesh Apon Chula Improved Cookstove Program II”, with regards to the relevant requirements of VCS Standard, Version 4.4/01/. The project activity uses the VMR0006 version 1.1/07/, which is classified as sectoral scope 3 “Energy Demand ". The following steps were included in the validation:

- Contract with PP for the scope and appointment of validation team and technical review team.

- Completeness check of VCS PD/06/.

- Desk review of VCS PD/06/ and estimated GHG emission reduction calculation sheet/09/all the reviewed the documents are listed in the appendix III.

- On-site inspection by the validation team to physically inspect the baseline scenario and project design

- Follow up interviews with project proponents and baseline survey households.

- Reporting and closure of findings (CARs/CLs/FARs) and preparation of draft validation report.

- Independent technical review of the draft validation report and final/revised documentation (e.g., VCS PD, corresponding estimated ER calculations sheet and evidences).

- Issuance of the final validation report to the contracted PP.

2.2 Document Review

The validation of the project activity is performed primarily as a document review of the VCS PD/06/ and associated documents as stated in detail in appendix III of this document. The review is performed by assessment team using dedicated protocols. The cross checks between information provided in the VCS PD and information from sources other than those used, if available, the team's sectoral or local expertise and, wherever necessary, independent background investigations. Earthood conducted a desk review as under;

- A review of the data and information presented to assess its completeness.
- A review of the VCS-PD/06/, estimated GHG emission reduction calculation sheet/09/, the applied methodology/07/ including applicable tool(s) and relevant laws regulations for the host country.
- Review of the baseline scenario, additionality criteria and monitoring plan and the project's adherence to key VCS standard/01/.

In addition, the validation team employed third-party material such as host-party legislation, technical reports pertaining to the project design or basic conditions, and technical data available on the public domain. A complete list of documents/ evidence reviewed is included as Appendix III.

2.3 Interviews

In accordance with VCS standard version 4.4/01/, para 4.1.9, "A site visit that includes a visit to facilities and/or project areas shall be conducted at validation", the validation team conducted an onsite visit on 08/05/2023. The onsite visit was conducted as a part of validating the baseline scenario to confirm the stove and fuel used for cooking purposes prior to the implementation of the proposed project activity. The following points were discussed as the part of the interviews:

a. Introduction, scope and objective of work, roles and responsibilities of audit team, resources required, and timetable of the onsite audit including venue for closing meeting and any concerns from PP.

b. All the details about the project activity mentioned in the VCS PD/06/ were cross checked by discussion with the PP representatives and relevant stakeholders.

c. Conducting the onsite audit by visiting households and interviewing the baseline survey users.

d. And finally, submission of the audit findings to the client and agreement on the issues raised and agreement on timelines.

The table below describes the onsite interviews conducted on 08/05/2023 and further identities personnel, including their roles, who were interviewed and/or provided information additional to that provided in the project description and any supporting document:

S.No.	Interview	Affiliation	Date	Subject	Team Members
1.	Ji Bao	Guangzhou Iceberg Environmental Consulting Services Co., Ltd.	08/05/2023	Project Design Start Date of project and project boundary Baseline scenario Baseline Identification and Additionality Monitoring system, roles, and responsibilities QA/QC procedures LSC process Compliance with relevant laws Predicted Social and Environmental impacts of the project	Jahnabi Kalita and Akkas Aki
2.	Jin Han	Guangzhou Iceberg Environmental Consulting Services Co., Ltd.			
3.	Josna Ara	KHEYA (Samaj Unnayan Sangstha)	08/05/2023	Project stove implementation process (at zero cost) Procedure for data collection and record keeping	Jahnabi Kalita and Akkas Aki
4.	Md. Nasir Uddin	Grassroot Cooperation Ltd.			

				Robustness and accuracy of data collection and transfer Integrity of Data	

The list of LSC participants interviewed by the validation team are as follows:

S.No.	Interview	Affiliation	Date	Subject	Team Members
1.	Sanjoy K. Das	LSC Attendee (Local Community residents)	08/05/2023	Mode of LSC invitation Procedures or methods used for engaging local stakeholders Procedures or methods used for documenting the outcomes of LSC On-going grievance mechanism Feedbacks about the project activity	Jahnabi Kalita and Akkas Aki
2.	Zahid Hasan				
3.	Md. Mafizur Rahman				
4.	Md. Saif Anwar				

The following table includes the list of baseline survey household representatives interviewed by the validation team:

S.No.	**Interview**	Affiliation	Date	Subject	Team Members
1.	Md. Sirajul Islam	Baseline Survey Sample	08/05/2023	Baseline stove and baseline fuel Stove usage patterns Presence of any ICS in the baseline scenario	Jahnabi Kalita and Akkas Aki
2.	Md. Deldar Ali				
3.	Md. Khalilur Rahman				
4.	Md. Shahidul Islam				

5.	Chtronjon Roy				
6.	Dilip Kumar				
7.	Mintu Ray				
8.	Md. Helal Hossain				

The above-mentioned end-users were picked randomly from the baseline survey database and belonged to villages Dondora, Kolonipara and Pschim Khutamar, which covers three out of the six villages covered as part of the baseline surveys conducted by the project developer.

However, to further improve robustness of the site visit and to provide a reasonable level of assurance, a 2nd site visit was conducted with local expert on-site and assessment team's remote participation from 18/10/20204 to 22/10/2024 following Verra's inquiry on location information for the 1st site visit and also on limited number of stakeholders were interviewed during the first site visit in one day.

The list of LSC participants interviewed by the validation team on the second site visit conducted remotely are as follows:

S.No.	Interview	Affiliation	Date	Subject	Team Members
1.	Nasin Uddin	LSC Attendee (Local community residents)	22/10/2024	Mode of LSC invitation Procedures or methods used for engaging local stakeholders Procedures or methods used for documenting the outcomes of LSC On-going grievance mechanism Feedbacks about the project activity	Sushant Vasisht (remote), Dilna Jose (remote) and Akkas Aki (on-site)
2.	Monira Akten Bristy				
3.	Jahid Hasan Rony				
4.	Samsunnahar				

The following table includes the list of baseline survey household representatives interviewed by the validation team during the second site visit conducted remotely:

S.No.	Interview	Affiliation & Location	Date	Subject	Team Members
1.	Md. Azikul Islam	Baseline Survey Sample & Dondora	18/10/2024 to 21/10/2024	Baseline stove and baseline fuel Stove usage patterns Presence of any ICS in the baseline scenario	Sushant Vasisht (remote), Dilna Jose (remote) and Akkas Aki (on-site)
2.	Md. Khalilur Rahman	Baseline Survey Sample & Dondora			
3.	Mst. Rashida Begum	Baseline Survey Sample & Kolonipara			
4.	Sree Sukumar Ray	Baseline Survey Sample & Kolonipara			
5.	Mst. Ojifa Paschim	Baseline Survey Sample & Paschim Khutamara			
6.	Md. Amedul Haque	Baseline Survey Sample & Uttar Laximipur			
7.	Md. Moksed	Baseline Survey Sample & Uttar Laximipur			
8.	Md. Nur Alam	Baseline Survey Sample & Uttar Laximipur			

9.	Md. Rasedul Islam	Baseline Survey Sample & Uttar Laximipur			
10.	Asma Khatun	Baseline Survey Sample & Koikhali			
11.	Mst. Asia	Baseline Survey Sample & Koikhali			

Through the onsite interview in the first site visit and the hybrid (remote + on-site) interviews conducted during second audit and comparing them with the baseline survey results /35/, the assessment team confirms that the baseline scenario including the baseline stoves and fuel used in these cooking devices were correctly identified. The location details of the site visit is also added in the remote site visit record to check the and assess the baseline situation /42/. Thus, the assessment team achieved a reasonable level of assurance by conducting a physical site- visit to confirm that project will be implemented in line with the VCS PD/06/. Section 2.4 contains information sampling approach followed by the validation team.

2.4 Site Visits

The VVB carried out an on-site visit on 08/05/2023 and physically inspected the validity of the baseline scenario and project technical design as specified in the VCS PD/06/. Additionally, a second round of site visit was conducted remotely from 18/10/2024, to 22/10/2024, for a reassessment as per Verra's instructions.

The site visit was conducted to validate the accuracy and completeness of the project description. The validation team members who visited the site collectively had the competence for the relevant technical area to which project activity is related. The views obtained during the onsite and remote observations were considered while concluding the validation opinion.

The evaluation team has used methods relevant for site visit interviews, surveys etc. to support the validation criteria to reach a reasonable level of assurance. Various aspects of project activity such as baseline scenario, project implementation, project boundary, monitoring procedures were discussed with the PP representative during the onsite visit interviews.

VVB Sampling Approach:

The Sampling and surveys for CDM project activities and programmes of activities (Version 9.0)/17/ states under paragraph 28 that "When the project participants or the coordinating/managing entity have applied a sampling approach, the VVB may apply acceptance sampling as described in the steps indicated in paragraphs 29–38 below as part of validation/verification activities".

Since the PP has determined the value of ex-ante parameter η_{old} through sampling of baseline users, the validation team conducted acceptance sampling in line with paragraph 30 and 31 of the sampling standard version 9.0/17/.

As per para 39 of the sampling standard version 9.0/17/, "A VVB may select a different sample size than the one indicated in paragraph 32 above either by choosing a different value for the consumer risk and producer risk (e.g., 20 per cent for the consumer risk) when applying acceptance sampling or by using another approach, if any of the following conditions apply:

(a) The estimated volume of annual GHG emission reductions of the project activity or the PoA being verified is equal to or less than 100,000 tCO2e.

(b) The security conditions in the project region prevents inspection of many samples (eg. conflict zones); or

(c) The VCS grouped project activity is located in a least developed country or a host party with 10 or fewer registered CDM project activities at the end of the monitoring period being verified."

The proposed project activity is located in People's Republic of Bangladesh, which is a Least Developed Country (LDC) (https://unfccc.int/topics/resilience/workstreams/national-adaptation-programmes-of-action/ldc-country-information). Thus, the validation team can choose a different sample size than one indicated in para 32 of the sampling standard/17/.

The validation team selected random sample from PP's baseline survey records (parameter- η_{old}) to check the acceptability (or otherwise) of the data for each such record with PP's sample records and determined if the PP's sample records meet the requirements.

Sample Size: (On site Visit conducted on 08/05/2023)

AQL	UQL	Producer Risk	Consumer Risk	Sample Size; Min	Acceptance No.
0.5%	20%	10%	20%	8	0

The validation team assessed 8 samples during the first sampling on 10/05/2023 and 11 samples during the second sampling from 18/10/2024 to 21/10/2024.

Sample Size: (Hybrid + Remote audit conducted from 18/10/2024 to 21/10/2024)

AQL	UQL	Producer Risk	Consumer Risk	Sample Size; Min	Acceptance No.
0.5%	20%	10%	10%	11	0

All the households interviewed were found to have inefficient conventional stove without grate or chimney using firewood. Therefore, no discrepancies were observed.

2.5 Resolution of Findings

This section summarises the results of the project's validation process. The results of the document review, onsite visit, and interviews are presented in this section. CARs, CLs, and FARs are used to correct material inconsistencies discovered during validation.

Corrective Action Request (CAR)

Participants in the project have committed mistakes that will affect the project's capacity to deliver meaningful, measurable further emission reductions.

i. Specific methodological standards that are applicable have not been met, or

ii. There's a chance that emission reductions won't be able to be measured or tracked.

Clarification Request (CL)

It's used when more information is needed to properly understand an issue or when the data isn't clear enough to determine whether a condition has been satisfied.

Forward Action Request (FR)

i. For the next verification period, the actual project monitoring and reporting processes demand attention and/or correction, or

ii. It is recommended that the MP be adjusted.

CARs and CLs will be resolved or closed if the PP changes the project description, corrects the PD, or provides sufficient further explanations or proof to address the concerns. If this is not done, the project activity will not be recommended for VCS registry registration.

07 CARs and 08 CLs were raised during this validation. The summary of the findings is provided in Appendix IV.

2.5.1 Forward Action Requests

No Forward Action Requests (FARs) were raised during this assessment.

3 VALIDATION FINDINGS

3.1 Project Details

The characteristics of the project activity as validated are described below:

- Project design, type, technologies and measures implemented, and eligibility of the project

The proposed project activity "Bangladesh Apon Chula Improved Cookstove Program II" is not a grouped project. The project activity includes the distribution of energy efficient Apon Chula improved cookstove (ICS) in the rural households of People's Republic of Bangladesh which rely on inefficient biomass stoves (conventional stove without grate or chimney and three stone fire) for cooking purposes. The ICS will continue to use non-renewable biomass (firewood) for cooking, but the ICS will use less wood fuel to meet thermal needs because it has higher thermal efficiency, which will result in a reduction of GHG emissions compared to the baseline/pre project scenario.

The proposed project aims to distribute 100,000 fuel-efficient improved cookstoves (ICS) in 2 years. In the sixth year after ICSs distribution, the project proponent will provide a new ICS to Households without cost, so that households will have access to them for the full crediting period. In the first phase of the project from 24/06/2022 to 25/06/2023, 46,991 ICS were distributed in the Rangpur Division and Khulna Division of Bangladesh and the remaining 53,009 ICSs will be distributed from 24/06/2025 to 23/06/2026. The validation team has reviewed the project database, confirming that the distribution data in the PD is consistent with the project database/16/.

The project activity is replacing conventional cooking solutions with fuel-efficient improved cookstoves, which falls under the category of efficiency improvements in thermal applications. Thus, the project is eligible to registered under VCS standard.

The validation team has confirmed from the technical specifications/13/ and project database/16/ and the photos of the ICS, the table of manufacturer specification is tabulated below:

No.	Parameter	Value
1	High power thermal efficiency	36.0% (The thermal efficiency was tested by manufacturer following Water Boiling Test, version 4.2.3)
2	Life span	7 years
3	Dimensions	28 CM Height (+/- 0.5 cm) Diameter Higher/Top 30 CM (+/- 0.5 cm) And Lower/Down 35 cm (+/- 0.5 cm)
4	Weight	25 Kg (+/- 1Kg)
5	Material	1.Combustion chamber made by metallic lining 2. Stove body mainly made by cement

The efficiency of the ICS distributed under the proposed project activity as 36% is verified from stove efficiency test report by Institute of Fuel Research and Development of Bangladesh/44/. The validation team has confirmed from the efficiency test report/44/ that the test was conducted using the Water

Boiling Test, v 4.2.3. and was carried out in accordance with the procedure specified in the applied methodology VMR0006, version 1.1/07/.

- CL#05 has been raised and resolved (Refer to Appendix IV for further details). Project proponent and other entities involved in the project and Ownership

Guangzhou Iceberg Environmental Consulting Services Co. Ltd, and Bitgreen Carbon Assets Management Pte Limited, are the project proponents of the proposed project activity.

Donation and carbon transfer agreement/20/ has been signed by four parties, party **A**: Guangzhou Iceberg Environmental Consulting Services Co. Ltd, Party **B**: Bitgreen Carbon Assets Management Pte Limited, Party **C**: Beijing Taiming Foundation Investment Consulting Co., Ltd and Party **D**: Guangzhou Iceberg Environmental Consulting Service Co., Ltd. Party A has the right to develop a greenhouse gas emission reduction and Party A (Guangzhou Iceberg Environmental Consulting Services Co. Ltd) has sole ownership of all the carbon credits generated from the project.

PP has also signed waiver agreements with the two local partners, Grassroot Cooperation LTD and KHEYA/31/ that clearly depicts that the VCUs generated from the project activity solely belongs to PP, Guangzhou Iceberg Environmental Consulting Service Co., Ltd.

An end user agreement/32/ has also been signed by each participating household confirming that the ownership right of the carbon credits generated from this project belong solely to the Project proponent (Guangzhou Iceberg Environmental Consulting Service Co., Ltd.).

Therefore, the validation team confirms that all the evidences demonstrating the ownership of the project or right to use were found to be acceptable. It was found to be in compliance with section 3.7.1 of VCS standard/01/. Independent research was conducted to confirm that the project is not listed under any emission trading program or other binding limits.

CL#01 has been raised and resolved (Refer to Appendix IV for further details).

- Project start date

The start date of the project activity is 24/06/2022 which is the date of distribution of first ICS under this project activity/19/. The validation team also examined the project database/16/ provided by the PP and confirms that the start date complies with section 3.8 of the VCS standard, Version 4.4/01/ and is thus accepted. The distribution of the ICS will happen in two phases. In the first phase from 24/06/2022 to 25/06/2023, 46,991 ICSs were distributed in Rangpur Division and Khulna Division, this information was cross checked with the distribution database provided by the PP/16/ and in the second phase from 24/06/2025 to 23/06/2026, the remaining 53,009 ICSs will be distributed and will be confirmed during the subsequent verification of the project, The validation team has reviewed the project database, confirming that the distribution data in the PD is consistent with the project database/16/.

- Project crediting period

According to the VCS Standard version 4.4/01/ section 3.9.1 state that, “For non-AFOLU projects, the project crediting period shall be either seven years, twice renewable for a total of 21 years, or ten years fixed”. The crediting period selected by the PP is of 10 years for the project activity from 24/06/2022 to 23/06/2032 (including both days) which is of fixed type and acceptable to the validation team.

- Project scale and estimated GHG emission reductions or removals

The project activity is expected to reduce emissions by more than 300,000 tonnes of CO_2e per year/09/. The validation team confirms that the project activity falls under category 2 ‘Large Project' according to paragraph 3.10.1 of the VCS standard version 4.4/01/, as it has the potential to reduce GHG emissions by more than 300,000 tCO_2e/year.

The average estimated amount of annual emission reductions are 519,536 tCO_2e and a total of 5,195,362 tCO_2e for the entire fixed crediting period of 10 years. If the underlying assumptions do not change, the emission reduction projection is reasonable, according to the validation team.

- Project location

The location of this project activity is in Rangpur Division, Khulna Division, Rajshahi Division and Barisal Division of People's Republic of Bangladesh. The first phase of distribution was held in Rangpur Division and Khulna Division of Bangladesh.

The project location is the geographical boundary of people’s Republic of Bangladesh.

Orientation	Latitude/Longitude
Eastmost	90°51'20" E
Westmost	88°01'09" E
Southmost	21°41'17" N
Northmost	26°36'53" N

The geographical coordinates of the project site were verified at the time of baseline survey samples during both the on-site visit by VVB and the local expert. Get geocoordinates mobile application was used to check the geographical coordinates for the samples visited on-site/29/. The information made available by the PP, the project database shared of the distribution districts within Bangladesh/16/ and the geo-coordinates obtained by the validation team/29/ have been verified during the site visit and found to be consistently defining the project location as the geographical boundaries of the host country, Bangladesh. Therefore, this was found to be acceptable by the VVB.

- Conditions prior to project initiation

The target population's ongoing usage of non-renewable wood fuel (firewood) to meet equivalent thermal energy needs as provided by project cookstoves in the absence of project activity is one of the prerequisites prior to project commencement.

- Project compliance with applicable laws, statutes, and other regulatory frameworks

The validation team has verified that there are no laws or regulations in Bangladesh that restrict the use of improved cookstoves (ICS) in households/15/. The project is a voluntary effort by the project proponents.

- Participation under other GHG programs:

- Projects registered (or seeking registration) under other GHG program(s)

The validation team has verified that the project has not been registered, and it has no plans to register under any other GHG program by reviewing the declaration from the PP that the project has not claimed or will not claim carbon credits under any other scheme after registration of the project under VCS/21/. Independent research was conducted by the validation team across various carbon registries to confirm that the project is not listed under any GHG mechanism.

- Rejection by other GHG programs

The project has not been rejected by any other GHG programs as confirmed from the PP declaration/21/.

- Other forms of credit and supply chain (Scope 3) emissions

– Emissions trading programs and other binding limits

The PP confirms in section 1.16.1 of the VCS PD /06/ that this project activity does not reduce GHG emissions from activities that are included in an emissions trading program. Bangladesh does not have its own ETS. Also, it does not seek or receive another form of GHG-related environmental credit.

– Other forms of environmental credit sought or received and eligible to be sought or received

The proposed project activity did not seek or receive another form of GHG-related environmental credit including renewable energy certificates.

– Issuance of public statement(s) to help prevent scope 3 emissions double claiming

PP has notified about the potential risk of scope 3 emissions double claiming through email to both the local partners, Grassroot Cooperation LTD and KHEYA who are responsible of the Apon Chula production and distribution. The Validation team has reviewed the email notifications/36/ sent to the local partners and confirms that it is in compliance with para 3.23.9 of the VCS standard version 4.4/01/.
CL#02 has been raised and resolved. (Please refer to Appendix IV for details).

- Sustainable development contributions

The project contributes to long-term development in several ways and is contributing to 12 SDGs:

Goal 1:No poverty

Using improved cookstoves can help people lead healthier and more productive lives by saving time and money on firewood for each household. Additionally, the project activities create many jobs, as the

manufacturing of the improved cookstoves takes place in local factories, which in turn leads to better income for local residents. The information provided under SDG goal 1 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 1.4.1 Proportion of population living in households with access to basic services. The number of households receiving project ICS will be considered as the project specific indicator and the increase in this parameter will be monitored from the ICS distribution database and the usage survey. Hence, The SDG Indicator 1.4.1 will be assessed during the first verification of the Project activity.

Goal 2: Zero hunger

The project enhances food security and nutrition, particularly for children and women, by decreasing inadequate cooking practices, reducing the burden of firewood collection, minimizing food preparation time, and lowering the need to purchase firewood. The information provided under SDG goal 2 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 2.1.1 Prevalence of undernourishment. The number of households receiving project ICS and still in use will be monitored as project-specific indicator. The decrease in this parameter will be monitored from the ICS distribution database and usage survey.

Goal 3: Good health and well-being

Most local people use non-renewable biomass, such as firewood, for cooking, which produces high levels of PM2.5 and carbon monoxide (CO) when it burns incompletely. Improved Cooking Stoves can significantly reduce exposure to these harmful pollutants by enhancing combustion efficiency, leading to faster cooking and more complete burning of the fuel. Additionally, ICS minimize the risk of burns, which is particularly important for protecting children and toddlers since they enclose the fire within the combustion chamber. The information provided under SDG goal 3 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 3.9.1 Mortality rate attributed to household and ambient air pollution. The number of households indoor air quality improved since they received the project ICSs will be monitored as project-specific indicator. The decrease in this parameter will be monitored from the ICS distribution database and monitoring survey.

Goal 4: Quality education

The use of improved cooking stoves leads to reduced fuel consumption, which decreases the time spent collecting fuel. This is especially beneficial for children, particularly girls, as it allows them more time to focus on their education. The implementation of this project requires active participation from local community members in the production and distribution of ICS. Through training provided by Iceberg, they gain relevant skills and education in sustainable development and global citizenship. The information provided under SDG goal 4 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex. The number of employees provided skill development training will be monitored as project-specific indicator. The increase in this parameter will be monitored from the training records, including training material, photos and attendance.

Goal 5: Gender equality

The project reduces women and children's drudgery through time savings in reducing time spent cutting, collecting, and carrying firewood from trees far removed from households and reduce time spent cooking over toxic smoky open fires. These tasks, if being undertaken without relief, are a major cause of gender inequality. The information provided under SDG goal 5 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age, and location. Average time saving on cooking and fuel collection in the project scenario by female per household per day will be monitored as project-specific indicator. The decrease in this parameter will be monitored from the monitoring survey.

Goal 6: Clean water and sanitation

Deforestation and large-scale agricultural expansion have been identified as the most significant land cover changes impacting the biosphere within the watershed. This project aims to save 264,451 tons of non-renewable biomass each year. With around 800 rivers spanning a total area of 147,630 square kilometers, Bangladesh boasts one of the most complex river systems in the world. As a result, the river ecosystem is present throughout the country. Consequently, this project will lead to a notable reduction in deforestation within the river ecosystem, thereby increasing the extent of forested areas in this region of Bangladesh. This initiative will also contribute to achieving Target 6.6: protect and restore water-related ecosystems. The information provided under SDG goal 6.6 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 6.6.1 Change in the extent of water-related ecosystems over time. Total non-renewable woody biomass fuel saved will be monitored as project-specific indicator. The increase in this parameter will be monitored from the ICS distribution database, usage survey, monitoring survey

Goal 7: Affordable and clean energy

The ICS that is distributed to households is a clean cooking technology. The project increases the proportion of the population with primary reliance on clean cooking technology in the project area. The information provided under SDG goal 7 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 7.1.2 Proportion of population with primary reliance on clean fuels and technology. The number of households receiving project ICS and still in use will be monitored as project-specific indicator. The increase in this parameter will be monitored from the ICS distribution database and usage survey.

Goal 8: Decent work and economic growth

The factories producing ICS are local enterprises. They hire additional workers to manufacture ICSs for the project. During the project's crediting period, Iceberg and its local partners are responsible for the maintenance and monitoring plan, which generates job opportunities for local residents. The information provided under SDG goal 8 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities. The number of employees hired for the project will be monitored as project-specific indicator. The increase in this parameter will be monitored from the labour contracts or salary slip.

Goal 9: Industry, Innovation, and Infrastructure

The local factories that produce ICS for the project are small-scale industries. They will expand their production capacity to meet demand. As a result, both the upstream and downstream supply chains will benefit from the project. This initiative promotes small-scale industries in Bangladesh, contributing to indicator 9.3.1: Proportion of small-scale industries in total industry value added. The information provided under SDG goal 9.3.1 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 9.3.1 Proportion of small-scale industries in total industry value added. The production capacity increased for the project of the producer will be monitored as project-specific indicator. The increase in this parameter will be monitored from the production record or related materials.

Goal 13: Climate action

The project is expected to reduce average annual GHG emissions by 546,712 tCO2e over a crediting period of 10 years, primarily due to a decrease in non-renewable firewood combustion for cooking and heating in households. The information provided under SDG goal 13 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 13.2.2 Tonnes of greenhouse gas emissions avoided or removed will be monitored as project-specific indicator.

Goal 15: Life on land

The Improved Cooking Stoves (ICS) distributed by the project are more thermally efficient, leading to decreased firewood consumption among local people. This reduction results in lower greenhouse gas (GHG) emissions compared to the baseline scenario. Additionally, it helps diminish deforestation and protects biodiversity and natural habitats in Bangladesh. The information provided under SDG goal 15 will be verified in the subsequent verification. The SDG impact will be verified from the indicator 15.1.1 Total non-renewable woody biomass fuel saved will be monitored as project-specific indicator. The increase in this parameter will be monitored from the ICS distribution database, usage survey, monitoring survey.

CAR#01 has been raised and resolved. (Please refer to Appendix IV for details).

- Additional information relevant to the project

- Leakage management

As the project adopts a net gross adjustment factor of 95% to account for leakage, this is not applicable.

- Commercially sensitive information

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

No further information is included in the VCS PD/06/. The validation team concludes that the project description is accurate, complete, and provides an understanding of the nature of the project.

3.2 Safeguards

3.2.1 No Net Harm

The project has no possible negative environmental or socio-economic impacts, which has been confirmed through the study of project technology.

3.2.2 Local Stakeholder Consultation

The local stakeholder consultation process has been described, by the PP, in Section 2.2 of the VCS PD/06/. The Project Participant correctly identified the relevant stakeholders such as the local employee, representatives of the affected people residing in project area.

Local stakeholder consultation process was conducted during the design phase through inviting the relevant stakeholders to comment on the project activity. The local stakeholder meetings were held on 11/05/2022 at Rangpur Division, and on 31/10/2022 at Khulna Division, Bangladesh. The participants across the host country (Bangladesh) were invited and informed about the meeting through email invite, and radio announcement in English and Bengali notifying the date, time and location of the event /37/. The attendance sheet and photos of the local stakeholder meetings were submitted as evidence by the PP/24/26/.

Stakeholders had no comments/complaints/grievances by the end of the meeting which could have any significant modification in the project description or its design. Evaluation forms/27/ were submitted as feedback and no negative comments were received from any of them. The assessment team interviewed the participants of the local stakeholder meeting to confirm the details about the meeting. This project activity was appreciated by the stakeholders considering how the project activity will raise the standard of living for rural households and will bring a positive impact to the community.

In addition, stakeholders are aware of the grievance redressal method announced during the stakeholder engagement and can contact the project participant or their local partners if they have any concerns. Opinion books/25/ have also been put in the villages where the project has been implemented thus establishing a continuous feedback and grievance mechanism in conformance to the VCS guidelines. As a result, it is confirmed that the project participant has built a structure for ongoing contact with the local stakeholders, in accordance with the requirements defined by section 3.18.5 of VCS standard, version 4.4/01/.

CL 03 has been raised and resolved (Refer to Appendix IV for further details).

3.2.3 Environmental Impact

The project will help significantly reduce the consumption of firewood during household cooking purposes. The project will provide employment to the cookstove crafts and improve the living standard of Bangladeshi people at rural areas.

The project has no possible negative environmental or socio-economic impacts, as the project involves the distribution of energy efficient cookstoves, hence environmental impact assessment (EIA) is not required.

3.2.4 Public Comments

In accordance with the requirements of para 3.18.6 of the VCS Standard Version 4.4/01/ 'All projects are subject to a 30-day public comment period. The date on which the project is listed on the project pipeline marks the beginning of the project's 30-day public comment period'.

The project was open for public comments from 21/09/2022 to 21/10/2022. No comments were received by the project during the public comment period as confirmed from the project registry webpage (https://registry.verra.org/app/projectDetail/VCS/3168).

3.2.5 AFOLU-Specific Safeguards

This section is not applicable.

3.3 Application of Methodology

3.3.1 Title and Reference

Following approved baseline & monitoring methodology is applied:

- VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, Version 1.1/07/.
- "TOOL30: Calculation of the fraction of non-renewable biomass"; Version 04.0/08/.

3.3.2 Applicability

The latest version of the methodology (VMR0006 version 1.1/07/) meets all the applicability conditions. As a result, the methodology is considered fully applicable for the crediting period, and no request for deviation in terms of methodology applicability is required. The VCS PD/06/ includes all applicable conditions entirely and appropriately. The following table shows the results of the application conditions assessment:

Methodology Applicability Criterion	Project Justification	Means of Validation
Project activities shall be implemented in domestic premises or in community-based kitchens.	The project activity replaces traditional conventional stove without grate or chimney and three-stone fire in individual households only.	Replacement of traditional conventional stove without grate or chimney and three-stone fire firewood stoves with higher efficiency Apon Chula ICS will be carried out in the targeted households, as confirmed during on-site interviews with PP representatives /29/ & during the remote audit (Audit 2) VVB again interviewed the PP representatives & baseline beneficiaries/42/.

The project stove shall have specified high-power thermal efficiency of at least 25% per the manufacturer's specifications and shall exclusively use woody biomass and can be single pot or multi-pot; in case of project stove replacing fossil fuel baseline stove, it shall exclusively use renewable biomass.	The Apon Chula improved cookstove has a specified high-power thermal efficiency of 36.0% as per the manufacturer's specifications. It uses wood biomass only.	The validation team confirms that the Apon Chula improved cookstove has thermal efficiency of 36% as confirmed from the stove efficiency test (WBT 4.2.3) report by Institute of Fuel Research and Development, Bangladesh /44/. Therefore, in accordance with methodological standards, the project ICS have a stipulated high power thermal efficiency of at least 25% as confirmed from the manufacturer's specifications/13/. Therefore, the criterion has been met.
Both 'Projects' and 'Large Projects' can use this methodology.	Since the average annual GHG emission reduction from the project is expected to be 536,663 tCO_2e, which is a large project as per Paragraph 3.10.1 category 2) Large projects: Greater than 300,000 tonnes of CO2e per year of VCS Standard (Version 4.4)	The proposed project activity is defined as a "Large Project" inline with para 3.10.1 of VCS Standard /01/. The scale of the project was also confirmed through review of estimated ER sheet/09/. The estimated annual average emission reductions by the project activity is 519,536 tCO_2e. Thus, the project meets the requirements set out in the methodology/07/.
Non-renewable biomass has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports, or statistics.	According to Global Forest Resources Assessment 2015 Report of Bangladesh by Food and Agriculture Organization of the United Nations[1], the area of forests of Bangladesh in 1990, 2000, 2005, 2010 and 2015 respectively is 1494*103, 1468*103, 1455*103, 1442*103 and 1429*103 hectares, it has decreased 4.4% from 1990 to 2015. Since Bangladesh is a least developed	As demonstrated by numerous FAO statistical statistics, non-renewable biomass has been in use since 31 December 1989. According to Global Forest Resources Assessment 2015 Report of Bangladesh by Food and Agriculture Organization of the United Nations /30/, forest areas are shrinking every year. The forest area of Bangladesh in 1990, 2000, 2005, 2010 and 2015 respectively is 1494*103, 1468*103, 1455*103,

[1] https://www.fao.org/forest-resources-assessment/past-assessments/fra-2015/country-reports/en/

	country till now [2], it is highly possible that non-renewable biomass has been used before 1990 across Bangladesh.	1442*103 and 1429*103 hectares. This equates to a decrease of 4.4% forest area in Bangladesh between 1990 and 2015. Based on the review of evidence & supporting documents/30/ provided by PP, VVB confirms that non- renewable biomass was being used in the project region since 31 December 1989. Thus, the criterion is met.
For the specific case of biomass residues processed as a fuel (e.g. briquettes, wood chips) it shall be demonstrated that: (a) It is produced using exclusively renewable biomass (more than one type of biomass may be used). (b) The consumption of the fuel should be monitored during the crediting period and (c) Energy use for renewable biomass processing (e.g. shredding and compacting in the case of briquetting) may be considered as equivalent to the upstream emissions associated with the processing of the displaced fossil fuel and hence disregarded.	According to baseline survey, all of the sampled households used firewood for cooking while no biomass residues such as briquettes and woods residues were used. The consumption of the fuel used in the project activity will be monitored. If briquettes utilization in project case the energy consumption for manufacturing of briquettes and transportation of briquette will be monitored to calculate project emissions.	The validation team confirmed during the onsite interviews/29/ & remote interviews/42/with the baseline survey households that only firewood is used as fuel for cooking purposes. Further, it is confirmed that no biomass residues such as briquettes are used as fuel in the pre-projects scenario. The consumption of the fuel used in the project ICS will be monitored. If briquettes are utilised in project ICS the energy consumption for manufacturing of briquettes and transportation of briquette will be monitored to calculate project emissions. Thus, the criterion is met.
The project description shall explain the proposed method for distribution of project devices including the method to avoid double counting of emission reductions such as unique	The project proponent uses online database to record the name, telephone number, location, ID number of end users and distribution date. Every ICS has a unique serial number on it.	The validation team has confirmed through on-site interviews with PP representatives/29/ that the suggested method for project ICS distribution includes measures to prevent double counting of emission reductions, such as

[2] https://www.un.org/development/desa/dpad/least-developed-country-category/ldcs-at-a-glance.html

identifications of product and end-user locations (e.g. programme logo).		unique serial number, end user information (name, telephone number, ID number of end users), and unique GPS referenced location. The validation team thus confirms that the record-keeping system will prevent double counting Additionally, VVB reviewed the project database/16/ and confirmed that there is no double counting report till date. same has been reconfirmed during the remote audit conducted by the VVB/42/ Hence, the criterion is met.
The project description shall also explain how the proposed procedures prevent double counting of emission reductions, for example to avoid that project stove manufacturers, wholesale providers or others claim credit for emission reductions from the project devices.	The stove manufacturers, local partner and end users have signed agreements with project proponent stating clearly that the PP is the sole ownership of the VCUs arising from the project.	The validation team confirms that the proposed methods will prevent double counting of emission reductions through interviews with PP representatives/29/ and the assessment of a sample beneficiary (end user) undertaking/32/. The PP has also signed waiver agreements with the two local partners, Grassroot Cooperation LTD and KHEYA/31/ that clearly depicts that the VCUs generated from the project activity solely belongs to PP, Guangzhou Iceberg Environmental Consulting Service Co., Ltd. Thus, the criterion is met.
Tool30 may be used by: (a) DNAs to submit region- or country-specific default fNRB values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or	For this project, Iceberg has used this tool to calculate project-specific fNRB value. It complies with option b.	The validation team confirms that the project-specific calculation of fNRB value /22/ is inline with Tool 30 version 4.0/08/. The detailed assessment is provided under section 3.3.8 of this report. Thus, the criterion is met.

(b) project participants to calculate project- or PoA-specific fNRB values.		

CL 03 has been raised and resolved (Refer to Appendix IV for further details).

3.3.3 Project Boundary

According to VMR0006, "Methodology for Installation of High Efficiency Firewood Cookstoves," Version 1.1/07/, the Project Boundary is established. The greenhouse gas sources identified in the VCS PD/06/ are deemed appropriate and evaluated below:

The project boundary includes the physical and geographical locations of the distributed Apon Chula ICS limited to The People's Republic of Bangladesh.

The validation team was able to ensure that the approved methodology/07/ addresses all the identified emission sources that are impacted by the project activity, as shown in table below:

Source		Gas	Included?	Justification/Explanation
Baseline Emission	Emission from use of non-renewable biomass/Fossil fuel	CO2	Yes	Major source
		CH4	Yes	Major source
		N2O	Yes	Major source
		Other	No	No other source identified
Project Emission	Emission from use of non-renewable biomass	CO2	Yes	Major source
		CH4	Yes	Major source
		N2O	Yes	Major source
		Other	No	No other source identified

The greenhouse gas sources indicated in the PD/06/ are transparently stated and deemed appropriate and consistent with the technique used. The validation team confirms that the project boundary, as well as the selected sources, sinks, and reservoirs, are all justified.

3.3.4 Baseline Scenario

The baseline scenario for the proposed project activity has been identified using the methodology VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, version 1.1 /07/. As per section 6 of applied methodology/07/, the baseline scenario is the continued use of non-renewable wood fuel (firewood/charcoal) or fossil fuel (coal/kerosene) by the target population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity.

The project activity involves distribution of energy efficient Apon Chula improved cookstoves to the rural households in Bangladesh. In the absence of the proposed project activity, three stone fire and conventional stove without grate or chimney were used for cooking in the households. The energy and mass flows, and the type and level of service provided through improved cookstoves in project scenario will remain same as of baseline scenario. This has been ensured by checking manufacturer's specification of ICS introduced through this project activity/13/ and independent desk review.

The baseline scenario has been established using the most recent (published in 2021) World Bank report on "Understanding Market-Based Solutions and Access To Finance Options For Clean-Cooking Technologies In Bangladesh"/39/, which depicts that 74% of households in Bangladesh uses traditional cookstoves for cooking purposes. According to WHO report on "Proportion of population with primary reliance on fuels and technologies for cooking, by fuel type (%)"/40/, 91% of households in rural areas of Bangladesh used biomass for cooking.

Multistage sampling method was used by the PP for baseline survey. Firstly, they randomly selected 6 villages from the targeted area and then 120 households across these 6 villages (Dondora, Kolonipara, Paschim Khutamara, Uttar Luxmipur, Koikhali, Bativita) were surveyed from 22/06/2022 to 29/06/2022, on 09/11/2022, 09/01/2023, 09/02/2023 and 15/02/2023, which further depicted that 92.5% of surveyed households used conventional stove without grate or chimney and 7.5% used three-stone fire stoves /35/. All the surveyed households used firewood in the baseline stoves for cooking purposes.

A baseline survey was conducted in six villages across two divisions: Rangpur and Khulna. In the Rangpur division, the baseline survey took place from 22/06/2022 to 29/06/2022 with the distribution of the ICS starting from 24/06/2022. And for the villages where the baseline survey was conducted from 24/06/2022, no ICS have been distributed in the first phase. In the Khulna division, the baseline survey was conducted from 09/11/2022 to 15/02/2023, and the distribution of ICS began on 16/11/2023. It is important to note that in villages where the baseline survey was conducted from 16/11/2022, no ICS was distributed during the first phase. Therefore, VVB confirms that the baseline survey was completed prior to the distribution of the ICS in all villages where the ICS was distributed in the first phase.

The validation team applied acceptance sampling approach and conducted onsite interviews with 8 households during the first round of sampling and the approach for the second sampling during the remote site visit is described under section 2.4 of the report under VVB Sampling Approach to confirm the baseline survey results. All the households interviewed were found to have inefficient conventional stove without grate or chimney using firewood.

The procedures for identifying the baseline scenario have been correctly followed and the identified scenario reasonably represents what would have occurred in the absence of the proposed project activity. VVB confirms that the applied methodology, documentary evidences/39,40/ and baseline survey results are correctly quoted and interpreted. The assumption and data can be deemed reasonable. The VCS PD/06/ considers the national and sectoral policies in effect. The selected methodology /07/ has been correctly applied to identify the baseline scenario as what would happen in the absence of the proposed project activity and in compliance with the prescription given therein.

CL#04 and CAR#02 have been raised and resolved (Refer to Appendix IV for further details).

3.3.5 Additionality

The activity method of applied methodology VMR0006 version 1.1/07/ was used by PP to demonstrate additionality, and the following steps were taken:

Step 1: Regulatory Surplus

The VVB investigated and confirmed that no government programme or policy in the host country mandates the distribution of household fuel-efficient cookstoves. As a result, the project is not mandated by any law, legislation, or regulatory framework, or by any systematically implemented law, statute, or other regulatory structure for UNFCCC non-Annex I nations.

As a result, the participation is entirely voluntarily. The VVB confirms that the proposed project is a voluntary coordinated action by Guangzhou Iceberg Environmental Consulting Services Co., Ltd. The first step has been completed.

Step 2: Positive List

In accordance with section 3.3.2 of this report, the project fits all the applicability requirements of the methodology which represents the positive list.

As confirmed through the onsite and remote interviews with PP representatives and local partners, the Apon Chula ICS has been installed at no cost to the household and the only source of revenue is the selling of GHG credits. The LSC attendees during the onsite and remote audit also confirmed that they were informed about the zero-cost distribution of the project ICS to the targeted population. Also, the project is not part of any government initiative or backed by multilateral funds.

The proposed project activity is thus considered additional because it satisfies the positive list criteria defined by para 3.14.2 of the applied methodology/07/ (VMR0006 version 1.1)

3.3.6 Quantification of GHG Emission Reductions and Removals

- **Baseline and Project Emissions**:

The applied methodology VMR0006, version 1.1 /07/ does not account for baseline emissions and project emissions separately, however, quantifies net emission reductions achieved by the project activity.

- **Leakage:**

In accordance with Section 8.3 of the applied methodology VRM006, version 1.1/07/ leakage is considered as 0.95.

- **Net Emission Reductions**

As per the applied methodology/07/, net emission reductions are calculated by applying equations 1 and 2, for project activities replacing baseline stoves using non-renewable biomass (firewood/ charcoal):

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

where,

i	Indices for the situation where more than one type/model of improved cookstove is introduced to replace three-stone fire
j	Indices for the situation where there is more than one batch of improved cookstove of type i
ER_y	Emission reductions during year y in t CO_2e
$ER_{y,i,j}$	Emission reductions by improved cookstove of type i and batch j during year *y* in t CO_2e

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

where,

$B_{y,savings,i,j}$	Quantity of woody biomass that is saved in tonnes per improved cookstove of type *i* and batch j during year y
$NCV_{wood\ fuel}$	Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonne)
$f_{NRB,y}$	Fraction of woody biomass that can be established as non-renewable biomass (f_{NRB})
$EF_{wf,\ CO2}$	CO_2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO_2/TJ)
$EF_{wf,non\ CO2}$	Non-CO_2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO_2/TJ)
$N_{y,i,j}$	Number of improved cookstoves of type i and batch j operating during year y
0.95	Discount factor to account for leakage

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

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

Equation 3 is not used in the project. So, the value of Bold is not calculated.

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

For the project equation 4 is used for the calculation of $B_{y=1,\ new,i,survey}$ value, where:

η_{old}	Efficiency of baseline cookstove. The value is 0.1 based on baseline survey.
$\eta_{new,y,i,j}$	Efficiency of the improved cookstove type i and batch j determined through water boiling test (WBT) during year y Alternatively, efficiency may be determined using Equation 4.
$B_{y=1,\ new,i,survey}$	Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i and batch j, determined in the first year of the implementation of the project through a sample survey.

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

Equation (5)

where,

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

A net to gross adjustment factor of 0.95 is applied to $ER_{y,i,j}$ to address the potential source of leakage that can be attributed to diversion of non-renewable biomass saved by project devices to non-project households that previously consumed renewable biomass.

The following assumptions are used for ex-ante calculations:

1. The project activity will install up to 100,000 ICSs in 2 years. The life span of ICS is 7 years as confirmed from the technical specifications/13/. In the sixth year of the ICSs installed, PP will provide a new ICS to households without cost, so that households will have access to them for the full crediting period.

2. The annual rate of stove loss is estimated to be 5%.

3. $B_{y=1,\ new,i,j,survey}$ is assumed as 1.72 tonnes / device / year. The value is sourced from fuel consumption test/38/ conducted by PP in Karimpur Village and Dhopakhali Village which demonstrated that each project stove will use 4.7 kg of woody biomass per day.

Hence, based on the above assumptions and calculation approach, the project activity is estimated to reduce 5,195,362 tCO_2e for a period of 10 years, with an annual average as 519,536 tCO_2e. The

equations stated above under section 3.3.6 of the PD were compared with the applied methodology/07/ and were found to be exactly same. The same equations have been used in the estimated ER sheet/09/ to calculate the estimated ERs for the entire crediting period.

Thus, the validation team confirms that the project activity complies with the specified requirements and formulae used to determine emission reductions as discussed above. The assessment team also confirms that:

- All assumptions and data used by the PP are listed in the VCS PD, including their references and sources;
- All documentation used by the PP as the basis for assumptions and source of data is correctly quoted and interpreted in the VCS PD;
- All values used in the VCS PD are considered reasonable in the context of the proposed project activity;
- The baseline methodology has been applied correctly to calculate baseline emission, whereas justification for project emissions, leakage emissions, etc., are provided correctly and ex-ante emission reductions are demonstrated;
- All estimates of the ex-ate proposed baseline emissions can be replicated using the parameters and proposed values provided in the VCS PD.

3.3.7 Methodology Deviations

The VMR0006 version 1.1/07/ was adopted for the project activity, and the PP adhered to the VCS PD/06/ development process. The validation team has confirmed that the project activity has not been subjected to any methodology deviations.

3.3.8 Monitoring Plan

The project's monitoring plan is in compliance with the applied methodology, VMR0006, Version 1.1/07/. The monitoring plan will give an opportunity for real measurement of emission reductions achieved. The monitoring plan for the same has been included in section 5 of the VCS PD/06/. Validation team confirms that the project participant is able to implement the monitoring plan.

Summary of Oversight, Accountability, QA/QC, and Handling Non-Conformances

1. Policies for Oversight and Accountability: Iceberg has established robust policies to ensure oversight and accountability in monitoring activities, which was confirmed during the physical & remote Audit conducted by VVB while interviews with the PP. Additionally, VVB reviewed the Monitoring Manual provided by the PP, Hence, VVB concluded that the Monitoring Plan, Data management and record keeping, Validation & Verification sharing and Stakeholder engagement and feedback Mechanisms are in order & found to be appropriate/46/.

Monitoring Plan Implementation, Data Management and Record Keeping, Stakeholder Engagement and the detailed monitoring plan defines roles and responsibilities, ensuring adherence to survey timing, frequency, and precision as per methodology requirements which was confirmed during the Physical audit while interviewing the staff of Iceberg present on site.

2. Procedures for Internal Auditing and QA/QC

QA/QC Procedures, Sampling plans ensure confidence/precision levels, with strategies to address non-sampling errors (e.g., non-response, interviewer bias). Local staff are trained to implement monitoring procedures, maximize response rates, and document non-response. Outliers are validated for potential errors and excluded if no errors exist, and this was confirmed during the Physical audit while interviewing the staff of Iceberg present on site. Additionally, VVB reviewed the Monitoring Manual provided by the PP, Hence, VVB concluded that the Procedures for Internal Auditing and QA/QC in order & found to be appropriate/46/.

3. Procedures for Handling Non-Conformances

Any non-conformances with the validated monitoring plan are documented and analysed, Compliance with Methodology: Changes to the monitoring plan are made if aligned with the methodology. Corrective Action: Revisions to the monitoring plan ensure issues are resolved; related ERs are excluded until corrections are verified. Additionally, VVB reviewed the Monitoring Manual provided by the PP, Hence, VVB concluded that the Procedures for handling Non-Conformances reflected in the para 7 of monitoring Plan shared by the PP/46/.

These measures were confirmed during on-site interviews & remote audits during opening & closing meeting & by reviewing the documents Monitoring plan/46/ shared by the PP to validate their implementation and effectiveness.

Data and Parameters fixed ex-ante:

Parameter	Description	Value	Assessment
$f_{NRB,y}$	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass	0.91	The fraction of woody biomass saved is calculated in line with applicable methodological CDM Tool 30, version 4.0/08/. The value has been consistently reported in the VCS PD/06/. fNRB calculation sheet has been provided by PP/22/ and all the values are verified by the assessment team. The detailed assessment has been included below.

$NCV_{wood\ fuel}$	Net calorific value of the non-renewable woody biomass that is substituted or reduced	0.0156 TJ/tonne	As per the applied methodology/07/, the net calorific value of non-renewable woody biomass that is substituted or reduced, is taken as the Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy/33/.
$EF_{wf,CO2}$	CO_2 emission factor for the use of wood fuel in baseline scenario	112 tCO_2/TJ	The value taken for CO_2 emission factor for the use of wood is a Default value from 2006 IPCC guidelines/33/. The value has been consistently reported in the VCS PD/06/.
$EF_{wf,non-CO2}$	Non-CO_2 emission factor for the use of wood fuel in baseline scenario	26.23 tCO_2/TJ	The value used for non-CO_2 emission factor for the use of wood fuel is taken from 2006 IPCC Guidelines/33/. The value has been consistently reported in the VCS PD/06/.
η_p	Efficiency of project stove at the start of project activity	0.36	The value for this parameter is taken from the Technical Specification of Apon Chula by third party and Stove Efficiency Test Report (Institute of Fuel Research and Development, Bangladesh, and Manufacturers)/13/ and is consistently reported in the VCS PD/06/.

Data and Parameters monitored:

Parameter	Description	Monitoring Frequency	Assessment

$N_{y,i,j}$ (Number)	Number of project devices of type i and batch j operating during year y	At least once every two years	The parameter will be recorded in the database and updated for operational rate through monitoring surveys in-line with the applied methodology/07/.
$\eta_{new,y,i,j}$	Efficiency of the improved cookstove type i and batch j implemented as part of the project activity	Annually	The Efficiency of Apon Chula ICS distributed is defined as per the vintage year of operation as defined in the applied methodology/07/. The value for the first year is considered based on the manufacturer's specification/13/. Thereafter, the efficiency of the improved cookstoves, considering the estimation of loss in efficiency per year, will be calculated using equation 5 of the applied methodology/07/.
$B_{y=1,new,i,j,survey}$	Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i and batch j, determined in the first year of the implementation of the project through a sample survey	Determined in the first year of project implementation	In accordance with the applied methodology, the parameter is determined during the first verification and fixed for the remaining crediting period through measurement campaigns at representative households and/or sample survey. CDM Standard for Sampling and Surveys for CDM Project Activities and Program of Activities/17/ will be used for determining the minimum sample size to achieve 90/10 confidence/precision levels. Therefore, the measurement methods and procedures to be applied for the parameter are described in line with the applied methodology/07/.

η_{old}	Efficiency of baseline cookstove	Fixed for each individual household at the time of project implementation	The value is fixed for each individual household at the time of project implementation. PP has also conducted baseline survey in 120 households across 6 villages (Dondora, Kolonipara, Paschim Khutamara, Uttar Luxmipur, Koikhali, Bativita) from 22/06/2022 to 29/06/2022, on 09/11/2022, 09/01/2023, 09/02/2023 and 15/02/2023, which further depicted that 92.5% of surveyed households used conventional stove without grate or chimney and 7.5% used three-stone fire stoves /35/. All the surveyed households used firewood in the baseline stoves for cooking purposes. The validation team applied acceptance sampling approach and conducted onsite interviews with 8 households to confirm the baseline survey results. All the households interviewed were found to have inefficient conventional stove without grate or chimney using firewood. Therefore, a default value of 0.1 is applied for η_{old} as prescribed by the applied methodology/07/ for baseline device as three-stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation.
Life Span	Project promoters to state the operating lifetime of project device for projects opting Equation 5 for determining project stove efficiency.	Once at the time of project stove installation	The value used has been verified from the Technical Specification report/13/ of the Apon Chula improved cookstoves.

f_{NRB} Assessment:

PP submitted an f_{NRB} calculation sheet/22/containing the sources of values used, which was reviewed by the assessment team.

The formula used for calculating the fNRB was found to be in accordance with paragraph 7 of TOOL30, version 4.0/08/:

f_{NRB}= NRB / (NRB+RB)

Where,

f_{NRB} = Fraction of non-renewable biomass in the applicable area in the relevant period (fraction or %)

NRB = Quantity of non-renewable biomass consumed in the applicable area in the relevant period (tonnes)

RB = Quantity of renewable biomass that is available on a sustainable basis in the applicable area in the relevant period (tonnes)

Since NRB is determined on a country specific basis by the PP, the following method was applied in line with paragraph 11 of TOOL 30, version 4.0/08/.

NRB= H – RB

Where,

H=Total annual consumption of woody biomass in the applicable area in the relevant period (tonnes)

The NRB was calculated by the PP in-line to equation 2 of the applied Tool 30 and was found to be acceptable as the fNRB here is calculated for a specific country (i.e., Bangladesh).

The consumption of woody biomass (H) was determined in accordance with paragraph 14, section 3.1 of TOOL30 version 4.0/08/. The total woody biomass consumption was calculated using the formula,

Total Consumption = Production + Imports - Exports.

For the year 2023, the data used for the updated calculations, including production, imports, and exports, were sourced from the FAO data. This aligns with the guidance provided in Section 14 of CDM Tool 30, version 4.

The population(N) data for the year 2023 was sourced from the World bank group site/11/[3].

[3] https://data.worldbank.org/indicator/SP.POP.TOTL?locations=BD

In accordance with TOOL33 version 2.0/43/, a wood-to-charcoal conversion factor of 4 was utilized. The wood density was considered to be 0.725 t/m^3/49/4, while the biomass conversion and expansion factor was taken as 1.25 t/m^3 /48[5]/.

The calculations were checked from the calculation sheet/22/ and sources provided in that sheet as well as cross check against online resources wherever deemed necessary by the assessment team.

The total annual consumption of wood in the absence of project activity in the host country was calculated based on annual fuelwood and charcoal consumption sourced from FAO Data[6].

A summary of sources and assessment of all parameters in line with applied TOOL 30 version 4.0/08/ mentioned above used in calculation of $f_{NRB,y}$ (for Bangladesh) have been provided in table below:

Parameter and Description	Value	Data Source	Assessment
$f_{NRB,y}$ (Fraction of non-renewable biomass in the country/region or project area)	0.91	Calculated in line with TOOL 30	This parameter was found to be in line with equation (1) of TOOL 30 version 4.0/08/ as checked against f_{NRB} calculation sheet/22/.
NRB (Quantity of non-renewable biomass (t/yr) in the country/region or project area)	2,06,04,353	Calculated in line with TOOL 30	This parameter was found to be in line with equation (2) of TOOL 30 version 4.0/08/ as checked against f_{NRB} calculation sheet/22/.
RB (Quantity of renewable biomass in the country/region or project area)	21,17,113	Calculated in line with TOOL 30	This parameter was found to be in line with equation (4) of TOOL 30 version 4.0/08/ as checked against f_{NRB} calculation sheet/22/. The weighted mean annual increment (MAI) values were calculated based on total and non-accessible forest extent covered under different ecological zone for the Republic of Bangladesh which were derived from the 2019

[4] https://openknowledge.fao.org/items/86176899-1b4f-411d-8644-965b8cf83f3d Pg no 142

[5] https://openknowledge.fao.org/items/d6f0df61-cb5d-4030-8814-0e466176d9a1 Pg no 49

[6] https://www.fao.org/faostat/en/#data/FO

			Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories/51/. Above-ground biomass growth rates for different ecological zones were taken from 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The Age weighted average was calculated on forest area for 3 categories (i.e. primary forests, above and below 20 years secondary forests) in accordance with table 5 of the TOOL30, version 4.0/08/.
H (Total annual consumption of wood in the absence of the project activity in the country/region/project area) (ton/yr)	2,27,21,466	UN data	In line with TOOL30 para 14 under section 3.1 /08/, the value was calculated based on annual fuelwood, charcoal and biomass consumption sourced from FAO Data/53/, and the population data was sourced from the World Bank Group website/11/. A wood-to-charcoal conversion factor of 4 was applied, along with a biomass conversion and expansion factor of 1.25 t/m^3 and a wood density of 0.725 t/m^3 was used.

All source links were assessed and discussed in detail against each input parameter in detail. These calculations were assessed and accepted by the assessment team. The total annual consumption of wood in absence of project activity was calculated to be 2,27,21,466 t/yr as verified from f_{NRB} calculation sheet/22/.

Renewable biomass (RB) was calculated as the sum of annual growth of both tropical moist forest and tropical rainforest.

The total woody cover data was obtained from the Hansen Global Forest Change dataset[7] /52/. The protected area was sourced from World Database on Protect Areas using only 'designated' categories

[7] https://developers.google.com/earth-engine/datasets/catalog/UMD_hansen_global_forest_change_2023_v1_11

with level I to level V management, and the accessible area were gathered from Open Street Maps using all roads and applying a 2,5-km buffer to determine accessible areas for harvesting[8].

Estimation of renewable biomass (RB) is carried out in line with paragraph 19 of TOOL30 version 4.0/08/:

$$RB = \Sigma(MAI_{forest,i} \times (F_{forest,i} - P_{forest,i})) + \Sigma(MAI_{other,i} \times (F_{other,i} - P_{other,i}))$$

Where:

$MAI_{forest,i}$ =Mean Annual Increment of woody biomass growth per hectare in subcategory i of forest areas (t/ha/yr)

$MAI_{other,i}$=Mean Annual Increment of woody biomass growth per hectare in subcategory i of other wooded land areas (t/ha/yr)

$F_{forest,i}$ =Extent of forest in sub-category i (ha)

$F_{other,i}$ =Extent of other wooded land in sub-category i (ha)

$P_{forest,i}$ =Extent of non-accessible area (e.g., protected area where extraction of wood is prohibited, geographically remote area) within forest areas (ha)

$P_{other,i}$=Extent of non-accessible area (e.g., protected area where extraction of wood is prohibited, geographically remote area) within other wooded land areas (ha)

i = Sub-category i of forest areas and other wooded land areas

The total renewable biomass in the host country was calculated to be 951,484.03 t/yr.

f_{NRB} calculation:

NRB = H – RB

= 2,27,21,466 – 21,17,113

= 2,06,04,353 t/y

f_{NRB} = NRB / (NRB+RB)

= 2,06,04,353/ (2,06,04,353 + 21,17,113)

= 0.91

The calculated f_{NRB} of 0.91 indicates that the consumption of woody biomass within the country is greater than its capacity to supply sustainably.

[8] https://www.openstreetmap.org/search?query=bangladesh#map=6/23.54/90.34

The approach and sources used for determination of parameter fNRB were found to be compliant with applied methodology/07/ and TOOL 30 version 4.0/08/. Through an independent desk review, it was confirmed that the data sources used for f_{NRB} calculation for Bangladesh are the latest published for Bangladesh and of equivalent vintage.

Thus, it can be stated that the f_{NRB} value for Bangladesh, is acceptable, and have been calculated following applicable calculations, as defined by the applied methodology/07/.

The value of the parameter f_{NRB} is therefore calculated as 0.91 which is found to be acceptable by the VVB.

Cross checks applied by the VVB to verify the fNRB value:

1. In line with para 10 of the tool 30/8/ which requires ex-ante estimation of fNRB/22/ to be based on most recent historical year, the recent historical data available for the same vintage has been used for the fNRB calculations for the PA. The population data of the year 2021/53/ is considered, it takes into account the scenario before the start of the project. Since the project was set to begin on July 26, 2022, and the decision-making and planning took place at the beginning of that year, it was deemed appropriate to use data from 2021 for estimation purposes. Furthermore, the value of parameter "H" has been revised based on the 2021 dataset, in accordance with Paragraph 10 of TOOL30, Version 4.0. The VVB notes that the use of the most recent historical data available at the time of the project start date representing the correct & same vintage has now been incorporated. On this basis the population data used now is more appropriate to the project scenario and is found to be acceptable by the VVB In line with para 6 of tool 30/6/, which requires comparing the fNRB value against published literature, including the Bailis Report- Bailis et al./45/ indicates that Bangladesh's national f_{NRB} value is between 46-52 percent. PP has clarified that the reason for this difference is due to different methods applied for quantification, i.e., WISDOM method used in the literature, while the project has applied the CDM Tool 30 in line with the applied methodology. It is noted that the values in the Bailis Report/45/ are based on data reported in the year 2009, whereas data from IPCC 2019 refinement study on forest cover and other underlying parameters have been applied by the PP. A detailed justification provided by PP in the f_{NRB} calculation sheet was reviewed and confirmed by the assessment team.
2. Para 13 of the applied tool/6/ states that "*If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of: i) total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and ii) most recent available observed annual rate of deforestation (ha/yr)*". PP has demonstrated this calculation in their fNRB calculation sheet/22/. The total average above ground biomass tonnage of the area of forest areas deforested in recent past is 62.82 tonnes/ha, as confirmed from Global Forests Resources assessment/30/; and the annual rate of deforestation is 0.3 mha/50/[9]. According to the calculation above, the NRB is 8.53% higher than the value calculated by i) and ii) .The cross-checked estimate of NRB was found to be lower than the estimated NRB. No further justification is required for the estimated NRB value as para

[9] https://www.cabidigitallibrary.org/doi/pdf/10.5555/20173070759 Page 4

13 of the tool 30 requires justification only for NRB value greater than 10% of product of above ground biomass value and annual deforestation rate. This is found to be acceptable by VVB.

3. In addition to the above checks, VVB has also reviewed the potential of double counting regarding commercial woody biomass consumption. PP has excluded multiple non-domestic wood consumption categories to keep the fNRB value conservative and to avoid double counting. Further, the domestic wood fuel consumption excludes charcoal consumption as verified from the FAO data used for the calculation of fNRB. The same has been confirmed by the VVB from the calculation sheet and hence the VVB confirms that no double counting has been observed. Furthermore, the fNRB value obtained in this project was cross-checked with the values from other project (GS4GG project: GS11152) in the same host country, and the value obtained in this project was found to be conservative.

All documentation and records must be retained safely and easily accessible for at least two years after the project crediting period ends, in line with section 3.23.1 of the VCS Standard (v.4.4)/01/. The validation team accepts the data collection and administration techniques described in section 5.3 of the VCS PD/06/. The validation team has confirmed from the project database provided by the PP that the following information has been captured from the end users and will maintain the same for the further distribution of ICS:

- Date of distribution.
- Geographic area of distribution.
- Model/type of project technology distributed.
- Quantity of project technology distributed.
- Name and telephone number (if available), and address of recipient
- Unique identification alphanumeric ID for each ICS that is sold/distributed.
- Whether the project ICS is still in use
- Whether using other cookstoves beside the project ICS
- The fuel used for project ICS and other cookstoves, including firewood, biomass residues processed as a fuel (e.g. briquettes, wood chips), LNG etc
- The way to get the firewood
- The time spend on collecting firewood, etc

The parameters to be monitored through sampling would be:

- $N_{y,l,j}$ - Number of project devices of type i and batch j operating during year y
- $B_{y=1,new,l,\ survey}$ - Quantity of woody biomass used by project devices in tonnes per device of type i and batch j

According to the validation team, the monitoring plan's implementation tools, such as data management, monitoring tools, and quality assurance and quality control procedures, are adequate to ensure that the emission reductions achieved by or resulting from the project proposal therein can be reported ex-post and verified. The sampling plan also complies with the monitoring methodology VMR0006 (v.1.1)/07/, the Standard of Sampling and Surveys of CDM Project Activities and Programme of Activities (v.09.0)/17/, and the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (v.04)/18/.

The validation team certifies that the overall monitoring plan complies with the methodology VMR0006 (v.1.1)/07/ requirements, that the monitoring arrangements described in the monitoring plan are practical within the project design, and that the project proponents will be able to carry out the described monitoring plan.

CL#08, CAR#03, CAR#04, CAR#05, CAR#06 and CAR#07 have been raised and resolved (Refer to Appendix IV for further details).

3.4 Non-Permanence Risk Analysis

It is not an AFOLU project activity, hence it is not applicable.

4 VALIDATION OPINION

Earthood Services Limited, formerly known as “Earthood Services Private Limited” (hereafter referred to as Earthood) has been contracted by Guangzhou Iceberg Environmental Consulting Services Co., Ltd.to conduct the VCS validation of the project activity – “Bangladesh Apon Chula Improved Cookstove Program II”, with VCS ID 3168, in accordance with the relevant requirements of VCS Standard version 4.4/01/; to achieve real, measurable, additional, and permanent emission reductions.

The proposed project aims to improve household and community access to energy efficiency measures by distributing high thermal efficiency, low greenhouse gas emission cooking stoves known as Apon Chula Improved Cook Stoves (ICS) to households of People’s Republic of Bangladesh. The replacement of inefficient traditional cookstoves through ICS will help to reduce greenhouse gas emissions and firewood use, resulting in long-term climate change mitigation.

This validation was carried out using a risk-based approach. 07 Corrective Action Requests (CAR), 08 Clarification Requests (CL) were raised and successfully closed during the validation. No Forward Action Request (FAR) was raised.

The validation of the GHG statement was conducted in accordance with ISO 14064-3; 2019 by the the validation team. The validation is based on the additional documents pertaining to baseline and monitoring methodology/07/, as well as follow-up interviews, onsite visit/29/ and remote site visit and supporting documents made available to the validation team by the PP.

The validation team confirms that the information provided in VCS PD/06/ fulfils the criteria of VCS Standard Version 4.4/01/ and is in line with all relevant VCS requirements. The validation has been performed using a risk-based approach as described above to provide a reasonable level of assurance.

The project emission reductions are calculated in a transparent and conservative manner, so that the expected average estimated amount of annual emission reduction is 519,536 tCO2e and a total of 5,195,362 tCO2e for 10 years of fixed crediting period. The assessment team is of opinion that the proposed project activity is in accordance with the applied methodology VMR0006 Version 1.1, VCS standard Version 4.4 and ISO 14064-3.

Validation period is broken down into calendar year vintages: From 24/06/2022 to 23/06/2032.

Validated GHG emission reductions and removals in the above period:

Year	Estimated GHG emission reductions or removals (tCO_2e)
24/06/2022 to 31/12/2022	49,051
01/01/2023 to 31/12/2023	305,653
01/01/2024 to 31/12/2024	323,908
01/01/2025 to 31/12/2025	357,337
01/01/2026 to 31/12/2026	625,439
01/01/2027 to 31/12/2027	640,026
01/01/2028 to 31/12/2028	674,742
01/01/2029 to 31/12/2029	640,490
01/01/2030 to 31/12/2030	611,811
01/01/2031 to 31/12/2031	657,485
01/01/2032 to 23/06/2032	309,419
Total estimated ERs	5,195,362
Total number of crediting years	10 Years (Fixed)
Average annual ERs	519,536

Approved by

Dr. Kaviraj Singh

CEO

Earthood Services Limited

Date: 14-07-2025

Place: Gurugram, Haryana

APPENDIX I: COMPETENCE STATEMENTS

Competence Statement			
Name	Jahnabi Kalita		
Education	M.Sc. Environment Management		
Experience	1 year		
Field	Environment, Climate change		
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 (TA 3.1)		
Reviewed by	Shifali Guleria, Quality Manager	**Date**	02/06/2023
Approved by	Deepika Mahala, Technical Manager	**Date**	02/06/2023

Name	Sushant Vashisht
Education	M.Sc. Environmental science and Technology
Experience	2+ years
Field	Environment science and technology
Approved Roles	
Team Leader	YES (VM)
Validator	YES (VM)
Verifier	YES (VM)
Local expert	YES (India)

Financial Expert	NO		
Technical Reviewer	YES		
TA Expert (X.X)	YES (VM 1.2, 3.1)		
Reviewed by	Shifali Guleria (Quality Manager)	**Date**	26/08/2024
Approved by	Deepika Mahala (Deepika Mahala)	**Date**	26/08/2024

Competence Statement			
Name	Shifali Guleria		
Education	M.Sc. (Environmental Studies and Resource Management), TERI University		
Experience	3+ 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	16/02/2022

Approved by	Ashok Gautam	**Date**	18/02/2022

Competence Statement			
Name	Dilna Jose		
Education	MTech in Environmental engineering BE in Civil Engineering		
Experience	9 months as Air Quality Engineer 10 months as Assistant professor		
Field	Green Tech & teaching		
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**	25/09/2024
Approved by	Deepika Mahala (Technical Manager)	**Date**	25/09/2024

Competence Statement			
Name	Akkas Aki		
Education	MBA in Sustainable Development and Management		
Experience	4 years		
Field	Sustainability		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	YES (Bangladesh)		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Reviewed by	Shifali Guleria (Quality Manager)	**Date**	05/05/2023
Approved by	Deepika Mahala (Technical Manager)	**Date**	05/05/2023

APPENDIX II: ABBREVIATIONS

Abbreviations	Full texts
AFOLU	Agriculture, Forestry and Other Land Use
BE	Baseline Emission
CL	Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent

CL	Clarification Request
DVR	Draft Validation Report
EIA	Environmental Impact Assessment
ER	Emission Reduction
Earthood	Earthood Services Limited
FAO	Food and Agriculture Organization
FAR	Forward Action Request
GHG	Greenhouse gas(es)
ICS	Improved Cook Stoves
IPCCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
MP	Monitoring Plan
PA	Project Activity
PD	Project Description
PE	Project Emission
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
QMS	Quality Management System
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCS-PD	VCS – Project Description
VCU	Verified Carbon Unit
VVB	Validation/verification Body

APPENDIX III: REFERENCES

S. No.	Title	References	Provider
1.	VCS Standard	Version 4.4 Dated: 21/12/2022	Others
2.	VCS Program Guide	Version 4.3 Dated: 21/12/2022	Others
3.	VCS Program Definitions	Version 4.3 Dated: 21/12/2022	Others
4.	Registration and Issuance Process	Version 4.3 Dated: 21/12/2022	Others
5.	VCS Validation and Verification Manual	Version 3.2 Dated: 19/10/2016	Others
6.	VCS PD	Version 9	PP

		Dated: 20/06/2025	
7	VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves	Version 1.1 Dated: 22/07/2021	Others
8.	TOOL30: Calculation of the fraction of non-renewable biomass	Version 4.0	Others
9.	Ex-ante ER Calculation Sheet	Version 6.0 Dated: 20/06/2025	PP
10.	VCS webpage for the project, https://registry.verra.org/app/projectDetail/VCS/3168	-	Others
11	World bank group, population statistics https://data.worldbank.org/indicator/SP.POP.TOTL?locations=BD	-	Others
12	VCS Validation Report template	Version 4.2 Dated: 21/12/2022	Others
13.	Technical Specification of Apon Chula by third party.	Dated: 22/02/2022	PP
14.	VPA inclusion report for GS VPA 11150 https://assurance-platform.goldstandard.org/project-documents/GS11150	Dated 20/07/2021	PP
15.	Bangladesh Law and Regulations: http://bdlaws.minlaw.gov.bd/laws-of-bangladesh.html	-	Others
16	Project Database	-	PP
17	Standard for Sampling and Surveys for CDM Project Activities and Program of Activities	Version: 09.0	Others
18	Guidelines for Sampling and Surveys for CDM Project Activities and Program of Activities	Version: 04.0	Others
19	First ICS distribution: Household-Bangladesh ICS Donation and Carbon Transfer Agreement(Grassroot)	Dated 24/06/2022	PP
20	Carbon Emission Reduction Project of Bangladesh Improved Cookstove Program Investment Agreement	Dated 14/06/2022	PP
21	Declaration from the PP that the project has not claimed or will not claim carbon credits	Dated 16/03/2023	PP

	under any other scheme after registration of the project under VCS		
22	fNRB calculation sheet	Dated 20/06/2025	PP
24	List of LSC Attendees	Dated 11/05/2022 and 31/10/2022	PP
25	Photos of opinion Book in villages for grievance	-	PP
26	Supplementary photos of LSC Meeting	Various	PP
27	Evaluation form	-	PP
28.	Training Manual and Training records	-	PP
29	On site visit evidence	Dated 08/05/2023	Others
30	FAO, Forest Resources Assessment 2015, https://www.fao.org/forest-resources-assessment/past-assessments/fra-2015/country-reports/en/	-	Others
31	• Apon Chula Improved Cookstove Project Cooperation Agreement between Guangzhou Iceberg Environment PTE. LTD. and Grassroot Cooperation LTD (Proof of Ownership) • Apon Chula Improved Cookstove Project Cooperation Agreement between Guangzhou Iceberg Environment PTE. LTD. and KHEYA (Proof of Ownership)	• Dated 06/04/2022 • Dated 20/09/2022	PP
32	End User Donation and Carbon Transfer agreements	Various	PP
33	2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy	Chapter 1 Introduction Chapter 2 Stationary Combustion	Others
34	Least Development Country https://www.un.org/development/desa/dpad/least-developed-country-category/ldcs-at-a-glance.html	-	Others
35	Baseline survey results	Various	PP
36	Scope 3 email evidences	16/05/2023	PP
37	LSC radio announcement	Various	PP
38	Fuel consumption test report carried out in Karimpur Village and Dhopakhali Village	22/12/2021 to 28/12/2021 and 14/01/2022 to 20/01/2022	PP
39	WHO report on Understanding Market-Based Solutions And Access To Finance	2021	PP

	Options For Clean-Cooking Technologies In Bangladesh: https://documents1.worldbank.org/curated/en/311561624871430872/pdf/Understanding-Market-Based-Solutions-and-Access-to-Finance-Options-for-Clean-Cooking-Technologies-in-Bangladesh.pdf		
40	WHO report on Proportion of population with primary reliance on fuels and technologies for cooking, by fuel type(%) : https://www.who.int/data/gho/data/indicators/indicator-details/GHO/proportion-of-population-with-primary-reliance-on-fuels-and-technologies-for-cooking-by-fuel-type	-	PP
41	2015 Global Forest Resources Assessments Bangladesh Report: https://openknowledge.fao.org/server/api/core/bitstreams/2381416a-b355-4c9e-83fa-fec639c6ab1e/content Density of Firewood: Forest Product Conversion Factors 2020 Page 48 https://openknowledge.fao.org/server/api/core/bitstreams/eebaeee6-cd98-4b35-9143-21f96fad16af/content	-	PP
42	Remote site visit evidence	18/10/2023 to 22/10/2024	Others
43	TOOL33: Default values for common parameters	Version 2.0	Others
44	Stove Efficiency Test Report (Institute of Fuel Research and Development, Bangladesh and Manufacturers)	-	PP
45	Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional wood fuels. Nature Climate Change, 5(3), https://www.researchgate.net/publication/271503594_The_Carbon_Footprint_of_Traditional_Woodfuels	2015	Others

46	Monitoring Manual for Bangladesh Apon Chula Improved Cookstove Program I&II	-	PP
47	FAO yearbook 2020 https://www.fao.org/3/cc3475m/cc3475m.pdf	-	Others
48.	Global Forest Resources Assessment 2020 https://openknowledge.fao.org/items/d6f0df61-cb5d-4030-8814-0e466176d9a1	-	Others
49.	The Charcoal Transition https://openknowledge.fao.org/items/86176899-1b4f-411d-8644-965b8cf83f3d Pg no 142	-	Others
50.	Forest and Land Degradation in Bangladesh https://www.cabidigitallibrary.org/doi/pdf/10.5555/20173070759 Page 4	-	Others
51.	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/	-	Others
52.	Hansen Global Forest Change	-	Others
53.	https://www.fao.org/faostat/en/#data/FO	-	Others
54.	Source for roads https://www.openstreetmap.org/search?query=bangladesh#map=6/23.54/90.34	-	Others

APPENDIX IV: FINDINGS

CAR: Corrective Action Request

CL: Clarification Request

FAR: Forward Action Request

Table 1.Remaining FAR from validation and/or previous validation

FAR ID	00	**Section no.**	NA	**Date :** DD/MM/YYYY
Description of FAR				
NA				
Project participant response				**Date :** DD/MM/YYYY
NA				

Documentation provided by project participant	
NA	
VVB assessment	**Date:** DD/MM/YYYY
NA	

Table 2.CL from this validation

CL ID	01	Section no.	3.1	Date : 15/05/2023
Description of CL				
1. There is no information on the implementation plan for the ICS being distributed as part of the project activity under section 1.1 & 1.11 of the PD & how the distribution and installation of approximately 100,000 ICS will be undertaken. PP is requested to justify. 2. Please explain the involvement of ICS manufacturer and transfer of carbon rights. 3. Please clarify the role of the entity "Bitgreen Carbon Assets Management Pte Limited" mentioned under section 1.5 of PD.				
Project participant response				**Date :** 17/05/2023
1. The lifetime of Apon Chula improved cookstove is about 7 years according to manufacturer specifications. In the sixth year after ICSs distribution, the project proponent will provide a new ICS to Households without cost, so that households will have access to them for the full crediting period. The local partners are in charge of the distribution. Please refer to submitted document "18_Implementation Plan of Program 2" for details. 2. The local partners Grassroot and Kheya are the ICS manufacturers as well as distributors, the signed Cooperation Agreement states that the carbon rights belong to PP. Please refer to submitted document "16_Apon Chula Improved Cookstove Project Cooperation Agreement". 3. It is another PP of the project. Please refer to document "25_Bangladesh Improved Cookstove Program-CN&EN" submitted this time.				
Documentation provided by project participant				
18_Implementation Plan of Program 2 16_Apon Chula Improved Cookstove Project Cooperation Agreement 25_Bangladesh Improved Cookstove Program-CN&EN				
VVB assessment				**Date:** 26/05/2023
NA				

1. PP has included the implementation plan under section 1.1 and 1.11 of the PD describing that 100,000 ICS will be distributed in the targeted households in 2 years. The ex-ante estimation of ERs have also also been calculated considering the 2 year distribution plan. Closed. 2. The manufacturers and local partners, Grassroot and Kheya have waived the ownership of the carbon credits generated from the project as confirmed from the carbon transfer agreement. The sole ownership of all the carbon credits generated from the project lies with the PP. Closed. 3. The multilateral agreement shared by the PP confirms the role of Bitgreen Carbon Assets Management Pte Limited as another PP of the proposed PA. However, the agreement states that "After the emission reductions are issued according to the issuance plan agreed upon by both parties, Party A and Party B should jointly negotiate and select the buyer of the emission reductions according to market conditions, sell the emission reductions after reaching an agreement, and share the proceeds". Therefore, it is not clear who will have the sole ownership of the carbon credits generated from the PA. Please clarify. OPEN.
Project participant response **Date :** 01/06/2023
3. The ownership of the carbon credits generated from the project belongs to Iceberg and Bitgreen. Thus Item 7 of Section 3.2 has been revised accordingly. The revised "ICS Donation and Carbon Transfer Agreements" have been submitted as Document 13 and 14 for reference. Meanwhile, we found that according to the VCS PD template, in Section 1.7 we should state who has the project ownership rather than the ownership of the carbon credits. So we revised section 1.7 accordingly to make it be in accord with the definition of "Project Ownership" in Program Definitions (V4.3). Document 16 has been submitted for reference.
Documentation provided by project participant
13_ICS Donation and Carbon Transfer Agreement-2_3168 *14_The First ICS Donation and Carbon Transfer Agreement-Program 2* *16_Apon Chula Improved Cookstove Project Cooperation Agreement*
VVB assessment **Date:** 09/06/2023
It is confirmed from the evidences submitted by PP that carbon credits generated from the project activity will lie with the PP, Guangzhou Iceberg Environmental Consulting Services Co., Ltd. Hence, CL#01 is closed

CL ID	02	**Section no.**	3.1	**Date:** 15/05/2023
Description of CL				

1. PP is requested to follow the template guidelines for filling out section 1.4 of the PD "In all other cases, indicate whether the project has been designed to include a single location or installation only, multiple locations or project activity instances, but is not being developed as a grouped project, or as a grouped project." 2. Under Supply Chain (Scope 3) Emission mentioned in 1.16.2 of PD, please demonstrate "that a public statement(s) by the project proponent has been made throughout the project crediting period. Where applicable, also demonstrate that the impacted good or service's producer(s) or retailer(s) have been notified of the project and the potential risk of Scope 3 emissions double claiming via email. Evidence of the public statement(s) and email(s) must be provided in this report or attached as an appendix"

Project participant response	**Date :** 17/05/2023
1. Modified to: The project has been designed to include multiple locations, but is not being developed as a grouped project. 2. As per the para 3.23.9 of VCS Standard 4.4: Where the producer(s) or retailer(s) of the impacted good or service are known but not involved in the project or do not have a website, the project proponent shall notify them of the project and potential risk of Scope 3 emissions double claiming via email. For the project, the producers have no website, so the PP have sent emails to them. Please refer to document "26_Emails about the Scope 3 emissions double claiming for VCS 3168 to partners" submitted this time.	
Documentation provided by project participant	
26_Emails about the Scope 3 emissions double claiming for VCS 3168 to partners	
VVB assessment	**Date:** 26/05/2023
1. The proposed PA is designed to include multiple locations, but is not being developed as a grouped project. Section 1.4 has been updated under the revised PD. Closed. 2. The PP has notified the ICS manufactures, Grassroot and Kheya about double claiming of carbon credits generated from the proposed PA as confirmed from the email sent to the local partners. However, the email evidences are not provided in the PD or attached as an appendix. Please adhere to the template guidelines. OPEN.	
Project participant response	**Date :** 01/06/2023
2. The contents of the emails have been added in Section 1.16 of the PD.	
Documentation provided by project participant	
NA	
VVB assessment	**Date:** 09/06/2023
The revised PD has been updated to include the email evidence sent to the local partners regarding risk of Scope 3 emissions double counting. Hence, CL#02 is closed.	

CL ID	03	**Section no.**	3.2.2	**Date:** 15/05/2023
Description of CL				

1. Please clarify and provide evidence on how the invites were sent for the LSC meetings in line with para 3.18.5 of VCS Standard "The project proponent shall demonstrate to the validation/verification body what action it has taken in respect of the local stakeholder consultation as part of validation" 2. There is no evidence provided (photos/ attendance list/ stakeholder forms) for the LSC held on 11/05/2022. Please substantiate. 3. Please follow template guidelines "How due account of all and any input received during the consultation has been taken. Include details on any updates to the project design or justify why updates are not appropriate."
Project participant response **Date :** 17/05/2023
1. The invites were sent by broadcast. Please refer to document "27_radio announcement". 2. Please refer to document "28_Photos of LSC on 11 May 2022" submitted this time. The submitted document "8_Attendance Sheet of LSC" has date in the top right corner. 3. According to the document "9_Feedback and Opinion", the PP has not received negative opinion on the LSC, so there is no update.
Documentation provided by project participant
27_radio announcement 28_Photos of LSC on 11 May 2022 8_Attendance Sheet of LSC 9_Feedback and Opinion
VVB assessment **Date:** 26/05/2023
1. The radio announcement is on the letter head of the local partners. Please provide evidence of the local radio channel and when was the announcement made. OPEN. 2. It has been confirmed from the photographs and attendance sheet that LSC was held on 11/05/2022. Closed. 3. The review of the Stakeholder forms provided by the PP provides VVB with sufficient evidence that no negative comments were received for the ICS and further for the PA. Closed.
Project participant response **Date :** 01/06/2023
1. The radio announcement was broadcast by staff holding a loudspeaker by hand or tying it to a bicycle and riding around the village. This is a common method in Bangladesh, please refer to document "32_Photo of broadcaster" as an example.
Documentation provided by project participant
32_Photo of broadcaster
VVB assessment **Date:** 09/06/2023
It is confirmed that information about local stakeholder meetings were communicated through radio broadcasters in the targeted villages. CL#03 is closed.

CL ID	04	Section no.	3.3.4	Date: 15/05/2023

Description of CL

1. Under section 3.2 of PD, how will the PP differentiate between the ICS distributed under PA 3144 and 3168 since both the programme logo will be the same? Please clarify if there is overlapping of project boundary between the two PAs.
2. Under section 3.3 of PD, there is no clarity on the baseline stove and fuel used in baseline stove referring to published literature, official reports or statistics in the host country.

Project participant response — **Date :** 17/05/2023

1. The ICS under PA 3168 are distributed by Grassroot and Kheya, ICS under PA 3144 are distributed by HWO and ACOB. Four distributors are in charge of different area of Bangladesh. Furthermore, every ICS has a unique serial number on it. The serial numbers for programme I belong to 000001 to 200000 and 600001 to 800000 while those for Programme II belong to 200001 to 600000. Please refer to submitted document "20_Photo of improved cookstove".
2. Modified to: As of 2020, only 19% of the population in Bangladesh had access to clean cooking. In 2018, 74% biomass stoves were used in Bangladesh. The source of data is published literature and official report by World Bank in Bangladesh.

Documentation provided by project participant

20_Photo of improved cookstove

VVB assessment — **Date:** 26/05/2023

1. The unique serial numbers embedded on the project ICS will ensure that there will be no double counting between the PAs, 3144 and 3168. Closed.

2. There is still not much clarity about the use of 3 stone firewood stoves prior to the implementation of the PA. The referred document states "A government sponsored program for the distribution of improved cook stoves was launched in 2013 and up to February 2020, IDCOL had installed 2.11 million improved cook stoves around the country, through a distribution network of partner organizations, which channel financing and products throughout the country." Therefore, please clarify the validity of 74% biomass stoves being used. OPEN.

Project participant response — **Date :** 01/06/2023

2. Since only 7.5% used three-stone as per our baseline survey, it is not an independent choice in many reports. It is classified as traditional stoves in many cases.

Source of data: https://www.myclimate.org/information/carbon-offset-projects/detail-carbon-offset-projects/bangladesh-efficient-cook-stoves-7241/

There are about 32.2 million households in Bangladesh, 2.11 million counts for 6.55% of the total number. Furthermore, with stoves lasting an average of 5 years, the IDCOL project started from 2013, most of the stalled ICSs may be no longer usable.

Source of data: 1: https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/a1d32f13_8553_44f1_92e6_8ff80a4ff82e/2021-06-30-09-23-c9a2750523d19681aecfd3072922fa2c.pdf, Page 4; 2: Improved Cookstoves - Stoves (lbl.gov)

Documentation provided by project participant

NA
VVB assessment **Date:** 09/06/2023
The pre project scenario is confirmed to be the use of traditional inefficient stoves for cooking in Bangladeshi households. CL#04 is closed.

CL ID	05	**Section no.**	1.11	**Date :** 28/10/2024
Description of CL				
In section 1.11 of the VCS PD, the thermal efficiency of the project stove is 36%. However, In section 1.11. of the PD in table 1, it is stated that the "*The thermal efficiency was tested by manufacturer following Water Boiling Test, version 4.2.3*". PP is requested to share the WBT test report to substantiate the same.				
Project participant response				**Date :** 18/11/2024
The thermal efficiency reports by manufacturers have been submitted this time as Document 16 and 17.				
Documentation provided by project participant				
16_Thermal efficiency test report-Grassroot 17_Thermal efficiency test report-Kheya				
VVB assessment				**Date:** 25/11/2024
According to the thermal efficiency test reports provided by the PP, the project stove's efficiency is confirmed to be 36%. The test was conducted in accordance with the Water Boiling Test, version 4.2.3. Hence, CL#05 is CLOSED				

CL ID	06	**Section no.**	1.17	**Date :** 28/10/2024
Description of CL				
Under section 1.17 of the PD v5.0, SDG 4, it is stated that they provide training for individuals to gain relevant skills, along with education in sustainable development and global citizenship. Therefore, PP is requested to provide appropriate training records and supporting documents of training to substantiate the same.				

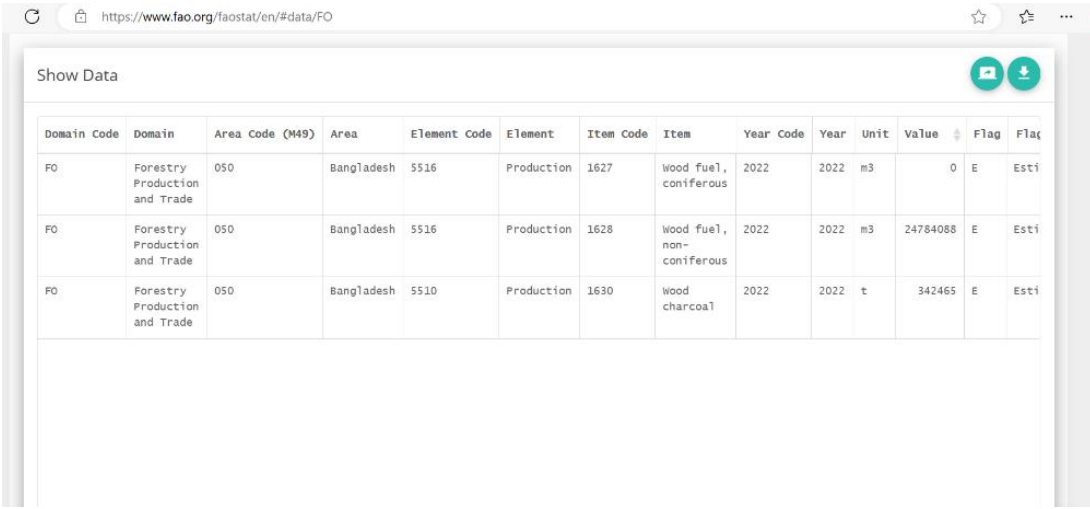
Project participant response	**Date :** 18/11/2024
The training record has been submitted this time as Document 17.	
Documentation provided by project participant	
VVB assessment	**Date:** 25/11/2024
VVB has evaluated the provided training record and confirmed that the training details align with the statements in the PD, contributing to Sustainable Development Goal 4. Thus, CL#06 is CLOSED	

CL ID	07	**Section no.**	4.4	**Date :** 28/10/2024
Description of CL				
In section 4.4 of the PD, PP states, "In the sixth year of the ICS distribution, Iceberg will provide a new ICS to households or repair existing ICS at no cost." However, in the summary description of the project in section 1.1, PP only mentions that a new ICS will be provided to households in the sixth year. PP should clarify this discrepancy.				

Project participant response	**Date :** 18/11/2024
The description in section 4.4 has been changed to be consistent with section 1.1: In the sixth year of the ICSs distribution, Iceberg will provide a new ICS to Households without cost.	
Documentation provided by project participant	
11_Bangladesh Apon Chula Improved Cookstove Program II VCS PD_3168_18112024tc	
VVB assessment	**Date:** 25/11/2024
Section 4.4 of the PD has been revised to align with Section 1.1, which specifies that new ICS will be provided to the Household at no cost in the sixth year. Therefore, CL#07 is now CLOSED.	

CL ID	08	**Section no.**	5.1	**Date :** 28/10/2024
Description of CL				

The f_{nrb} calculation sheet indicates that the annual firewood production is 25,509,042 m^3, while the annual charcoal production is 339,760 t. However, these values differ from those provided in the referenced source (see figure below). PP should clarify this discrepancy.



Domain Code	Domain	Area Code (M49)	Area	Element Code	Element	Item Code	Item	Year Code	Year	Unit	Value	Flag	Flag
FO	Forestry Production and Trade	050	Bangladesh	5516	Production	1627	Wood fuel, coniferous	2022	2022	m3	0	E	Esti
FO	Forestry Production and Trade	050	Bangladesh	5516	Production	1628	Wood fuel, non-coniferous	2022	2022	m3	24784088	E	Esti
FO	Forestry Production and Trade	050	Bangladesh	5510	Production	1630	Wood charcoal	2022	2022	t	342465	E	Esti

Project participant response	**Date :** 18/11/2024
The first edition of f_{nrb} calculation was in 2022, we sourced the latest data then in the website, which resulting the discrepancy. Now we updated the f_{nrb} calculation sheet with the latest data. Please refer to the submitted Document 19.	
Documentation provided by project participant	
19-Bangladesh fNRB_18112024	
VVB assessment	**Date:** 25/11/2024
The f_{nrb} document provided by the PP has been updated according to the latest data available from the FAO website. Hence, CL#08 is CLOSED.	

Table 3.CAR from this validation

CAR ID	01	Section no.	3.1	Date : 15/05/2023
Description of CAR				

1. SDG 6 “Clean water and sanitation” targeted by the proposed project is about providing clean water by the project technology where in the baseline scenario the targeted population consumes unsafe drinking water. It is not clear how an ICS can target to provide clean water and sanitation in line with conditions existing prior to project implementation. 2. Please clarify how ICS distribution will reduce inequality targeted under SDG 10.
Project participant response **Date :** 17/05/2023
1. Modified to: Deforestation and large agricultural growth were recognized as most important land cover changes occurred which could affect biosphere of the watershed. The project will save 264,451t non-renewable biomass every year. Since there are around 800 rivers in 147,630Km^2 land of Bangladesh which creates the most complex river-system in the world, the river ecosystem is in every corner of the country. Hence, the project will result in a significant reduction of deforestation in the river ecosystem, which will contribute to achieve Target 6.6: protect and restore water related ecosystems. 2. The project promotes the foreign direct investment in a least developed country-Bangladesh for the manufacturing of ICSs. It will reduce inequality between countries. It will achieve the Target 10.b encourage development assistance and investment in least developed countries.
Documentation provided by project participant
VVB assessment **Date:** 26/05/2023
1. The targeted indicator 6.6.1 measures the extent change while considering spatial area changes, water quality and water quantity changes as defined by UN SDG indicator metadata. Please clarify how ICS distribution will contribute to the extent to which different types of water-related ecosystems are changing in extent over time. OPEN. 2. The indicator 10.b.1 targets "Total resource flows for development, by recipient and donor countries and type of flow comprises of Official Development Assistance (ODA), other official flows (OOF) and private flows. Official flows includes official development assistance (ODA) while private flows are broken down into flows at market terms and charitable grants " as per as UN SDG metadata 10.b.1. However, no MOU has been signed if ICS distribution targets resource flow to recipient country, Bangladesh. It is not clear if ICS distribution is an official flow or private flow inline with the indicator chosen. OPEN.
Project participant response **Date :** 01/06/2023
1. Target 6.6 is: "By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes." The project will reduce the deforestation in river related system and thus protect forest in river-related ecosystem of Bangladesh. The related content has been added in Section 1.17 accordingly. 2. The money for ICS manufacture and distribution in Bangladesh in the project is a private flow. Related content has been added in Section 1.17 of the PD. Document 16 has been submitted as reference.
Documentation provided by project participant
16_Apon Chula Improved Cookstove Project Cooperation Agreement
VVB assessment **Date:** 09/06/2023

PP has appropriately identified the SDG contributions by the Project Activity, SDG 6.6 and 10.b.1 in line with UN SDG indicators. Thus, CAR#01 is closed.

CAR ID	02	**Section no.**	3.3.4	**Date :** 15/05/2023
Description of CAR				
1. Section 3.4 of the project description refers to a baseline survey conducted in order to confirm the baseline stove is conventional stove without grate or chimney. However, there is no information on who conducted this survey, the dates and number/type of households surveyed. 2. The Household ID mentioned under column B of "6_Data Recording Form for Baseline Survey" sheet has duplicated values. Please clarify.				
Project participant response				**Date :** 17/05/2023
1. The project proponent has conducted a baseline survey under the cooperation with staff of local partners from 22/06/2022 to 29/06/2022, on 09/11/2022, 09/01/2023, 09/02/2023 and 15/02/2023. The 120 sampled households were in 6 villages (Dondora, Kolonipara, Paschim Khutamara, Uttar Luxmipur, Koikhali, Bativita) from 4 districts. The information has been added in Section 3.4 of PD. 2. The Household IDs were sorted from No.1 separately in each village, the sampled households were from 6 different villages. Hence, different households from different villages may have duplicated IDs. But in one village, each household has a unique ID.				
Documentation provided by project participant				
NA				
VVB assessment				**Date:** 26/05/2023
1. PP has now included details about the baseline study conducted to confirm the use of baseline stove by the targeted population under section 4.4 of the PD. 2. The justification by PP was found sufficient. Thus, CAR#02 is closed.				

CAR ID	03	**Section no.**	3.3.8	**Date :** 15/05/2023
Description of CAR				
1. Section 4.4 of PD, on page 21 equation 3 and 4 are mentioned from the applied methodology to calculate Bysavings. It is not clear which option is chosen by the PP. PP shall provide clarity on the option chosen. 2. ηold a. This is a monitored parameter which is "Fixed for each individual household at the time of project Implementation" as per the applied methodology. b. It is not clear how the minimum sample for baseline survey determined inline with the guidelines outlined under Option (b) in Section 8.4 of the applied methodology				

Project participant response	Date : 17/05/2023
1. Equation 4 has been chosen to estimate the quantify of woody biomass saved due to implementation of improved cook stoves. Clarified in Section 4.4 of PD. 2. a. Moved to monitored parameter. b. The Baseline Survey was conducted in 120 households from 6 villages. Multi-stage sampling method was applied in the baseline survey. According to Equation 16 in Guideline for sampling and surveys for project activities and programmes of activities (Version 04.0) as well as the baseline survey, since $\eta_{\_old}$ = 0.1 for all the surveyed households, SD_B=SD_W =0. Therefore, when the number of villages that were sampled is 6, 90/10 confidence/precision was achieved in the baseline survey. (Because when SD_B=SD_W =0, the right side of Equation 16 is 0. So when c=6, 90/10 confidence/precision was achieved). The above information has been addd in the η_{old} form of Section 5.2 of the PD.	
Documentation provided by project participant	
NA	
VVB assessment	**Date:** 26/05/2023
1. PP has chosen equation (4) from the applied methodology to calculate the parameter, Bysavings as stated under section 4.4 of the PD. The calculations were further confirmed from ex-ante ER calculation sheet. Closed. 2. a. ηold has been revised as a ex-post parameter in line with the applied methodology. Closed. b. The parameter table of ηold in the applied methodology prescribes guidelines stated under Option (b) in Section 8.4 of the methodology to determine minimum sample size for baseline survey. Please clarify the approach. OPEN.	
Project participant response	**Date :** 01/06/2023
2b. According to Option (b) in Section 8.4 of the applied methodology, "PP shall carry out a survey of usage prior to implementation of the project activity following the sampling approach described in the latest version of CDM document Sampling and Surveys for CDM project activities ", we used multi-stage sampling as per Guideline for sampling and surveys for project activities and programmes of activities (Version 04.0). The related description and why the chosen sample size can meet the 90/10 confidence/precision were added in Page 33-34 of the PD.	
Documentation provided by project participant	
NA	
VVB assessment	**Date:** 09/06/2023
PP has carried out the baseline survey in line CDM Standard for Sampling and Surveys for CDM project activities, meeting the prescribed 90/10 confidence/precision. Therefore, the minimum sample size for baseline survey was determined in line with the guidelines prescribed by the applied methodology. Thus, CAR#03 is closed.	

CAR ID	04	Section No.	3.3.8	Date : 15/05/2023
Description of CAR				

1. The default fNRB value for Bangladesh was 83 % in the CDM EB 67, Annex 22 report "Default Values Of Fraction Of Non-Renewable Biomass For Least Developed Countries And Small Island Developing States ". Also, currently registered projects in the host country (UNFCCC PoA ref no. 10538, PoA GS ID: 10833) records the value of the parameter as 84%. . PP is requested to justify the approach followed for calculating the fNRB value as 95.76% and how is the applied value conservative. 2. It is not clear how it is assumed that each project stove will use 4.7 kg of woody biomass per day used for ex-ante estimation of the monitored parameter B_(y=1,new,i,j,survey).
Project participant response **Date :** 17/05/2023
1. The approach described in "Information note: Default values of fraction of non-renewable biomass for least developed countries and small island developing States (EB67, Annex 22)" has expired and is no longer applicable. Currently registered projects in the host country (UNFCCC PoA ref no. 10538, PoA GS ID: 10833) used Global FRA 2015. We used Global FRA2020 of Bangladesh. The data source is better. Furthermore, the same fNRB is used in registered GS project-Safe water project in Bangladesh (GS ID: 11150). The FVR has been provided as Document 31. Please refer to it. 2. PP conducted two pilot tests before the project, 4.7kg/device/day was the average value of the tests. The actual value will be determined according to the requirement of applied methodology. Please refer to document "30_Fuel Consumption Test Report" submitted this time.
Documentation provided by project participant
30_Fuel Consumption Test Report 31_GS11150 VPA Inclusion report
VVB assessment **Date:** 26/05/2023
1. PP has used latest available FRA data published in 2020 to determine the value of fNRB. The value of fNRB fixed as 0.9576 is also sourced from published fNRB value for GS VPA 11150. Closed. 2. The pilot studies were conducted in Karimpur Village and Dhopakhali Village, therefore please justify how it is fair to use the same value of wood consumption of 4.7 kg/ per ICS under the targeted villages by the PA considering that behavioral/ cultural changes in the villagers as the villages are in different districts and located further away. OPEN.
Project participant response **Date :** 01/06/2023
2. Since we have to choose villages which have already received ICSs before the start of the project, they are probably in the different areas of Bangladesh. Bangladesh is not a big country. The area is only 147,630km2, similar to Odisha of India. 97.7% of the total population is Bengali people[10]. So there is no big behavioral/ cultural changes within the country. Moreover, this data is only used for ex-ante estimation of ERs. In the verifications, fuel consumption survey will be conducted on the beneficiaries of the project for determining the real ERs.
Documentation provided by project participant
NA
VVB assessment **Date:** 09/06/2023

[10] https://www.worlddata.info/languages/bengali.php

PP has appropriately determined the value of firewood consumption for ex-ante estimation as 4.7 kg/ per ICS as confirmed from the fuel consumption report.

CAR#04 is closed.

CAR ID	05	Section no.	3.3.8	Date : 15/05/2023

Description of CAR

1. Section 5.3 monitoring plan, as per the applied meth, the survey must obtain, at minimum, the following:

i. The cookstoves distributed under the project are being used.
ii. The project stoves are operational and in good condition
iii. Baseline stoves, if any are being used along with project stoves.

However, there is no provision to capture the information and discount for baseline stove being is use along with the project stove.

2. Under section 5.3, there is no information on the sampling method, please clarify how the samples will be selected for conducting the monitoring surveys?

3. It is further not clear which one of the two methods prescribed in the applied methodology for determining the minimum sample for monitoring surveys (either by using latest version of CDM Sampling standard to achieve 90/10 confidence precision or simplified approach proposed in option (b) under Section 8.4 of methodology) will be applied by the PP. Please clarify.

Project participant response	Date : 17/05/2023

1. Whether the project ICS is still in use; Whether use other cookstoves besides the project ICS (including baseline cookstove); The way to get the firewood; The time spend on collecting firewood, etc. The information has been added in Section 5.3 of PD.
2. Multi-stage sampling will be used. The sample size will be decided by the actual distribution quantity of ICSs then.
3. PP using lates version of CDM Sampling standard, the PD has been modified.

The sampling requirements of methodology are:

Parameter	Measurement procedures
$N_{y,i,j}$	Measured directly or based on a representative sample. Sampling standard shall be used for determining the sample size to achieve 90/10 confidence/precision levels. Separate samples shall be taken for each batch
$B_{y=1,new,i,survey}$	Determined in the first year of the introduction of the devices (e.g. during the first year of the crediting period, y=1) through measurement campaigns at representative households and/or sample survey. Sample surveys to estimate this parameter, that are solely based on questionnaires or interviews (i.e. that do not implement measurement campaigns) may only be used if the following conditions are satisfied:

	Pre-project devices have been completely decommissioned and only efficient project device(s) are exclusively used in the project households; If multiple devices are used in the project, it is possible from the results of the survey questions to clearly differentiate the quantity of woody biomass being used by each device. In other words, if more than one device, or another device that consumes woody biomass, are in use in project households, then the sample survey needs to distinguish the quantity of biomass used by the project device and the other devices that use biomass. Only the quantity of biomass used by the project device will be accounted in project caused emission reductions.

According to "Standard sampling and surveys for CDM project activities and POAs (Ver9.0)" and "Guideline for sampling and surveys for CDM project and POA (Ver 4.0)", multi-stage sampling will be used. The sample size will be decided by the actual distribution quantity of ICSs then. The equations are shown below:

$$c \geq \frac{\frac{SD_B^2}{\overline{p}^2} \times \frac{M}{M-1} + \frac{1}{\overline{u}} \times \frac{SD_w^2}{\overline{p}^2} \times \frac{(\overline{N}-\overline{u})}{(\overline{N}-1)}}{\frac{0.1^2}{1.645^2} + \frac{1}{M-1}\frac{SD_B^2}{\overline{p}^2}}$$

Where:

C	=	Number of groups that should be sampled
M	=	Total number of groups in the population
u	=	Number of units to be sampled within each group
N	=	Average units per group
SD_B^2	=	Unit variance (variance between villages)
SD_W^2	=	Average of the group variances (average within village variation)
p	=	Overall proportion
1.645	=	Represents the 90% confidence required
0.1	=	Represents the 10% relative precision

And

$$c \geq \frac{\left(\frac{SD_B}{Clustermean}\right)^2 \times \left(\frac{M}{M-1}\right) + \left(\frac{1}{u}\right) \times \left(\frac{SD_W}{Overallmean}\right)^2 \left(\frac{\overline{N}-u}{\overline{N}-1}\right)}{\left(\frac{0.1}{1.645}\right)^2 + \frac{1}{M-1}\left(\frac{SD_B}{Clustermean}\right)^2}$$

Where:

C	=	Number of groups that should be sampled
M	=	Total number of groups in the population
u	=	Number of units to be sampled within each group
N	=	Average units per group
SD_B^2	=	Unit variance (variance between villages)
SD_W^2	=	Average of the group variances (average within village variation)
1.645	=	Represents the 90% confidence required
0.1	=	Represents the 10% relative precision

Documentation provided by project participant

NA

VVB assessment	**Date:** 26/05/2023

1. PP has revised the aspects to be covered during the monitoring surveys under section 5.3 of the PD. The registered monitoring plan further describes questions about operationality of the project ICS, use of baseline stove will be asked to the end-users. CLOSED.

2. It is not clear why PP has chosen such a complex method of sampling, when the population for monitoring survey can be homogeneous. OPEN.

3. By=1,new,i,survey is mean parameter while Ny,i,j is a proportion parameter. Thus, please clarify how the equation for determining minimum sample size for both the types of parameter are considered same. OPEN.

Project participant response	**Date :** 01/06/2023

2. According to Paragraph 22 in Page 7 of "Guideline for sampling and surveys for CDM project and POA (Ver 4.0)", "Multi-stage sampling is a more complex form of cluster sampling. Measuring all the elements in the selected clusters may be prohibitively expensive, or not even necessary." Since we cannot choose all of hundreds of households in one village for baseline survey, we used multi-stage sampling. In addition, according to Paragraph 39 in Page 33 of "Guideline for sampling and surveys for CDM project and POA (Ver 4.0)", "Multi-stage sampling can be thought of as sampling from a number of groups, and then going on to sample units within each group. Continuing with the cookstove example, we want to sample a number of villages and then a number of households within each sampled village." It is a common practice for using multi-stage sampling in a cookstove project. 3. The first equation in Section 5.3 is for proportional parameter of interest while the second one is for mean value parameter of interest. The related content has been added in Section 5.3 of the PD.
Documentation provided by project participant
NA

VVB assessment	**Date:** 09/06/2023
2. Multistage sampling will be used by PP to determine the sample size for conducting the ex-post monitoring surveys. The sampling method included under section 5.3 of the PD is inline with CDM Guideline for sampling and surveys for CDM project and POA, Ver 4.0. 3. Section 5.3 of the PD is revised to include the sample size calculations of mean parameter, By=1,new,i,survey and proportional parameter, Ny,i,j. Thus, CAR#05 is closed,	

CAR ID	06	**Section no.**	4.4	**Date :** 28/10/2024
Description of CAR				
In section 4.4, the parameter $N_{y,i,j}$ for all the years in the crediting period is mentioned; however, the equation used to calculate this parameter, based on an annual stove loss rate of 5%, is not included in the emission reduction calculation. The project proponent is requested to update this information.				
Project participant response				**Date :** 18/11/2024

The calculation of the parameter $N_{y,i,j}$ for all the years has been updated in section 4.4 of the revised PD. The details are as follows:

46,991 ICSs have been distributed to households in the first year since the project started (Phase I). The remaining 53,009 ICSs are planned to be distributed from 24/06/2025 to 23/06/2026, i.e., the fourth year after the start of the project (Phase II).

Therefore, for the ICSs of Phase I,

the $N_{y,i,j}$ in year 1 is 46,991,

the $N_{y,i,j}$ in year 2 is 46,991-46,991*5%=44,641,

the $N_{y,i,j}$ in year 3 is 44,641-46,991*5%=42,292,

the $N_{y,i,j}$ in year 4 is 42,292-46,991*5%=39,942,

the $N_{y,i,j}$ in year 5 is 39,942-46,991*5%=37,593,

the $N_{y,i,j}$ in year 6 is 37,593-46,991*5%=35,243,

Due to in the sixth year of the ICSs distributed, Iceberg will provide a new ICS to Households without cost,

the $N_{y,i,j}$ in year 6 including the redistributed ICSs, which is 46,991. Since it is planned to gradually replace the stoves distributed in the first year with new stoves in the sixth year, it makes the average operating days in the sixth year for the ICS distributed in first year is six months and for the ICS distributed in sixth year is six months too. Thus, two batches of stoves with different thermal efficiencies exist at the same time in the sixth year, which has been taken into account in the calculation of emission reductions below.

Then, the $N_{y,i,j}$ in year 7 is 46,991-46,991*5%=44,641,

the $N_{y,i,j}$ in year 8 is 44,641-46,991*5%=42,292,

the $N_{y,i,j}$ in year 9 is 42,292-46,991*5%=39,942,

the $N_{y,i,j}$ in year 10 is 39,942-46,991*5%=37,593.

Likewise, for the ICSs of Phase II,

the $N_{y,i,j}$ in year 4 is 53,009,

the $N_{y,i,j}$ in year 5 is 53,009-53,009*5%=50,359,

the $N_{y,i,j}$ in year 6 is 50,359-53,009*5%=47,708,

the $N_{y,i,j}$ in year 7 is 47,708-53,009*5%=45,058,

the $N_{y,i,j}$ in year 8 is 45,058-53,009*5%=42,407,

the $N_{y,i,j}$ in year 9 is 42,407-53,009*5%=39,757,

Due to in the sixth year of the ICSs distributed, Iceberg will provide a new ICS to Households or without cost,

the $N_{y,i,j}$ in year 9 including the redistributed ICSs, which is 53,009. Since it is planned to gradually replace the stoves distributed in the first year with new stoves in the sixth year, two batches of stoves with different thermal efficiencies exist at the same time in the sixth year, which has been taken into account in the calculation of emission reductions below.

Then, the $N_{y,i,j}$ in year 10 is 53,009-53,009*5%=50,359.

Documentation provided by project participant	
11_Bangladesh Apon Chula Improved Cookstove Program II VCS PD_3168_18112024tc	
VVB assessment	**Date:** 25/11/2024
Section 4.4 has been revised to include the calculation of the parameter Ny,i,j for all the years during the crediting period, utilizing the annual loss rate of 5%. Thus, CAR#06 is CLOSED.	

CAR ID	07	**Section no.**	5.1	**Date :** 28/10/2024
Description of CAR				
According to the calculation tool used for the f_{NRB}, specifically TOOL30: Calculation of the fraction of non-renewable biomass, version 04.0, the default value for wood-to-charcoal conversion factor is 4.0 kg of fuelwood (wet basis) per kg of charcoal (dry basis), as stated in Tool 33. However, in this project's calculations, a value of 6 was used instead of 4, which is the conversion factor from Tool 30 Version 3.0.				
Project participant response				**Date :** 18/11/2024
The value has been changed from 6 to 4 in fnrb calculation sheet. Please refer to the submitted Document 19.				
Documentation provided by project participant				
19-Bangladesh fNRB_12112024				
VVB assessment				**Date:** 25/11/2024
f_{nrb} calculation has been updated using the latest wood-to-charcoal factor of 4, as per TOOL30: Calculation of the fraction of non-renewable biomass, version 04.0. Hence, CAR#07 is CLOSED.				

Table 4.FAR from this validation

FAR ID	00	Section No.		Date : DD/MM/YYYY
Description of FAR				

NA	
Project participant response	**Date :** DD/MM/YYYY
NA	
Documentation provided by project participant	
NA	
VVB assessment	**Date:** DD/MM/YYYY
NA	