



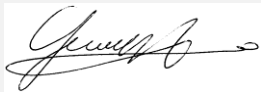
JOINT VALIDATION & VERIFICATION REPORT

IMPROVED COOKSTOVE DISTRIBUTION IN GHANA BY EKI



Document Prepared by RINA Services S.p.A (RINA)

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Work Carried Out By	Team Leader, Verifier, Technical Expert (TA 3): Vinay Singh

Summary:

RINA Services S.p.A. (RINA) has performed the Validation & Verification of the aforementioned grouped project along with the initial 20,102 nos. of project activity instances.

The objective of the Validation is to have an independent evaluation of a project activity by a VVB against the requirements of the VCS standard Version 4.4/04/ and GHG program applied, based on the project design document. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant VCS requirements/04/, GHG program requirements and host Party criteria are validated to confirm that the project design/01/, as documented, is sound and reasonable and meets the identified criteria. Validation is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

The objective of the verification work is to comply with the requirements of Verified Carbon Standards requirements /04/ and ensure that the project activity has been implemented and operated as per the PD/01/, and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place. The ICS burns wood more efficiently thereby improving thermal energy transfer to pots, hence saving charcoal and greenhouse gases. Not only will this halt the rapidly progressing deforestation but will also reduce health hazards from indoor air (smoke) pollution and women and children will have to spend less time in collecting firewood.

As the target populations are unable to afford these stoves (ICS), project promoters have distributed ICS free of cost. The end user has been informed in advance that the use of ICS generates carbon finance which in turn is used to cover the price of ICS and for recovering project implementation costs.

The project involves distribution of fuel-efficient improved cook stoves (ICS) to replace the baseline traditional cook stoves in households. The ICS to be deployed under this project is energy efficient which substantially reduces fuel consumption and emissions for conducting cooking and water heating tasks in homes. The boundary of the grouped project is in Ghana and there are 20,102 project activity instances distributed across the boundary.

0 Clarification Requests (CLs) , 11 Corrective Action Requests (CARs) and 01 Forward Action Request (FAR) were raised during the course of Validation & Verification.

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1 INTRODUCTION

1.1 Objective

RINA Services S.p.A. (RINA) has been commissioned by the EKI Energy Services Limited to perform an independent validation & verification assessment.

The objective of the Validation is to have an independent evaluation of a project activity by a VVB against the requirements of the VCS Version 4.4/04/ and GHG program applied, based on the project design document/01/. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant VCS requirements/04/, GHG program requirements and host Party criteria are validated to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Verified Carbon Units (VCUs).

The objective of the verification work is to comply with the requirements of Verified Carbon Standards requirements. According to this assessment RINA shall:

- ensure that the project activity has been implemented and operated as per the PD/01/, and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place,
- the project's baseline is assessed against “VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, Version 1.1 dated 22 July 2021, Sectoral scope 3”/05/
- the project's monitoring plan is assessed against “VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, Version 1.1 dated 22 July 2021, Sectoral scope 3”/05/
- ensure that the Joint PD-MR/01/ and other supporting documents provided are complete, verifiable and in accordance with applicable VCS requirements/04/,
- ensure that the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology/05/,
- evaluate the data recorded and stored as per the applicable requirements/04/.
- assessment of the sustainability monitoring parameters as per the VCS standard version 4.4 requirements/04/.

1.2 Scope and Criteria

The scope of any assessment is defined by the underlying legislation, regulation and guidance given by relevant entities or authorities. The joint validation and Verification scope is to review the VCS joint PD-MR/01/ against the VCS criteria which refer to VCS Version 4.4 standard and all the GHG program requirements/04/. Validation and Verification is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the joint PD-MR/01/.

In the case of VCS project activities, the scope is set by:

- VCS v4.4 standard/04/ requirements
- Clean Development Mechanism Validation and Verification Standard (VVS) for programmes of activities, v3.0/06/
- Baselines and monitoring methodologies (including GHG inventories)/05/
- Environmental issues relevant to the applicable sectoral scope
- Current technical and operational knowledge of the specific sectoral scope and information on best practice
- Stakeholder consultation and feedback

The assessment team has employed a risk-based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the Joint VCS PD-MR/01/. The focus of the assessment team is to identify the significant risks for the project implementation and the generation of VCU.

1.3 Reasonableness of Assumptions and Level of Assurance

All the revisions of the validation & verification report before being submitted to the client were subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent the VVB's instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for VCS and CDM validation and verification. The level of assurance of the validation report is defined as reasonable. The VVB confirms that a reasonable level of assurance has been achieved during the verification process.

The Joint validation and verification team and the technical reviewers consist of the following personnel.

Role	Last Name	First Name	Country
Team Leader, Verifier & Technical Expert TA 1.2	Singh	Vinay	India

Technical Reviewer	Amalorpavanthan	Cyril A A	India
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1.4 Summary Description of the Project

The project involves distribution of fuel-efficient improved cook stoves (ICS) to replace the baseline traditional cook stoves in households.

The ICS deployed under this project is energy efficient which substantially reduces fuel consumption and emissions for conducting cooking and water heating tasks in homes. The ICS improve the efficiency of combustion and thermal transfer to the pot compared with a traditional pot support or three-stone fire by incorporating energy efficient technology which provides a conducive environment for clean and efficient combustion of wood. It substantially reduces wood fuel consumption compared with a less efficient or three-stone fire or traditional pot support.

The project activity cook stoves are with different manufacturers and specifications of cook stoves will be provided during validation/verification or during inclusion of project activity instances.

The ICSs in initial project activity instances are installed in the rural household of Ghana. Till the end of the monitoring period, 20,102 project activity instances (ICS) were deployed under this grouped project. Only two stove model (Gyapa cookstoves and Obaapa Clean Stove) was distributed in the project.

The technical specifications of the ICS installed in the current/initial project activity instances are provided below;

TECHNICAL DETAILS		
A)	Cook Stove Type/Category	Gyapa 
B)	Fuel Used	Charcoal
C)	Weight	8 Kg

D)	Wide	290 mm
E)	Height	260 mm
F)	Body Material	AluZinc Sheet
G)	Material Thickness	0.5 mm
H)	Air Supply	Natural Draft
I)	Expected life of the stove	7 Years
J)	Guarantee /Warranty Period	1 Year
L)	The Overall Thermal Efficiency	37%

TECHNICAL DETAILS		
A)	Cook Stove Type/Category	Obaapa 
B)	Outer Body Material	Aluzinc Sheet
C)	Inner Chamber Material	Ceramic
D)	Material of Handle	Combustion Chamber
E)	Material of Wood Support	N/A
F)	Material of Led Provided	Iron Rod Pot Support
G)	Length of Stove (in mm)	260
H)	Width of Stove (in mm)	290
I)	Expected life of the stove	7 Years
J)	Guarantee /Warranty Period	1 Year

K)	Weight	Above 6 kg to 8kg
L)	The Overall Thermal Efficiency	36%

This is grouped project; the location of project activity instances is anywhere in geographical region of Ghana. The new instances will be added as and when the new ICSs get installed across Ghana in the future.

There are 20,102 numbers of ICSs distributed and operational under the current/initial project activity instances; as each ICSs has been considered as an individual project activity instance, the total number of project activity instances considered in the joint PD-MR/01/ is 20,102.

The average annual GHG emission reductions from the current/initial project activity instances estimated to be generated is 72.030 tCO₂e, and hence, total GHG emission reductions over the entire crediting period of seven years is expected to be 504,210 tCO₂e.

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

Validation was conducted using RINA procedures in line with the requirements specified in the VCS Standard version 4.4/04/ and CDM VVS v3/06/. Sampling process under this Validation & Verification has been done in accordance with the applied methodology, VMR0006/05/.

The validation & verification consists of the following phases:

- Document review;
- Follow-up actions;
- Onsite audit and interviews
- The resolution of outstanding issues and
- Issuance of the final validation & verification report.

The information provided by the project participants is assessed by applying the means of verification specified in the VCS v4.4, Toolkit/04/ and the CDM VVS V3/06/.

The audit team performs first a desk review, followed by onsite assessment and telephonic interview/discussion, which results in the formation of a draft report and a list of findings.

The next step involves the evaluation of the findings through direct communication with the PPs and then finally the preparation of the verification report.

This verification report and other supporting documents then undergo an internal quality control by the CB “Environment and energy” before submission to the VCS.

The following sections outline each step in more detail.

2.2 Document Review

The following table lists the documentation that were reviewed or crosschecked by the VVB during the Joint validation & verification process.

S.I. No.	Document Reference
01	- Joint PD-MR of the VCS project, titled, “Improved Cookstove Distribution in Ghana by EKI” Version no. 01 dated 03-October-2022 - Joint PD-MR of the VCS project, titled, “Improved Cookstove Distribution in Ghana by EKI” Version no. 02 dated 13-June-2023 - Joint PD-MR of the VCS project, titled, “Improved Cookstove Distribution in Ghana by EKI” Version no. 03 dated 12-September-2023
02	- Ex-ante and Ex-post Emission reduction calculation sheet w.r.t the Joint PD-MR of the VCS project, titled, “Improved Cookstove Distribution in Ghana by EKI” Version no. 01 dated 03-October-2022 - Ex-ante and Ex-post Emission reduction calculation sheet w.r.t the Joint PD-MR of the VCS project, titled, “Improved Cookstove Distribution in Ghana by EKI” Version no. 02 dated 13-June-2023 - Ex-ante and Ex-post Emission reduction calculation sheet w.r.t the Joint PD-MR of the VCS project, titled, “Improved Cookstove Distribution in Ghana by EKI” Version no. 03 dated 12-September-2023
03	VCS project 3801 listing – https://registry.verra.org/app/projectDetail/VCS/3801
04	- VCS: VCS Standard, Version 4.4 (v 4.4), Requirements Document of 21-December-2022 - VCS: VCS Program Guide, VCS Version 4.3 (v4.3), Requirements Document of 21-December-2022
05	VCS Methodology VMR0006 v1.1 dated 22/07/2021 https://verra.org/wp-content/uploads/imported/methodologies/VMR0006-Methodology-for-Installation-of-High-Efficiency-Firewood-Cookstoves-v1.1.pdf
06	- CDM validation and verification standard for programmes of activities, version 03.0 dated 09-September-2021

	- Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 09.0 dated 27-May-2021 - TOOL 30: Calculation of the fraction of non-renewable biomass, Version 4.0 dated 08-September-2022																																				
07	Technical specification from the manufacturer, Jacgk Trust Enterprise and Sustainable Energy Technologies Limited (SETECH Ghana)																																				
08	- Thermal efficiency test certificate issued by Technology Consultancy Centre, Knust, Kumai dated 31-August-2022 for the model Obaapa Clean Stove. - Thermal efficiency test certificated issued by Technology Consultancy Centre, Knust, Kumai dated 25-September-2020 for the model Gyapa.																																				
09	Monitoring survey results submitted by the project participant, EKI Energy Services.																																				
10	Declarations from household to transfer the ownership rights of the carbon assets.																																				
11	- Declaration/Undertaking from Sustainable Energy Technologies (SETECH) (manufacturer) for no ownership of carbon credit/double counting dated 29-March-2023. - Declaration/Undertaking from Sustainable Energy Technologies (SETECH) (distributor) for no ownership of carbon credit/double counting dated 05-April-2023. - Declaration/Undertaking from EKI Energy Services for the ownership, no double counting of ICS dated 27-March-2022 - Declaration/Undertaking from EKI Energy Services dated 12-September-2023 to confirm that there is no improved cookstove units has been distributed/implemented under other two proposed VCS projects (ID 3983 and 3982).																																				
12	Sample End Eser Agreements executed with the beneficiaries to confirm the ownership of carbon credits with PP. <table><tr><th>S.I. No.</th><th>ICS Serial No.</th><th>Date</th></tr><tr><td>1</td><td>EKIGH-22/L2/0013532</td><td>16-March-2023</td></tr><tr><td>2</td><td>EKIGH-22/L1/0007742</td><td>29-March-2023</td></tr><tr><td>3</td><td>EKIGH-22/L1/0007745</td><td>29-March-2023</td></tr><tr><td>4</td><td>EKIGH-22/L1/0007701</td><td>29-March-2023</td></tr><tr><td>5</td><td>EKIGH-22/L1/0007738</td><td>29-March-2023</td></tr><tr><td>6</td><td>EKIGH-22/L1/0007725</td><td>29-March-2023</td></tr><tr><td>7</td><td>EKIGH-22/L1/0007737</td><td>29-March-2023</td></tr><tr><td>8</td><td>EKIGH-22/L1/0007741</td><td>29-March-2023</td></tr><tr><td>9</td><td>EKIGH-22/L1/0007739</td><td>29-March-2023</td></tr><tr><td>10</td><td>EKIGH-22/L1/0007722</td><td>29-March-2023</td></tr><tr><td>11</td><td>EKIGH-22/L1/0007740</td><td>29-March-2023</td></tr></table>	S.I. No.	ICS Serial No.	Date	1	EKIGH-22/L2/0013532	16-March-2023	2	EKIGH-22/L1/0007742	29-March-2023	3	EKIGH-22/L1/0007745	29-March-2023	4	EKIGH-22/L1/0007701	29-March-2023	5	EKIGH-22/L1/0007738	29-March-2023	6	EKIGH-22/L1/0007725	29-March-2023	7	EKIGH-22/L1/0007737	29-March-2023	8	EKIGH-22/L1/0007741	29-March-2023	9	EKIGH-22/L1/0007739	29-March-2023	10	EKIGH-22/L1/0007722	29-March-2023	11	EKIGH-22/L1/0007740	29-March-2023
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3	EKIGH-22/L1/0007745	29-March-2023																																			
4	EKIGH-22/L1/0007701	29-March-2023																																			
5	EKIGH-22/L1/0007738	29-March-2023																																			
6	EKIGH-22/L1/0007725	29-March-2023																																			
7	EKIGH-22/L1/0007737	29-March-2023																																			
8	EKIGH-22/L1/0007741	29-March-2023																																			
9	EKIGH-22/L1/0007739	29-March-2023																																			
10	EKIGH-22/L1/0007722	29-March-2023																																			
11	EKIGH-22/L1/0007740	29-March-2023																																			

	12	EKIGH-22/L1/0007748	29-March-2023	
	13	EKIGH-22/L1/0007750	29-March-2023	
	14	EKIGH-22/L1/0007758	29-March-2023	
	15	EKIGH-22/L1/0007749	29-March-2023	
	16	EKIGH-22/L2/0013501	16-March-2023	
13	ICS distribution database maintained by the project participant for all the ICSs distributed to the beneficiaries.			
14	Kml. Files for geographical boundary of the host country Ghana			
15	- fNRB calculation spread sheet w.r.t to the Joint PD-MR of the VCS project, titled, "Improved Cookstove Distribution in Ghana by EKI" Version no. 02 dated 13-June-2023. - fNRB calculation spread sheet w.r.t to the Joint PD-MR of the VCS project, titled, "Improved Cookstove Distribution in Ghana by EKI" Version no. 03 dated 12-September-2023.			
16	Local stakeholder consultation meeting documents; Pubic notice, attendance sheet, minutes of meeting, grievance register and internal audit record.			
17	Employment records of the ICS manufacturer and distributors.			
18	Country wise fuel wood consumption database maintained by United Nations Statistics Division. https://data.un.org/Data.aspx?d=EDATA&f=cmID%3AFW%3BtrID%3A1231			
19	- Ghana's national report (2017), https://www.state.gov/reports/2017-country-reports-on-human-rights-practices/ghana/ - Ghana's national report (2019), https://collections.unu.edu/eserv/UNU:7280/UNU-INRA_PB_STEWART-UNUIGBE_FEB2019.pdf			
20	Records of traning provided to the monitoring/survey personal by the ICS distributors.			
21	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4: Agriculture, Forestry and Other Land Use. https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch04_Forest%20Land.pdf			
22	2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion https://www.ipccnggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf			

23	2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 1 Introduction https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
24	Clean and efficient cooking action plan of Government of Ghana. https://cleancooking.org/wp-content/uploads/2021/07/334-1.pdf
25	Global Forest Resource Assessment report, FAO Yearbook of Forest Products 2020, http://www.fao.org/3/cb0004en/cb0004en.pdf
26	A report prepared by FAO on Charcoal Transition in 2017. https://www.fao.org/3/i6935e/i6935e.pdf
27	Country profile of Ghana, FAO - Geography, Climate and Population, Ghana https://www.fao.org/3/i9749en/I9749EN.pdf
28	Forestry Commission Annual Report – 2020 https://fcghana.org/?p=3362
29	Report dated 01-November-2019, published by National Library of Medicine, USA on Understanding climate variability and change: analysis of temperature and rainfall across agroecological zones in Ghana, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6838908/#bib27 (page 2/table 1)
30	Annual report for the year 2016 issued by Forest Services Division – Forestry Commission of Ghana, in December, 2017. https://www.oldwebsite.fcghana.org/userfiles/files/Plantation%20Annual%20Report/FC%20AnnualReport%202016.pdf
31	FAO statistics year book for the year 2020. https://www.fao.org/3/cc3475m/cc3475m.pdf
32	Annex A, Glossary of IPCC Good Practice Guidance for LULUCF. https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Glossary_Acronyms_BasicInfo/Glossary.pdf
33	Baseline survey forms/results conducted in the project area by the project participant.
34	Report published on 19-January-2015 by Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change.

35	Report named, Ghana Country Forest Note was published by the World Bank Group, in February 2023 https://documents1.worldbank.org/curated/en/099121002072329755/pdf/P1759890df863f00209c030ceea9c881108.pdf
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2.3 Interviews

Audit team had conducted the interview process during its onsite verification during the project site visit conducted on 07-June-2023, 08-June-2023, 09-June-2023 and 10-June-2023. The key personnel interviewed, and the main topics interviewed are summarized in the table below:

For Gyapa ICS

S/N	NAME	STOVE ID	TOWN
1	EMMANUEL OFORI	EKIGH-22/L1/0021096	TEACHER MANTE
2	AGYEIWAA MARGARET	EKIGH-22/L1/0021831	TEACHER MANTE
3	RUTH APAAH	EKIGH-22/L1/0020873	TEACHER MANTE
4	MAWUSI SHILENYA	EKIGH-22/L1/0017897	TEACHER MANTE
5	DUGBAZA FLORENCE	EKIGH-22/L1/0018614	TEACHER MANTE
6	SEMEKOR ERNESTINA	EKIGH-22/L1/0017846	TEACHER MANTE
7	ABIGAIL	EKIGH-22/L1/0017867	TEACHER MANTE
8	DARKO EUNICE	EKIGH-22/L1/0018084	TEACHER MANTE
9	BANI SETH	EKIGH-22/L1/0018660	TEACHER MANTE
10	AMPONSAH FELICIA	EKIGH-22/L1/0018404	TEACHER MANTE
11	REGINA ANSAAH	EKIGH-22/L1/0018217	TEACHER MANTE
12	AMPONSAH LINDA	EKIGH-22/L1/0021347	TEACHER MANTE

13	MATILDA POKUAA	EKIGH-22/L1/0018264	TEACHER MANTE
14	NANCY AFATSAW	EKIGH-22/L1/0021156	TEACHER MANTE
15	AYARIGA ESTHER	EKIGH-22/L1/0048170	TEACHER MANTE
16	PAUL AGYEI	EKIGH-22/L1/0021225	TEACHER MANTE
17	AMOANIWAA EVELYN	EKIGH-22/L1/0017873	TEACHER MANTE
18	MANUBEA BEATRICE	EKIGH-22/L1/0018101	TEACHER MANTE
19	TONDE COMFORT	EKIGH-22/L1/0022081	TEACHER MANTE
20	ARTHUR PATRICK	EKIGH-22/L1/0001379	ASUBOI
21	TEI AFUA	EKIGH-22/L1/0021278	ASUBOI
22	DONKOR DORIS	EKIGH-22/L1/0021073	ASUBOI
23	DOKU COMFORT	EKIGH-22/L1/0021065	ASUBOI
24	OBENG JACQUELINE	EKIGH-22/L1/0001331	ASUBOI
25	BEATRICE NDAKPAAM	EKIGH-22/L1/0022228	ASUBOI
26	MARGARET ADDAE	EKIGH-22/L1/0020806	ASUBOI
27	OKLU ESTHER	EKIGH-22/L1/0022128	ASUBOI
28	OPOKU GRACE	EKIGH-22/L1/0022107	ASUBOI
29	AMPONSAH KWAME	EKIGH-22/L1/0020942	ASUBOI
30	NUERTEY ESTHER	EKIGH-22/L1/0001457	ASUBOI

For Obaapa ICS

S/N	NAME	STOVE ID	TOWN
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1	AGNES OPPONG	EKIGH-22/L1/0006667	NTENSERE
2	JIBRIL SULEMANA	EKIGH-22/L1/0006304	NTENSERE
3	OSMAN AMAMA	EKIGH-22/L1/0006211	NTENSERE
4	COMFORT AYAMMA	EKIGH-22/L1/0005431	NTENSERE
5	SANDRA AWINSUNE	EKIGH-22/L1/0005021	NTENSERE
6	AKUA ADU	EKIGH-22/L1/0005045	NTENSERE
7	ACHIAA ABENA	EKIGH-22/L1/0005410	NTENSERE
8	REBECCA NYARKO	EKIGH-22/L1/0006064	NTENSERE
9	GRACE KONADU	EKIGH-22/L1/0005444	NTENSERE
10	JANET NSIAH	EKIGH-22/L1/0006249	NTENSERE
11	MARTHA OSEI FRIMPONG	EKIGH-22/L1/0006334	NTENSERE
12	SIBALEY AFIA	EKIGH-22/L1/0006380	NTENSERE
13	LAMISI ASAANA	EKIGH-22/L1/0005418	NTENSERE
14	MARIAM SEIDU	EKIGH-22/L1/0005044	NTENSERE
15	AMA SERWAA	EKIGH-22/L1/0000058	NTENSERE
16	AGYEIWAA FAUSTINA	EKIGH-22/L1/0006366	NTENSERE
17	KASSIM HARIJETA	EKIGH-22/L1/0006208	NTENSERE
18	GYAWU FAUSTINA	EKIGH-22/L1/0006683	NTENSERE
19	ERNESTINA AMOAH	EKIGH-22/L1/0005046	NTENSERE
20	AARON SARFO	EKIGH-22/L1/0006665	NTENSERE
21	ESTHER AMOAH	EKIGH-22/L1/0006643	NTENSERE

22	AWINI LOIS	EKIGH-22/L1/0006336	NTENSERE
23	GIFTY NUAMAH	EKIGH-22/L1/0005051	NTENSERE
24	BOATNG DEBORAH	EKIGH-22/L1/0006639	NTENSERE

Other persons interviewed:

Sr. No.	Date	Name and Role	Organization	Topic
1	14-June-2023	Sukanta Das, AVP, Operation	EKI Energy Services Ltd.	Project description, eligibility, baseline, additionality, Implementation of the project, O&M activities, sampling, on-going LSC. etc
5	12-June-2023	Vinit Garg, DGM Operation	EKI Energy Services Ltd.	
2	14-June2023	Saroj Sahoo, GM, Operation	EKI Energy Services Ltd.	
6	12-June2023	Monil Shrivastava, Executive, Operation	EKI Energy Services Ltd.	
2	07,08,09-June-2023	Yogesh Mishra	EKI Energy Services Ltd.	
3	07,08,09-June-2023	Felix	Local distributor	
4	07,08,09-June-2023	Emanuel	Local distributor	

2.4 Site Visits

Audit team had conducted a site inspection by physical visit to the project site and discussed different topics as mentioned under section 2.3 of this report. The team has conducted the site visit on 07-June-2023, 08-June-2023, 09-June-2023 and 10-June-2023. During the site visit, the verification team had visited the sample households selected and physically checked operation and functionality of the ICSs installed. The RINA team enquired about their overall experience about using the ICSs, how it has become convenient compared to the conventional cook stoves, impact on smoke reduction and time consumed. They were found to be happy and no complaint or operational issue has been raised by any of the households. Apart from the households, the local distributors and monitoring persons were also interviewed during site.

VVB Sampling:

The assessment team applied acceptance sampling in accordance with the paragraph 27-33 of the “Standard: Sampling and surveys for CDM project activities and programme of activities, version 09”/06/. The assessment team carried out the random sampling from the PP’s sample records and checked (using its professional judgment) the acceptability of the data for each record in the PP’s sample records. The assessment team has determined acceptance sample size based on the “Table. Sample size and acceptance number based on AQL, UQL, and producer and consumer risks” of standard “Sampling and surveys for CDM project activities and programme of activities” version 09.0.

During the onsite audit verification, a random sampling approach has been used by the verification team to verify the reported values for the monitored parameters which are determined through sample survey by PP. For the determination of acceptance sample size, the team has selected the following using its professional judgment:

- Acceptable quality level (AQL) – 0.5%
- Unacceptable Quality Level (UQL) – 20%
- Producer risk -10%
- Consumer risk -10%

Verification team has determined acceptance sample size for all the sample survey parameters based on the “Table. Sample size and acceptance number based on AQL, UQL, and producer and consumer risks” of standard “Sampling and surveys for CDM project activity and programme of activities” version 09.0. From the above factors, the verification team determined the minimum sample size (n) as 11 and acceptance number (c) as 0. The sample size used to verify the reported values for the monitored parameters which are determined through sample survey by PP. The assessment team interviewed the households during on site audit conducted at both the states and filled the survey form to check the acceptability of the data for each record in the PP’s sample records. When the minimum sample size derived for the VVB survey was 11, whereas the audit team has surveyed 30 households from Gyapa model of cookstove and 24 households from Obapa model.

Using acceptance sampling approach, assessment team checked the PP’s sample results (reported in the Monitoring surveys) along with the following evidences:

1. Onsite audit inspection/interviews
2. ICS Database
3. Database of all project participating households

Following the requirement of the paragraph 28 of the Standard “Sampling and surveys for CDM project activities and programmes of activities” version 09.0, the acceptability of data in the random sample chosen from the PP’s sample records was determined. Based on the number of records where there was agreement, it was determined whether the PP’s sample records meet the requirements. The acceptability of the data was based on the assessment team professional judgement in line with the para 28 of the Sampling Standard.

All the data records for the parameters were in agreement with PP’s sample records and no discrepant records was found from the PP’s records. Since no discrepant records were found, therefore, the PP’s set of records have been accepted based on the acceptance sampling. This is in line with the paragraph 32 of Standard “Sampling and surveys for CDM project activities and programmes of activities” version 09.0/06/ and found acceptable.

2.5 Resolution of Findings

The objective of this phase of the joint validation-verification is to resolve any outstanding issues which need to be clarified for RINA’ s positive conclusion on the project description. To guarantee transparency any findings raised regarding to the validation and verification of the project are incorporated in the Validation and Verification Protocol Tables in Appendix II to this report.

CAR (Corrective Action Request) is raised if one of the following occurs:

- Non-compliance with the monitoring plan, the methodology or the standardized baseline are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- Modifications to the implementation, operation and monitoring of the project activity has not been sufficiently documented by the project participants;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- Issues identified in a FAR during validation to be verified during subsequent verifications.

Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met. All CARs and CLs raised by RINA during verification shall be resolved prior to submitting a request for registration and issuance.

FAR (Forward Action Request) is raised during verification if the monitoring and reporting require attention and/or adjustment for the next verification period.

During the current verification, 00 Clarification request (CLs), 01 Forward Action Request (FAR) and 11 CAR (Corrective Action Request) were raised.

2.5.1 Forward Action Requests

01 forward action request (FAR) was raised for present validation and verification.

3 VALIDATION FINDINGS

3.1 Project Details

The project involves distribution of fuel-efficient improved cook stoves (ICS) to replace the baseline traditional cook stoves in households. The main purpose of the project is the distribution of fuel-efficient improved cook stoves (ICS) in the Republic of Ghana (Ghana). The Improved cookstove stove distributed through this project has replaced the low-efficient baseline cookstove.

In rural Ghana, a large portion of households rely on mud or three-stone stoves for daily cooking. In addition to having a relatively low thermal efficiency, these mud or three-stone stoves also contribute to health risks from indoor air (smoke) pollution.

Through this project, the distribution, and installation of high thermal efficient improved cook stoves (ICS) has been undertaken for households. The ICS burns charcoal more efficiently thereby improving thermal energy transfer to pots, hence saving charcoal and greenhouse gases. Not only will this halt the rapidly progressing deforestation but also reduce health hazards from indoor air (smoke) pollution and time & money of participating household now have to spend less time in the procurement of charcoal.

As the target populations are unable to afford these stoves (ICS), project promoters have distributed ICS free of cost. The end-user has been informed in advance that the use of ICS generates carbon finance which in turn is used to cover the price of ICS and for recovering project implementation costs.

The project locations for initial Project Activity Instances are in Republic of Ghana (Ghana) and it may expand further in other parts of Africa. The project participant has distributed 20,102 ICS till the end of this monitoring period i.e., 28-February-2023.

The project participant has considered one cookstove as one project activity instance for this group project activity. The first project activity instance was implemented on 16-January-2023 under this grouped project activity.

The project activity cook stoves are with different manufacturers and specifications of cook stoves will be provided during validation/verification or during inclusion of project activity instances.

The project ownership is with EKI Energy Services Limited which has been checked by the audit team based on the declarations/11/ and the user agreements/12/ submitted by them. The end user agreements are executed with the end users with the following conditions apart from others;

- The user does not currently own an improved cookstove and will use the improved cookstove(s) voluntarily to replace a traditional stove.
- The user by virtue of the agreement agrees that carbon credits ownership is with the project participant/ Enking International.
- The users are bound to use the ICS and refrain from use of existing less efficient traditional cook stove used prior to the receipt of ICS.
- In case the user is shifting to other location the same will be intimated to representatives of the project participant/Enking International.
- The user cannot give away/rent/sub-let/sell the ICS to other users.
- The contract will also be terminated in case the user decides or shift to other fuel options like coal, LPG or any high carbon intensity fuel etc.

The end users of the ICSs after executing the agreements are thus bound to use only one ICS by a single household and not to use less efficient traditional cookstoves. This is further confirmed by the project participant through regular visit to selected households by the representatives of the project participant. The site representatives of the project participants were interviewed by the audit team during onsite verification. The end user agreements/12/ submitted by the project participant were verified by the RINA team and found appropriate.

The commissioning date of the first ICS under first project instance is 16-January-2023. The project participant has submitted the first end user agreement/12/ to support the start date of the project activity. The first ICS was distributed on 16-January-2023 which is verified from the end user agreement. Hence, 16-January-2023 has been considered as the project start date appropriately.

All the project activity instances in the proposed grouped project activity are located within geographical boundaries of republic of Ghana (Ghana). The KML files/14/ are submitted

for the geographical location is delineated in the form of extreme geographic coordinates of Ghana as follows:

Project Site	Latitude	Longitude
Republic of Ghana (Ghana)	8° 2' 5.5608" N	1° 18' 47.8512" W

There are no laws and regulations governing the use of improved cookstoves in Ghana for households. Rather, the government of Ghana promotes the efficient and clean cooking initiative in the country that there is a robust action plan clean cooking technology/24/ has been prepared. Therefore, the project can be concluded as a voluntary effort by the project proponent.

The project has not been registered, nor is it seeking registration or rejected under any other GHG program as checked from the declarations/11/ of project owner.

The project applies VCS Methodology: VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, Version 1.1 dated 22 July 2021, Sectoral scope 3/05/.

The eligibility criteria for inclusion of new project activity instances under this grouped project has been assessed by the audit team as given below.

Sr. No	Criterion	Justification by PP	Audit team conclusion
1	Meet the applicability conditions set out in the methodology applied to the project	New project activity instances (Energy Efficient Cook Stoves) will meet the applicability conditions set out in Section 3.2 where the target of the end-user is household and the ICS deployed is at least 25% of thermal efficiency.	The new project activity instances comply with the methodology VMR0006/05/ as checked by the audit team. The ICS deployed in the households have an efficiency greater than 25% as checked from the ICS technical specifications/07/ and thermal efficiency test reports. The efficiency test report for both the model of efficient cook stoves was conducted by Technology Consultancy Centre, Knust, Kumai/08/ and the same is checked by the assessment team to confirm that the ICS deployed have thermal

Sr. No	Criterion	Justification by PP	Audit team conclusion
			efficiency greater than 25%.
2	Use the technologies or measures specified in the project description.	The technology used for project activity is energy efficient cook stoves. Only energy efficient cook stoves to be adopted in the project by replacing traditional cook stoves in household.	Technology employed is the ICS as verified from the technical specifications/07/.
3	Apply the technologies or measures in the same manner as specified in the project description.	Only energy efficient cook stoves to be adopted in the project by replacing traditional cook stoves in household.	Technology employed is the ICS as verified from the technical specifications/07/
4	Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.	The new project activity instances will be installed within Ghana subject to the same baseline scenario determined in Section 3.4.	Project instances are installed in the Republic of Ghana (Ghana) and are within the geographical region defined by the project. The ICS are subject to the baseline scenario defined in sec 3.4. The baseline scenario is verified through interview with households as mentioned in section 2.2.
5	Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area.	All new project activity instances will use the activity method for demonstration of additionality. Step 1: Regulatory Surplus There is no mandated government programme or policy in host country of this project ensuring the distribution of new energy efficient cook	The project activity instances use the activity method for demonstration of additionality and complies with positive list as it satisfies criterion 1 where it meets all the applicability conditions of the methodology/05/. The distribution of cook stoves is free of cost to households has been checked through interview

Sr. No	Criterion	Justification by PP	Audit team conclusion
		stoves for each project activity instances. Step 2: Positive List The inclusion of new project activity instances will comply with positive list as it satisfies criterion 1 where it meets all the applicability conditions of the methodology.	with households as mentioned in section 2.2.
6	Where a capacity limit applies to a project activity included in the project, no project activity instance shall exceed such limit. Further, no single cluster of project activity instances shall exceed the capacity limit, determined as follows: Each project activity instance that exceeds one percent of the capacity limit shall be identified. Such instances shall be divided into clusters, whereby each cluster is comprised of any system of instances such that each instance is within one kilometer of at least one other instance in the cluster. Instances that are not within one kilometer of any other	No project activity instance shall exceed the applicable limit, which is 180 GWhth/y. Expected annual energy saving for each instance comes out to be 0.0191 GWhth/y which is less than 0.02% of the threshold limit. As the annual energy saving is below 1% of the limit, therefore no project activity instance is identified and divided into clusters.	The expected annual energy saving of ICS is below the threshold of 180 GWhth/y. The energy saving from each project activity instance is checked from ER calculation sheet/02/. Each project activity instance is within capacity limit of thermal energy saving of 180 GWhth/y and does not exceed the capacity limit. The cluster guideline is not applicable as the instances are considered separate and therefore the inclusion will also follow the same guideline.

Sr. No	Criterion	Justification by PP	Audit team conclusion
	instance shall not be assigned to clusters. None of the clusters shall exceed the capacity limit and no further project activity instances shall be added to the project that would cause any of the clusters to exceed the capacity limit.		
Along with above eligibility criteria, the new project activity instance will follow below criteria during inclusion in the grouped project activity.			
1	Occur within one of the designated geographic areas specified in the project description	New project activity instances (Energy Efficient Cook Stoves) will occur in the designated geographic areas specified in the project description that is Ghana.	Project instances are installed in the Republic of Ghana (Ghana) is within the geographical region defined by the project. The location is verified through interview with households as mentioned in section 2.2
2	Comply with at least one complete set of eligibility criteria for the inclusion of new project activity instances. Partial compliance with multiple sets of eligibility criteria is insufficient.	New project activity instances will comply with complete set of eligibility criteria as mentioned above for the inclusion of new project activity instances.	New project activity instances comply with complete set of eligibility criteria as mentioned above for the inclusion of new project activity instances.
3	Be included in the monitoring report with sufficient technical, financial, geographic and other relevant information to demonstrate compliance with the applicable set of	New project activity instances information be included in the monitoring report with sufficient technical, financial, geographic and other relevant information to demonstrate compliance with the applicable set of	New project activity instances comply with complete set of eligibility criteria as mentioned above for the inclusion of new project activity instances

Sr. No	Criterion	Justification by PP	Audit team conclusion
	eligibility criteria and enable sampling by the validation/verification body.	eligibility criteria and enable sampling by the validation/verification body.	
4	Be validated at the time of verification against the applicable set of eligibility criteria	New project activity instances should be included by validating eligibility criteria as mentioned in this document	The eligibility criteria has been assessed by the team for the project instances. All the project activity instances meet the eligibility criteria.
5	Have evidence of project ownership, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance (i.e., the date upon which the project activity instance began reducing or removing GHG emissions)	New project activity instances ownership needs to be evidenced from start date of respective project activity instance.	The declaration/undertaking/11/ from the project owner and the user agreements/12/ have been checked by the audit team to confirm the project ownership. The start date of the first project instance has also been checked by the audit team.
6	Have a start date that is the same as or later than the grouped project start date	New project activity instances start date should be after the start date of grouped project activity.	The start date of the project instance is on or after the start date of grouped project. the project activity instances started commissioning on 16-January-2023, thus meets the start date criteria.

Sr. No	Criterion	Justification by PP	Audit team conclusion
7	Be eligible for crediting from the start date of the instance through to the end of the project crediting period (only). Note that where a new project activity instance starts in a previous verification period, no credit may be sought for GHG emission reductions or removals generated during a previous verification period (as set out in Section 3.4.4 of VCS standard version 4.4) and new instances are eligible for crediting from the start of the next verification period.	New project activity Instances is eligible to claim credits from crediting period start date to the end of the project crediting period.	New project activity instances are eligible to claim credits from crediting period start date to the end of the project crediting period. The start date of project activity is considered as 16-January-2023, thus the project activity instances added in project activity have start date on or after the 16-January-2023. All future activity instances must have start date on or after 16-January-2023 to meet the eligibility criteria. Single verification will be carried for all eligible project activity instances for specific monitoring period.
8	Only eligible for crediting from the start of the verification period in which they were added to the grouped project.	New project activity instances will adhere to this criterion by being eligible for crediting only from the beginning of the verification period in which they are included in the grouped project	The start date of the crediting period of the new activity instance shall be considered from the date in addition of the project activity instance as per requirement.
9	Not be or have been enrolled in another VCS project.	New project activity instances will not be previously registered or currently enrolled in any other VCS project.	Declarations/15/ from the project participant, manufacturer and distributor were received that the cookstoves units included in the project shall not be included/considered for registration under any other VCS project or

Sr. No	Criterion	Justification by PP	Audit team conclusion
			projects under any other standard. Further the project participant has applied for registration of 2 other cookstove projects under VERRA, one (ID 3983¹) has been listed under pipeline listing and the other (ID 3982) is under the process of pipeline listing. It has been confirmed from the project participant that no improved cookstove unit is implemented under the above mentioned two proposed VCS projects (ID 3983 and 3982). A declaration/11/ to confirm the same has been received from the project participant which has been found to be appropriate by the RINA team.
10	Adhere to the clustering and capacity limit requirements for multiple project activity instances set out in 3.6.8 – 3.6.9.	In line with section 3.6.8 of the VCS standard v4.4 all singular project activity instances within ten kilometres of another instance of this project activity with EKI Energy Services Limited will be consider within this current project activity only (Project ID 3801).	Since the project participant has two other proposed VCS projects in Ghana (ID 3983 and 3982), a FAR has been raised by the RINA team to confirm at the time of inclusion on new project activity instance that all singular project activity instances fall within ten kilometres of another instance of this project

¹ <https://registry.verra.org/app/projectDetail/VCS/3983>

Sr. No	Criterion	Justification by PP	Audit team conclusion
		Applicability for Section 3.6.9, already provided in the above table.	activity and there is no overlap of activity instances of the other two project proposed VCS cookstoves projects of the project participant in Ghana.

The project adopts a net gross adjustment factor of 95% to account for leakage. No commercially sensitive information has been excluded from the public version of the project description. The project contributes to social, environmental, economic and technological benefits which contribute to sustainable development of the local environment and the country. The key benefits are provided below which have been assessed by the audit team.

- Reduces drudgery to women due to reduced charcoal use
- Improves overall health of women and children by reducing smoke
- Better cooking time
- Reducing rate of degradation of forests and deforestation in the project area.
- Reduction in use of non-renewable biomass thus leading to reduction in GHG emissions.
- Employment opportunities for local communities through the CDM activity.
- Introduction of new technology to the rural communities

PP and other entity Details

Assessment team checked during the site visit as well from the documentation verification and confirms that the details of the project proponent and confirms that EKI Energy Services Limited in PP for the project activity.

Project Start Date

The project participant has submitted the first end user agreement to support the start date of the project activity. The first ICS was distributed on 16-January-2023 which is verified from the end user agreement/12/. Hence,16-January-2023 has been considered as the project start date appropriately. The same is acceptable to the assessment team as the same is as per the requirement of VCS standard version 4.4

Project Crediting period

Assessment team confirms that the crediting period dates for the project is as below:

16-January-2023 to 15-January-2030, seven years renewable crediting period. Being renewable crediting period, total crediting period of grouped project activity is 21 years. The same is acceptable to the assessment team as the same is as per the requirement of VCS standard version 4.4/04/.

Project Scale and estimation of GHG

Assessment team confirms that the project activity is grouped project and project activity instance thermal energy saving is below 180 GWhth/year. The average Annual estimation of the project activity considering all the current/initial instances is 70,650 tCO_{2e}. The ER estimation is with consideration all project activity instances and total 20,102 cook stoves and with 365 days of operation per year with 0% annual loss or non- operation of ICS assumption. Based on survey result, annual loss or non-operation of ICS will be considered for actual ER calculations. The average lifetime of cook stove is 7 years, but it may expect that cook stove will be in operation beyond 7 years also. Thus, above ER estimation is determined considering the 7 years of operation. As the estimated annual average GHG emission reductions or removal per year is more than 300,000 tCO_{2e}/Year, thus each project activity instance falls in the category of “Project”.

Project Scale	
Project	√
Large project	

Conditions prior to project initiation

Assessment team during the desk review and remote audit confirms that the project is an installation of energy efficient cook stove project. The baseline as described in section 3.4.4 of this report will continue to be the baseline in the absence of project activity. The baseline scenario is the continued use of non-renewable wood fuel (firewood/charcoal) or fossil fuel (coal/kerosene) by the target population to meet similar thermal energy needs as provided by project cook stoves in absence of project activity.

For current/initial project activity instances to be included in this grouped project activity, the baseline scenario is the continued use of non-renewable wood fuel (firewood) by the target population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity. This has been checked during onsite audit and found to be appropriate.

Project contribution to sustainability:

The sustainability indicators as mentioned below is checked by the assessment team and found correct. PP considered 9 SDG i.e., SDG-1.1, 3.9, 7.1, 8.3,13.0 and 15.2.

SDG1.1: The project has increased the 80 participants' total daily income to GHS 2000 to 5500 per month, bringing them above the international poverty line. Therefore, the project has increased the total daily income of participants', bringing them above the international poverty line. The audit team has checked the employment records/17/ submitted by the project participant to confirm the same.

SDG 3.9 refer to good health and wellbeing and indicator is selected as Reduction in PM2.5 emissions attributed to household and ambient air pollution. The ICS technology helps in Lowered indoor air pollution in 20,102 households by facilitating use of improved cookstoves. Therefore, the project will contribute to reduction of indoor air pollution and hence complying with the SDG 3 goals.

SDG 7.1: The project contributes to the SDG by increasing proportion of population with primary reliance on clean fuels and technology. The ICS technology helps in replacing the use of baseline inefficient cookstoves has resulted in increase in population with reliance on clean technology. Therefore, the project will contribute to increased reliance on clean technology through distribution of 20,102 numbers of improved cookstoves.

SDG 8.3: Contribute to employment, employment provided to around 58 male and 35 female personals for stove manufacturing unit. The audit team has checked the employment records/17/ submitted by the project participant to confirm the same.

SDG 13.0 refer to climate action and the indicator is selected as 13.0 i.e. tonnes of greenhouse gas emissions avoided or removed. The ICS technology helps to avoid the release of 4,209 tonnes of carbon-dioxide into the atmosphere which would have happened in case of continuous use of baseline stoves. Therefore, the project activity complies with the requirement of SDG 13.0.

SDG 15.2 refer to proportion of land that is degraded over total land area. The project contributes to the reduction of deforestation of 2,555 tonnes of charcoal biomass from forests surrounding the communities and reducing pressure on forest reserves. Therefore, the project activity complies with the requirement of SDG 15.2.

3.2 Participation under Other GHG Programs

The project has not been registered, nor is it seeking registration or rejected under any other GHG program as checked from the declarations of project owner/11/.

3.3 Safeguards

3.3.1 No Net Harm

No potential negative environmental or socio-economic impacts have been identified for the project.

3.3.2 Local Stakeholder Consultation

The stakeholder consultation details are as follows:

Date of Invitation	Date of meeting	Location
27-August-2022	15-October-2022	Miklin Hotel, Accra, Ghana

All the relevant stakeholders have been invited which consist of villagers (local community), NGOs and other officials. The stakeholders are invited via public notice and the same was communicated in advance prior to the date of meeting. The PP has given the brief introduction of the project activity and explained the social, environmental and economic benefits of the project. The participants enquired regarding the benefits related to employment generation and uses of the ICS. The audit team has checked the stakeholder related documentation- invitations, summary provided to participants, attendance sheet and minutes of meeting/16/ and found to be appropriate.

For the verification stage, the VVB has also conducted sampling of few households through onsite assessment. PP has maintained a register as a part of on-going communication with local stakeholders, end users are informed about grievance register/16/. The distributors have the responsibility to take grievances regarding the project activity and same will be conveyed to PP during operation of project activity. Thus, ongoing communication of stakeholders is followed through grievance mechanism. The audit team has checked the grievance register/16/ and no grievances have been reported during the first monitoring period for the all the project instances. The VVB confirms that the local stakeholder consultations have been done in accordance with VCS v4.4 requirements.

The beneficiary households are visited on regular and selected basis by the local representatives of the distributor appointed by the project participant; on receipt of any grievances or complain or operational issues, they record the same and try to resolve them by themselves first. In case any support is required, they escalate the issue to the distributor who may further escalate the same to the project participant in case the grievance is not resolved by the distributor. The internal audit records/16/ for the same has been submitted by the project participant which has been found to be appropriate by the RINA team. The local representatives were interviewed by the audit team during on site verification and found satisfactory. The beneficiaries were also interviewed by the audit team on sampling basis during site visit to understand about their knowledge on the grievance resolution procedure explained to them; they were found to be well informed

about the same. During the current monitoring period, there is no such grievance was found to be reported.

3.3.3 Environmental Impact

No potential negative environmental or socio-economic impacts have been identified for the project

3.3.4 Public Comments

No comments were received during the global consultation period. The VERRA project webpage/03/ has been verified by the RINA team to confirm the same.

3.3.5 AFOLU-Specific Safeguards

As this a non-AFOLU projects, this section is not required.

3.4 Application of Methodology

3.4.1 Title and Reference

The project applies VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, Version 1.1 dated 22 July 2021, Sectoral scope 3/05/.

3.4.2 Applicability

The applicability of the methodology is justified below

Applicability criterion	Justification by PP	Audit team conclusion
Project activities shall be implemented in domestic premises or community-based kitchen	The proposed project involves the deployment of ICS only in households. For all project activity instances, project activity is implemented in households.	The proposed project instances are implemented in households which is domestic premises, which has been checked by the audit team from the user agreements/12/.
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	Energy Efficient stoves planned to be installed under this project are single-pot portable charcoal fired cook stoves that have an efficiency of more than 25%.	Energy Efficient stoves is installed under this project are single pot portable cook stoves that have an efficiency more than 25%. For all project activity instance, ICS with efficiency of 37% and

and can be single-pot or multi-pot;	For all project activity instances, ICS with an efficiency of 37% and 36% respectively is planned to be installed. For future project activity instances, the manufacturer may change or add, and the cook stove efficiency that should be more than 25% as mentioned in the methodology based on manufacturer specification.	36% is installed as per the Thermal efficiency test certificated issued by Technology Consultancy Centre, Knust, Kumai dated 31-August-2022 for the model Obaapa Clean Stove and issued by Technology Consultancy Centre, Knust, Kumai dated 25-September-2020 for the model Gyapa/08/.
Both 'Projects' and 'Large Projects' can use the methodology	Estimated average annual emission reductions for the grouped project activity are less than 300,000 tonnes of CO ₂ e per year. Therefore, the proposed project qualifies for the "Projects" criteria.	The same is confirmed by the audit team.
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;	Non-renewable biomass has been used since 31 December 1989 as demonstrated by UN Data ² and as demonstrated below by referring to published literature, official reports, or statistics;	Usage of non-renewable biomass in Ghana has been used since 31 December 1989 as demonstrated by UN Data/18/ and Ghana national report 2017 and 2019/19/.
For the specific case of biomass residues processed as a fuel (e.g. briquettes, wood chips), it shall be demonstrated that: It is produced using exclusively renewable biomass (more than one type of biomass may be used) The consumption of the fuel should be monitored during the crediting period Energy use for renewable biomass processing (e.g. shredding and compacting in the case of briquetting)	Not applicable, as the project activity does not use processed biomass as a fuel. The ICS is introduced as an energy efficiency measure to replace baseline stoves and reduce the use of non-renewable biomass for combustion.	Not applicable to the project.

² <http://data.un.org/Data.aspx?d=EDATA&f=cmlID%3aFW>

The VCS PD shall explain the proposed method for the distribution of project devices including the method to avoid double counting of emission reductions such as unique identifications of product and end-user locations (e.g. programme logo) The above criteria are as per the below VCS meth requirement and para 7 of the latest version of meth AMS II.G version 12 is followed. (Additionally, applicability criteria numbers 8 and 9 set out in Section 2.2 of AMS II.G, version 11.1 shall apply)	Each ICS in this project will be identified by a unique combination of customer name and geographical location, as well as a serial number. The serial number will be a unique number which will allow for a clear distinction between the stoves. No individual serial number can be repeated within the project, thus ensuring that each stove is counted only once in the proposed project. In addition, the project has been cross-checked against other CDM project activity operating in the country using the UNFCCC, the Gold Standard, and other relevant voluntary carbon schemes to ensure that the ICS is not included in any other CDM project activity or voluntary project activity.	Each ICS has a unique ID which has been checked from the stove installation database/13/ and also end user agreements/12/. The Project Owner have provided the undertakings/11/ that no double counting of emission reductions occurred due to unique identifications of product and end-user location. Please refer the section 2.3 of report for serial numbers of ICS reviewed during audit process.
The VCS PD shall also explain how the proposed procedures prevent double counting of emission reductions, for example, to avoid the project stove manufacturer, wholesale providers, or others claiming credit for emission reductions from the project devices. The above criteria are as per the below VCS meth requirement and para 8 of the latest version of meth AMS II.G version 12 is followed. (Additionally, applicability criteria numbers 8 and 9 set out in Section 2.2 of AMS II.G, version 11.1 shall apply)	Manufacturers/ cook stove distributors undertaking is provided that EKI will be the owner of that carbon credits and Manufacturers/ cook stove distributors will not claim any credits for such cook stoves.	The Project Owner have provided the undertakings/11/ that no double counting of emission reductions occurred due to unique identifications of product and end-user location.

3.4.3 Project Boundary

The project boundary includes emission from use of non- renewable biomass from baseline and project cook stoves. The details of this boundary have been checked from the ICS project database/13/ and geographical locations of the project/14/. CO₂, CH₄ and N₂O are the major source of GHG and the same has been assessed by the audit team. This is in line with table 1 of methodology and found to be appropriate. The emission reductions are

calculated as per equation 1 of methodology/05/ which considers the CO₂ emission factor and non-CO_{2e} emission factor.

3.4.4 Baseline Scenario

As per the methodology/05/ applied the baseline scenario is the continued use of non-renewable wood fuel (firewood/charcoal) or fossil fuel (coal/kerosene) by the target population to meet similar thermal energy needs as provided by project cook stoves in absence of project activity.”

For the project activity, the baseline scenario is the continued use of non-renewable fuel (charcoal) by the target population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity. The baseline scenario identified has been assessed based on published literature and database/18//19/.

3.4.5 Additionality

The PP has demonstrated the additionality in line with methodology/05/ requirement as below. The PP uses activity method for the demonstration of additionality.

Activity Method

Step 1: Regulatory Surplus

There is no mandated government programme or policy in host country of this project ensuring the distribution of domestic fuel-efficient cookstoves. The project is not mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework. The assessment team has been checked through search of any laws which are mandated to install ICS in India and found that there are no any such mandated laws for implementation of project activity. Also PP, Manufacturer, Distributor and household owners are interviewed during audit and confirmed that this project activity is voluntary and not mandated by any laws.

Households may only participate voluntarily in this project. It is hereby confirmed that the proposed project is a voluntary coordinated action by EKI. This has been assessed by the project ownership and undertaking documents/11/12/.

Step 2: Positive List

As per Section 3.2 of joint VCS PD-MR/01/, the project meets the applicability conditions of the methodology and also meets below conditions which represent the step 2 positive list.

1. The project installs the ICS at zero cost to the household and PP has no other source of revenue other than the sale of GHG credits. This has been checked through interview

with household owners, PP, manufacturer and distributors. Thus, project activity is deemed to be additional.

2. The project is not implemented as part of government schemes or supported by multilateral funds. PP has invested for purchase, distribution and commissioning of ICS to household owners and household owners receive the ICS at free of cost.

Since the project fulfils the conditions above, it is deemed additional.

3.4.6 Quantification of GHG Emission Reductions and Removals

The improved cookstove is introduced as an energy efficiency measure in the project, therefore equations 1 and 2 of the methodology will be applied to calculate the net GHG emission reductions

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

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 tCO₂e
- $ER_{y,i,j}$ = Emission reductions by improved cookstove of type i and batch j during year y in tCO₂e

$$ER_{y,i,j} = B_{y,savings,i,j} \times NCV_{wood\ fuel} \times f_{NRB,y} \times (EF_{wf,CO_2} + EF_{wf,non\ CO_2}) \times N_{y,i,j} \times 0.95 \quad \text{Equation (2)}$$

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
- $f_{NRB,y}$ = Fraction of woody biomass that can be established as non-renewable biomass (fNRB)
- $NCV_{wood\ fuel}$ = Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonne)³

³2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 1 Introduction

$EF_{wf,CO2}$	=	CO2 emission factor for the use of wood fuel in the baseline scenario (IPCC default for wood fuel, 112 tCO ₂ /TJ) ⁴
$EF_{wf,non\ CO2}$	=	Non-CO2 emission factor for the use of wood fuel in the baseline scenario (IPCC default for wood fuel, 26.23 tCO ₂ /TJ) ⁵
$N_{y,i,j}$	=	Number of improved cookstoves of type i and batch j operating during year y
0.95	=	Discount factor to account for leakage

The quantification of woody biomass saved due to the implementation of improved cookstoves to be estimated using equation below:

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

where

η_{old}	=	Efficiency of baseline cookstove
$\eta_{new,y,i,j}$	=	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.
$B_{y=1,new,i,j,survey}$	=	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.

$$\eta_{new,y,i,j} = \eta_p \times (DF_n)^{y-1} \times 0.94 \quad \text{Equation (4)}$$

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.

⁴2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion

⁵2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion

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

For ex-ante calculation purpose, the assumption below is applied:

- 1) The project installed 20,102 ICSs.
- 2) The life span of each ICS is 7 years; thus, the operational lifetime of each project activity instance is taken as 7 years.
- 3) Annual stove loss rate is estimated at 0% which is used to determine number of improved cookstoves of type i and batch j operating during year y for ex-ante emission reduction calculation. This is assumed for estimation. During actual ER calculation, this value may change. This value are determined during actual verification based on survey results.
- 4) $B_{y=1, \text{ new, i, survey}}$ is considered as 8.55 kg/device/day or equal to 3.119 tonnes/device/year for Gyapa. And $B_{y=1, \text{ new, i, survey}}$ is considered as 8.36 kg/device/day or equal to 3.051 tonnes/device/year for Obaapa. This value has been determined during the first monitoring period, based on survey results/09/.

Determination of F_{nrB} value:

The fraction of non-renewable biomass, F_{nrB} in the host country has been calculated by the project participant applying TOOL 30: Methodological tool, Calculation of the fraction of non-renewable biomass, version 04.0/06/. A detailed calculation spread sheet for F_{nrB} calculation/15/ has been provided by the project participant which is verified by the RINA team and found to be appropriate.

The fraction of woody biomass that has been established as non-renewable is given by:

$$f_{\text{NRB}} = \frac{\text{NRB}}{\text{NRB} + \text{RB}}$$

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) |

Commercial use of woody biomass for non-energy purposes (such as building or furniture) that is derived from forests or other land areas in the relevant area (tonnes)

$$NRB = H - RB$$

Where:

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

The following equation accounts for all consumption within the relevant area to determine the overall consumption of woody biomass (H).

$$H = HW \times N + CE + NE$$

Where:

HW = Average consumption of wood fuel per household, including fuelwood and charcoal, in the applicable area in the relevant period (tonnes//household)

N = Number of households consuming wood fuel within the applicable area in the relevant period (number)

CE = Commercial woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of woody biomass in ovens, boilers etc.) that are extracted from forests or other land areas in the applicable area in the relevant period (tonnes)

NE = Commercial woody biomass consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or other land areas in the applicable area in the relevant period (tonnes)

The total consumption of woody biomass in the applicable area has been calculated from the direct available data for Total roundwood consumption and wood density in the following table.

Parameter	Value	Unit
Total roundwood consumption	52.17	In Million cums
Wood density	0.725	T/m3
H (Total consumption of woody biomass in the applicable area in the relevant period)	37.82	Million Tonnes

Total roundwood consumption has been sourced from FAO statistics year book for the year 2020/31/ which has been found to be correct. Likewise, the wood density has been used from a report prepared by FAO on charcoal transition in 2017/26/ which has been found to be correct.

Procedure to estimate the quantity of renewable biomass available (RB):

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

Where:

- $MAI_{forest,i}$ = Mean Annual Increment of woody biomass growth per hectare in sub-category i of forest areas in the relevant period (tonnes/ha/yr)
- $MAI_{other,i}$ = Mean Annual Increment of woody biomass growth per hectare in sub-category i of other land areas in the relevant period (tonnes/ha/yr)
- $F_{forest,i}$ = Extent of forest in sub-category i in the relevant period (ha)
- $F_{other,i}$ = Extent of other land in sub-category i in the relevant period (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 (in sub-category i) in the relevant period (h)
- $P_{other,i}$ = Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within forest areas (in sub-category i) in the relevant period (ha)

Calculation of $MAI_{forest,i}$ and $MAI_{other,i}$

For calculation of $MAI_{forest,i}$ and $MAI_{other,i}$, above-ground biomass growth (tonnes d.m./ha-yr) has been sourced from 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4: Agriculture, Forestry and Other Land Use./21/. The values considered for the calculation are found to be correctly referred. The values of above-ground growth used for the calculation are provided as below;

[IPCC, Forest Land, Volume 4, Table-4.9](#)

Ecological Zone	Status Condition	Above Ground Biomass	Unit
Tropical rainforest	Primary	1.30	tonnes/hectare/year
	Secondary >20 years	3.50	tonnes/hectare/year
	Secondary ≤20 years	7.60	
Average		3.53	tonnes/hectare/year
Tropical moist deciduous forest	Primary	0.40	tonnes/hectare/year
	Secondary >20 years	0.90	tonnes/hectare/year
	Secondary ≤20 years	2.90	
Average		0.94	tonnes/hectare/year
Tropical Dry Forest	Primary	0.00	tonnes/hectare/year
	Secondary >20 years	1.60	tonnes/hectare/year
	Secondary ≤20 years	3.90	
Average		1.60	tonnes/hectare/year

Distribution of total forest area by age:

Distribution of total forest area by age is determined in following manner which has been used to derive average of above ground biomass growth.

	Primary forest	Established area (forest $\leq$ 20 yrs)	Forest area $\geq$ 20yrs	Total forest
Area (million Ha)	0.39	0.27	7.34	7.99
	4.82%	3.32%	91.86%	100.00%

The area under primary forest and total forest (Extent of forest in sub-category i in the relevant period (ha)) are been sourced from Global Forest Resource Assessment report, FAO Yearbook of Forest Products, 2020/25/. The values have been found to be appropriately used.

The established area (forest $\leq$ 20 yrs) has been calculated by considering the plantation records from the year 2016 to 2020 from Forestry Commission Annual Report of Ghana, 2020/28/ and the planation area up to the year 2016 from 2016 Annual report issued by Forest Services Division – Forestry Commission of Ghana, in December, 2017/30/, The values are found to be considered appropriately by RINA team,

The Forest area $\geq$ 20yrs has been calculated by subtracting the quantity of primary forest and Established area (forest $\leq$ 20 yrs) from the total forest area. This has been assessed to be appropriate by the RINA team.

The distribution of total forest area (Ghana) by ecological zone:

The distribution of total forest area (Ghana) by ecological zone which is used for calculation of $MAI_{forest,l}$ and $MAI_{other,l}$ has been determined as below:

Country	Tropical					
	Sudan Savannah	Guinea Savannah	Deciduous forest	Semi-Decideous	High Rainforest	Costal Savannah
Ghana	1%	63%	3%	28%	3%	2%
Ghana Rainfall (mm/yr)	1000	1100	1500	1300	2200	800
Tropical Zone	Dry	Moist	Moist	Moist	Rain forest	Dry

The percentage distribution of forest area has been considered from Report dated 01-November-2019, published by National Library of Medicine, USA on Understanding climate variability and change: analysis of temperature and rainfall across agroecological zones in Ghana./29/. The

values are checked and found to be correctly applied. This has been verified by the RINA team this is the latest data available as on date.

The category of tropical zone has been considered based on the *Annex A, Glossary of IPCC Good Practice Guidance for LULUCF/32/* which has been found to be appropriate by the RINA team.

$MAI_{forest,i}$ and $MAI_{other,i}$ are thus calculated as below;

$$MAI_{forest,i} = 1.04 \text{ tonnes/hectare/year}$$

$$MAI_{other,i} = 1.04 \text{ tonnes/hectare/year}$$

The arithmetic calculation carried out in the spread sheet/15/ has been found to be correct by the RINA Team.

The quantity of renewable biomass (RB) is thus calculated as below;

	$MAI_{forest,i}$	$MAI_{other,i}$	$F_{forest,i}$	$P_{forest,i}$	$F_{other,i}$	$P_{other,i}$	RB
	tonnes/hectare/year		Million Ha				Million tonnes
Ghana	1.04	1.04	7.99	1.425	0	0	6.82

$P_{(forest,i)}$ i.e. Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) has been considered as forest in the protected area in the host country, Ghana. This has been considered from the Global Forest Resource assessment report, FAO Yearbook of Forest Products 2020/25. The value has been checked and found to be correctly used.

The fraction of woody biomass thus derived by the project participant is as below;

	H	RB	NRB	F_{nrb}
Ghana	37.82	6.82	31.00	81.97%

In line with paragraph 6(b) of the TOOL 30/06/: the project participant has compared and analysed the calculated values against the values for fNRB reported in relevant scientific literature and justified any differences.

As per the paragraph 6(b) of the TOOL 30, this analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least: (i) Bailis, R.; Drigo,

R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. *Nature Climate Change*, 5(3), pp. 266–272/34/.

However, the literature provided in paragraph 6. (b) (i) of Tool 30 version 4, published on 19 January 2015, presents a value range of 30% ~ 40% for fNRB in Ghana (Figure 2). The literature explicitly states, "We present a spatially explicit assessment of pan-tropical wood fuel supply and demand, calculate the degree to which wood fuel demand exceeds regrowth, and estimate wood fuel-related greenhouse-gas emissions for the year 2009." This underscores that all the values utilized in the report pertain to data preceding the year 2009.

As mentioned in the report, the report presents a spatially explicit assessment of pan-tropical woodfuel supply and demand, calculate the degree to which woodfuel demand exceeds regrowth, and estimate woodfuel-related greenhouse-gas emissions for the year 2009. The above estimated value of FNRB indicates the wood harvested in excess of MAI to satisfy the demand that remains after accounting for the use of afforestation and/or reforestation.

The RINA team has further cross verified the status of forestation and FNRB from latest available information in the public domain. A detail report named, Ghana Country Forest Note was published by the World Bank Group, in February 2023/35/ has been reviewed by the RINA team which provides the updated scenario of the consumption of biomass in Ghana and the contribution of the renewable component in it. Page no. 32 of the report specifies high extraction of forest resources for economic growth has resulted in increased deforestation in the country. As mentioned in page no. 33 of the report, based on the deforestation rates of the 2017 FREL, it is estimated that the cost of deforestation to Ghana is about US\$400 million per year, equivalent to 0.7 percent of 2017 GDP. As mentioned in page 2 of the report, Deforestation is high and spatially concentrated in areas of high poverty of Ghana.

To quote the extract from page no. 14 of the report/35/;

Fuelwood harvesting/charcoal production also remains an important driver since biomass, such as wood, grass, animal dung, and charcoal, have long been an important source of energy in Ghana. National statistics shows that biomass accounted for approximately 34 percent of the total energy consumed in 2020 (Ghana Energy Commission 2021). A recent World Bank (2022a) assessment estimated that the total national annual woodfuel demand for cooking is around 14,897,125 t per year in wood equivalent and that 15 percent of the total wood demand is being harvested in excess of the mean annual increment (MAI) (also see section 3.4.2).

Therefore, the RINA team concludes that the value of fNRB determined by the project participant and used for emission reduction is conservative and hence acceptable.

In line with the TOOL30: Methodological tool: Calculation of the fraction of non-renewable biomass, v4.0, as the project participant has selected ex-ante calculation of fNRB, RINA team has ensured that the data belonging to the most recent historical year available in the public domain are used for the calculation.

Determination of efficiency of ICS during year y

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

Where,

$\eta_{p1} = 37\%$ (Gyapa project stove)

$\eta_{p2} = 36\%$ (Obaapa Clean stove)

$$DF_n = 0.99$$

Example of calculation:

If project stove is Gyapa project stove and $y = 1$

$$\begin{aligned} \eta_{new,y,i,j} &= 37\% \times (0.99)^{1-1} \times 0.94 \\ &= 34.78\% \end{aligned}$$

Hence, the efficiency of ICS during year y is as below:

Year (y)	$\eta_{new,y,i,j}$
1	34.78%
2	34.43%
3	34.09%
4	33.75%
5	33.41%
6	33.08%
7	32.74%

Example of calculation:

If project stove is Obaapa project stove and $y = 1$

$$\begin{aligned} \eta_{new,y,i,j} &= 36\% \times (0.99)^{1-1} \times 0.94 \\ &= 33.84\% \end{aligned}$$

Hence the efficiency of ICS during year y is as below:

Year (y)	$\eta_{new,y,i,j}$
1	33.84%
2	33.50%
3	33.17%
4	32.83%
5	32.51%
6	32.18%
7	31.86%

Determination of the quantity of woody biomass that is saved in tonnes per ICS during year y

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

Example of calculation for Gyapa:

If y= 1,

$$B_{y,savings,i,j} = 3.119 \times [(0.3478/0.2) - 1]$$

= 2.31 tonnes

Year (y)	$B_{y=1,new,i,survey}$	$\eta_{new,y,i,j}$	η_{old}	$B_{y,savings,i,j}$
1	3.119	34.78%	0.2	2.31
2	3.119	34.43%	0.2	2.25
3	3.119	34.09%	0.2	2.20
4	3.119	33.75%	0.2	2.14
5	3.119	33.41%	0.2	2.09
6	3.119	33.08%	0.2	2.04
7	3.119	32.74%	0.2	1.99

Example of calculation for Obaapa:

If y= 1,

$$B_{y,savings,i,j} = 3.051 \times [(0.3478/0.2) - 1]$$

= 2.11 tonnes

Year (y)	$B_{y=1,new,i,survey}$	$\eta_{new,y,i,j}$	η_{old}	$B_{y,savings,i,j}$
1	3.051	33.84%	0.2	2.11
2	3.051	33.50%	0.2	2.06
3	3.051	33.17%	0.2	2.01
4	3.051	32.83%	0.2	1.96
5	3.051	32.51%	0.2	1.91
6	3.051	32.18%	0.2	1.86
7	3.051	31.86%	0.2	1.81

Determination of emission reductions by ICS of year1 during year y

$$ER_{y,i,j} = B_{y,savings,i,j} \times NCV_{wood\ fuel} \times f_{NRB,y} \times (EF_{wf,CO_2} + EF_{wf,non\ CO_2}) \times N_{y,i,j} \times 0.95$$

Where,

$$NCV_{wood\ fuel} = 0.0156 \text{ TJ/tonne}$$

$$f_{NRB,y} = 0.8197$$

$$EF_{wf,CO_2} + EF_{wf,non\ CO_2} = 112 + 26.23 = 138.23 \text{ tCO}_2/\text{TJ}$$

Example of calculation for Gyapa project stove ($N_{y,i,j} = 18,893$):

If $y=1$,

$$ER_{y,i,j} = 2.31 \times 0.0156 \times 0.8197 \times 138.23 \times 18,893 \times 0.95$$

$$= 73,131 \text{ tCO}_2$$

Year	$B_{y,savings,i,j}$	$NCV_{wood\ fuel}$	$f_{NRB,y}$	$EF_{wf,CO2}$ + $EF_{wf,non\ CO2}$	$N_{y,i,j}$	$ER_{y,i,j}$
1	2.31	0.0156	0.8197	138.23	18,893	73,131
2	2.25	0.0156	0.8197	138.23	18,893	71,410
3	2.20	0.0156	0.8197	138.23	18,893	69,707
4	2.14	0.0156	0.8197	138.23	18,893	68,020
5	2.09	0.0156	0.8197	138.23	18,893	66,350
6	2.04	0.0156	0.8197	138.23	18,893	64,697
7	1.99	0.0156	0.8197	138.23	18,893	63,060

Example of calculation for Obaapa project stove ($N_{y,i,j} = 1209$):

If $y=1$,

$$ER_{y,i,j} = 2.11 \times 0.0156 \times 0.8197 \times 138.23 \times 1209 \times 0.95$$

$$= 4,286 \text{ tCO}_2$$

Year	$B_{y,savings,i,j}$	$NCV_{wood\ fuel}$	$f_{NRB,y}$	$EF_{wf,CO2}$ + $EF_{wf,non\ CO2}$	$N_{y,i,j}$	$ER_{y,i,j}$
1	2.11	0.0156	0.8197	138.23	1,209	4,286
2	2.06	0.0156	0.8197	138.23	1,209	4,181
3	2.01	0.0156	0.8197	138.23	1,209	4,077
4	1.96	0.0156	0.8197	138.23	1,209	3,974
5	1.91	0.0156	0.8197	138.23	1,209	3,873
6	1.86	0.0156	0.8197	138.23	1,209	3,772

7	1.81	0.0156	0.8197	138.23	1,209	3,672
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The total ER estimation combined for all Project activity Instances i.e for Gyapa and Obaapa is as below

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
Year 2022-23 (16-January-2023 – 14-October-2023)	77,417	0	0	77,417
Year 2023-24(15-October-2023 – 14-October-2024)	75,591	0	0	75,591
Year 2024-25(15-October-2024 – 14-October-2025)	73,784	0	0	73,784
Year 2025-26(15-October-2025 – 14-October-2026)	71,994	0	0	71,994
Year 2026-27(15-October-2026 – 14-October-2027)	70,223	0	0	70,223
Year 2027-28(15-October-2027 – 14-October-2028)	68,469	0	0	68,469
Year 2028-29(15-October-2028 – 14-October-2029)	66,732	0	0	66,732
Total	504,210	0	0	504,210

3.4.7 Methodology Deviations

No deviation envisaged for the present joint validation and verification.

3.4.8 Monitoring Plan

In line with the section 9.3 of the applied methodology, VMR0006, v1.1/05/, following information shall be recorded by the project participant whenever an ICS is distributed to a beneficiary.

1. Unique serial number
2. Date of distribution
3. Geographic area of distribution
4. Model of project technology distributed
5. Quantity of project technologies distributed
6. Name and address of the recipient/end-user

These data are the part of the database/15/ maintained by the project participant which are verified by the RINA team and found appropriate. Further, the details are also included in the end user agreements/12/ which are checked and found to be appropriate.

Assessment team checked the monitoring plan as per methodology requirement and the detail analysis is as below:

Parameters determined ex-ante:

1. Non-CO2 emission factor for the use of wood fuel in baseline scenario- Value of 26.23 tCO₂e/TJ as per IPCC default values/23/.
2. Efficiency of baseline cookstove- Value of 0.1 as per methodology default value. This is accepted as baseline scenario was a three- stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney.
3. Efficiency of project stove at the start of project activity.- Value of Gyapa model is 37.00% and for Obaapa model is 36.00% as per manufacturer specifications/07/
4. Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass- Value of 0.804 has been calculated as per TOOL30: Calculation of the fraction of non-renewable biomass"/06/
5. CO₂ emission factor for the use of wood fuel in baseline scenario - Value of 112 tCO₂e/TJ as per IPCC default values/22/.
6. Net calorific value of the non-renewable woody biomass that is substituted or reduced- Value of 0.0156 TJ/tonne has been used as per IPCC default value/22/.
7. Discount factor to account for efficiency loss of project cookstove per year of operation (fraction)- Value of 0.99 as per methodology default value.
8. Operating lifetime of project device for projects opting Equation 5 for determining project stove efficiency- 7 years as per manufacturer specification.
9. Leakage factor, 0.95 has been considered in line with the applied methodology VMR0006, ver. 1.1 Section 8.3.

The above values are checked as per methodology requirement and found to be appropriate.

Parameters determined ex-Post:

The parameters that would be monitored are as follows:

- Number of project devices of type I and batch j operating during year y
- The efficiency of the improved cook stove type i and batch j determined as per equation 5 of methodology during year y
- Annual quantity of woody biomass used by improved cook stoves 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

Sampling approach applied by the Project Participant for monitoring survey.

The project participant followed the simple random sampling approach and the minimum sample size have been determined as per the following guidelines:

- Project target population < 300: Minimum sample size 30
- Project target population 300 – 1000: Minimum sample size 10% of group size
- Project target population > 1000: Minimum sample size 100

The project participant has applied simplified approach for determining the minimum sample size for parameters to be monitored in which case it is not requisite for the sample compliance with 90/10 confidence precision is not obligatory.

As per the requirement of applied VCS methodology VMR0006/05/, a minimum sample size of 100 is required to be surveyed for the project population greater than 1000.

The sampling has been conducted by trained personnel from the project proponent. The training records/20/ for the sampling personnel has been provided to the VVB for verification. The maximum length of one monitoring period will be two years (duration, not calendar years), with an option for annual or biennial monitoring. The project proponent is responsible for managing household data collection and entry into the project database.

Survey results:

The following parameters were obtained through sampling:

1. $N_{y,i,j}$: Number of stoves in operation
2. $By=1,new,i,j,survey$: Quantity of charcoal used by improved cookstoves

125 samples were selected (considering 20% non-response) from each cookstove model (i.e., Gyapa project stove and Obaapa Clean stove) for all monitoring parameters by section 8.4 option (b) of the applied methodology VMR0006. The survey team had finally surveyed 200 samples (100 from each type) on the ground from the 250 selected samples. The objective was to obtain reliable and unbiased estimates of the monitoring parameters.

A single homogeneous population was considered for both parameters.

The following table summarizes the sample sizes and results.

Monitored Parameter	Gyapa	Obaapa
Sample size	100	100
Average Quantity of charcoal used by improved cookstoves (By=1,new,i,j,survey) Kg/day/stove	1.424	1.393

The values of average quantity of charcoal used by the improved cookstoves by the ICSs are considered from the monitoring survey reports/09/ which are verified and found that the values are correctly applied.

3.5 Non-Permanence Risk Analysis

Not applicable

4 VERIFICATION FINDINGS

4.1 Accuracy of GHG Emission Reduction and Removal Calculations

The VVB had telephonic/Teams interviews with concerned onsite persons, households and has reviewed documents & photographs submitted by PP; assessment team concluded that the project activity is implemented and operated in-line with the Joint VCS PD-MR/01/. A total number of 20,102 ICS distributed across the boundary which is mentioned in the PD. There is no change in the project design or operation and monitoring practices at site which can alter the applicability or additionality of the project activity. In addition to the interviews with PP, assessment team have checked the all the documentation and found that the project activity is implemented as per the VCS PD and Monitoring report submitted by the PP for current monitoring period.

Parameters fixed ex-ante:

Means of verification	The data and parameters fixed ex ante have been checked from the CPA-DD, approved methodology and IPCC. 1. Non-CO2 emission factor for the use of wood fuel in baseline scenario- Value of 26.23 tCO2e/TJ as per IPCC default values/22/. 2. Efficiency of baseline cookstove- Value of 0.1 as per methodology default value. This is accepted as baseline scenario was a three- stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a
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	chimney. - Efficiency of project stove at the start of project activity.- Value of Gyapa model is 37.00% and for Obaapa model is 36.00% as per manufacturer specifications - Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass- Value of 0.804 has been calculated as per TOOL30: Calculation of the fraction of non- renewable biomass” - CO2 emission factor for the use of wood fuel in baseline scenario - Value of 112 tCO2e/TJ as per IPCC default values. - Net calorific value of the non-renewable woody biomass that is substituted or reduced- Value of 0.0156 TJ/tonne as specified by the methodology AMS II.G ver.10 has been used. - Discount factor to account for efficiency loss of project cookstove per year of operation (fraction)- Value of 0.99 as per methodology default value. - Operating lifetime of project device for projects opting Equation 5 for determining project stove efficiency- 7 years as per manufacturer specification. - Leakage factor, 0.95 has been considered in line with the applied methodology VMRO006, ver. 1.1 Section 8.3.
Findings	3 CARs were raised related to this and closed successfully.
Conclusion	RINA confirms that the values fixed ex ante parameters are in line with the requirements of VCS standard v4.4/04/

Parameters monitored Ex-post

Means of verification	The verification of the parameters required by the monitoring plan is provided as follows: <table> <tr> <td>Data / Parameter</td><td>Ny,j,j</td></tr> <tr> <td>Data unit</td><td>Number</td></tr> <tr> <td>Description</td><td>Number of project devices of type I and batch j operating during year y</td></tr> <tr> <td>Source of data</td><td>Monitoring</td></tr> <tr> <td>Means of verification/Comments:</td><td>The number of stoves installed have been verified from the ICS installation database/13/ which provides the complete</td></tr> </table>	Data / Parameter	Ny,j,j	Data unit	Number	Description	Number of project devices of type I and batch j operating during year y	Source of data	Monitoring	Means of verification/Comments:	The number of stoves installed have been verified from the ICS installation database/13/ which provides the complete
Data / Parameter	Ny,j,j										
Data unit	Number										
Description	Number of project devices of type I and batch j operating during year y										
Source of data	Monitoring										
Means of verification/Comments:	The number of stoves installed have been verified from the ICS installation database/13/ which provides the complete										

		list of the stoves installed during each year. The type of stoves is defined as per the VCS PD. The project implementer is maintaining database of all the ICS installed in the PD. Every individual project ICS involved in the project covered under this joint PD-MR (observed to be uniquely identifiable by its ID number) was allocated a sample number. Further, verification team has re-calculated the sample size according to the required confidence/precision and found the sample size correctly calculated. Also, the achieved precision for every parameter was recalculated by the verification team and was found to meet the minimum desired confidence and precision levels. The survey procedures are in line with the applied VCS methodology VMR0006/05/. Please refer section 3.4.8 for the joint PD-MR for the assessment of monitoring sample survey conducted by the project participant.
	Cross- Check	This has been cross-checked with the contract agreements/12/ with the beneficiaries.
	Data / Parameter	$\eta_{new,y,i,j}$
	Data unit	Fraction
	Description	The efficiency of the improved cook stove type i and batch j determined as per equation 5 of methodology during year y
	Source of data	Calculation
	Means of verification/Comments:	The project opts to determine the efficiency using equation 5 given by methodology; therefore, it is not required to monitor this parameter via a Sampling survey. However,

		the grouped project activity provides the option to use a different model of cookstoves for new future project activity instances to be included, hence this parameter value may vary based on a different model of future instances. The values considered for the model used in the current/initial project instances are found to be appropriately used. The manufacture's specification has been used as the source for this which has been assessed by RINA to be correct.
	Cross-Check	-
	Data / Parameter	$B_{y=1,new,i,j,survey}$
	Data unit	Tonnes
	Description	Annual quantity of woody biomass used by improved cook stoves in tonnes per device of type i and batch j, determined in the first year of the implementation of the project through a sample survey
	Source of data	Monitoring survey
	Means of verification/Comments:	Determined in the first year of the introduction of the devices (e.g. during the first year of the crediting period, $y=1$) through measurement campaigns at representative households and/or sample survey. Sample surveys to estimate this parameter, that are solely based on questionnaires or interviews (i.e. that do not implement measurement campaigns) may only be used if the following conditions are satisfied. (i) Baseline cookstoves have been completely decommissioned and only improved cookstoves are exclusively used in the project households; (ii) If multiple devices are used in the project, it is possible from the results of the survey questions to clearly differentiate the quantity of firewood

	being used by each device. In other words, if more than one device, or another device that consumes charcoal, are in use in project households, then the sample survey needs to distinguish the quantity of firewood used by the project device and the other devices that use charcoal. The project participant through its monitoring survey has confirmed that the baseline/pre-project cookstoves are completely dismantled and no longer used by the participating households. The monitoring survey reports also reveal that there are no other devices being used by the households. The monitoring survey results submitted by the project participant/09/ are checked by the RINA team and found satisfactory. Further, the end user agreements executed between the project participants and end users also oblige the end users not to own or use any other improved cookstove and refrain them from use of less efficient traditional cook stove used in pre-project/baseline scenario. The copies of end user agreements/12/ submitted by the project participant were checked by RINA team to verify the same. The RINA team during onsite verification had conducted interviews with the selected households. All the households interviewed were found to be happy with the performance of the ICS with regard to decrease in quantity of fuel and smoke during cooking in comparison with the traditional cookstoves used earlier by them. Therefore, going back to the old days and using traditional cookstoves for their cooking needs was felt by the RINA team to be not required or possible. Thus, the RINA team concludes that the above two conditions are satisfied by the
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		project activity and applying sample survey to estimate this parameter is acceptable. Please refer section 3.4.8 for the joint PD-MR for the assessment of monitoring sample survey conducted by the project participant.
	Cross-Check	-
	Data / Parameter	$\eta_{old,i,j}$
	Data unit	Fraction
	Description	The efficiency of baseline cookstove
	Source of data	Methodological default value
	Means of verification/Comments:	The value has been considered by the project participant based on the baseline survey results; it is observed that the baseline device was a three-stone fire using charcoal, or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney, The baseline survey forms/33/ submitted by the project participant are checked by the RINA team and found to be appropriate. Hence default value of 0.2 is considered for Efficiency of the baseline cookstove in line with the applied methodology.
	Cross- Check	-
	Data / Parameter	Life Span
	Data unit	Years
	Description	Operating lifetime of project device for projects opting Equation 5 for determining project stove efficiency

	Source of data	Manufacturer's specification
	Means of verification/Comments:	The manufacturer's specification/07/ has been verified and found to be appropriate by the RINA team.
	Cross- Check	-
Findings	5 CARs were raised related to this and closed successfully.	
Conclusion	The monitoring has been carried out in accordance with the monitoring plan contained in the joint VCS PD-MR/01/. All parameters were monitored and determined as per the applied methodology, VMR0006, v1.1/05/ and defined monitoring plan. The substantiation of this conformity on information flow for these parameters including the values in the monitoring reports is reported in the above sections. During the verification, all relevant monitoring parameters of the registered monitoring plan have been verified with regard to the appropriateness of the verification method, the correctness of the values applied for ER calculation/02/, the accuracy and applied QA/QC measures. After appropriate corrections, carried out by the project participant, it is confirmed that all monitoring parameters have been measured/determined without material misstatements and are in line with all applicable standards and relevant requirements. All parameters required to be monitored are recorded at the intervals required by the registered monitoring plan and the applied methodology. On the basis of review of source and nature of available evidences and records, the verification team confirms the quality of evidence defined and the values used for the monitoring parameters are in line with the requirements of VCS standard v4.4/04/	

VVB Sampling:

The assessment team applied acceptance sampling in accordance with the paragraph 27-33 of the "Standard: Sampling and surveys for CDM project activities and programme of activities, version

09"/06/. The assessment team carried out the random sampling from the PP's sample records and checked (using its professional judgment) the acceptability of the data for each record in the PP's sample records. The assessment team has determined acceptance sample size based on the "Table. Sample size and acceptance number based on AQL, UQL, and producer and consumer risks" of standard "Sampling and surveys for CDM project activities and programme of activities" version 09.0.

During the onsite audit verification, a random sampling approach has been used by the verification team to verify the reported values for the monitored parameters which are determined through sample survey by PP. For the determination of acceptance sample size, the team has selected the following using its professional judgment:

- Acceptable quality level (AQL) – 0.5%
- Unacceptable Quality Level (UQL) – 20%
- Producer risk -10%
- Consumer risk -10%

Verification team has determined acceptance sample size for all the sample survey parameters based on the "Table. Sample size and acceptance number based on AQL, UQL, and producer and consumer risks" of standard "Sampling and surveys for CDM project activity and programme of activities" version 09.0. From the above factors, the verification team determined the minimum sample size (n) as 11 and acceptance number (c) as 0. The sample size used to verify the reported values for the monitored parameters which are determined through sample survey by PP. The assessment team interviewed the households during on site audit conducted at both the states and filled the survey form to check the acceptability of the data for each record in the PP's sample records. When the minimum sample size derived for the VVB survey was 11, whereas the audit team has surveyed 30 households from Gyapa model of cookstove and 24 households from Obapa model.

Using acceptance sampling approach, assessment team checked the PP's sample results (reported in the Monitoring surveys) along with the following evidences:

4. Onsite audit inspection/interviews
5. ICS Database
6. Database of all project participating households

Following the requirement of the paragraph 28 of the Standard "Sampling and surveys for CDM project activities and programmes of activities" version 09.0, the acceptability of data in the random sample chosen from the PP's sample records was determined. Based on the number

of records where there was agreement, it was determined whether the PP's sample records meet the requirements. The acceptability of the data was based on the assessment team professional judgement in line with the para 28 of the Sampling Standard.

All the data records for the parameters were in agreement with PP's sample records and no discrepant records was found from the PP's records. Since no discrepant records were found, therefore, the PP's set of records have been accepted based on the acceptance sampling. This is in line with the paragraph 32 of Standard "Sampling and surveys for CDM project activities and programmes of activities" version 09.0 and found acceptable.

4.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	Assessment team checked technical specifications, commissioning evidences, photographs with unique ID on the digesters, baseline survey and monitoring survey data, forestry report for India to confirm the project baseline, additionality and emission reductions. During, remote audit, PP, PP representatives and stakeholders were interviewed to cross check data submitted. PP representative confirmed that all data will be kept for 2 years following the end of the crediting period. During remote audit and discussion with PP, assessment team confirmed that the data will be kept for 2 years following the end of the crediting period. The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same were verified during the remote audit by interviewing PP representatives and submitted evidence like breakdown record etc.
Findings	No findings were raised.
Conclusion	Hence assessment team confirmed that the values considered in emission reduction calculations are correct. The verification team therefore is of the opinion that the project participant is capable of implementing the monitoring plan in the context of the project activity. Remote audit and interview with PP and PP representative

	also confirm that the operational and description as mentioned in Joint PD and MR is as per the site practice and thus assessment team confirms that the details are correct. Assessment team checked the calculation of estimated VCUs vs. Actual VCUs. As per the Joint PD and MR/01/, the estimated amount of VCUs annually is 70,650 tCO₂e. The days involved in present monitoring period are 44 days from the year 2023. Therefore, on pro-rata basis the estimated VCUs for the monitoring period is 8,517 tCO₂e. Actual VCUs obtained for the monitoring period are 4,291 tCO₂e and thus the actual VCUs are 49.62% lower than the estimated VCUs. As actual VCUS are less than estimated VCUs for current monitoring period, assessment team found it to be appropriate and accepted.
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5 VALIDATION AND VERIFICATION OPINION

RINA Services S.p.A. has been engaged by EKI Energy Services Ltd. to perform the Joint validation and verification of the project activity.

The management of the project participant/owner is responsible for the preparation of the GHG emissions data and the reported/estimated GHG emissions reductions on the basis set out within the project's Monitoring Plan in the Joint VCS PD & MR and the approved VCS Methodology: VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, Version 1.1 dated 22 July 2021, Sectoral scope 3.

Our Validation approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board and VCS board. Our approach is risk-based, drawing on an understanding of the risks associated with estimated GHG emissions data and the controls in place to mitigate these. The validation can confirm that:

- The project's description compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS standard version 4.3
- The project's baseline and additionality and monitoring plan are assessed against "VCS Methodology: VMR0006" for grouped project.
- A risk based approach has been followed to perform this validation activity. The review of the project description and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews with Project Owner have provided with sufficient evidence for positive validation opinion as per the requirement of VCS.

The conclusions of this report demonstrate that the proposed VCS project, as described in the VCS PD, conforms to all applicable validation criteria.

VERIFICATION CONCLUSION:

Our Verification approach was based on the requirements as defined under VCS Standard, the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the project is operated as planned and described in the project document;
- the monitoring plan is as per the applied methodology;
- the development and maintenance of records and reporting procedures are in accordance with the monitoring plan;
- the installed equipment/devices being essential for generating emission reduction runs reliably as per monitoring plan
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.
- No limitation observed for the present verification

In our opinion the GHG emissions reductions reported for the project activity for the period are fairly stated in the Joint VCS PD & MR Version 02 dated 13-June-2023. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology: VMR0006 version 1.1 and the VCS standard version 4.4.

The project complies with the validation and verification criteria for projects and their GHG emission reductions or removals set out in VCS Version 4.3 and include any qualifications or limitations.

Verification period: From 16-January-2023 to 28-February-2023

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2023 (16-January-2023--28-February-2023) (inclusive of both the dates)	4,209	0	0	4,209
Total	4,209			4,209

APPENDIX I: RESOLUTION OF CORRECTIVE ACTION REQUESTS AND CLARIFICATION REQUESTS

Table 1. FAR from this validation and/or verification

FAR ID	01	Section no.	3.1	Date : 29/09/2023
Description of FAR				
Since the project participant has two other proposed VCS projects in Ghana (ID 3983 and 3982), at the time of inclusion on new project activity instance it shall be confirmed that all singular project activity instances fall within ten kilometres of another instance of this project activity and there is no overlap of activity instances of the other two project proposed VCS cookstoves projects of the project participant in Ghana.				
Project participant response				Date: DD/MM/YYYY
NA				
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Table 2. CL from this verification

CL ID	xx	Section no.	xx	Date : DD/MM/YYYY
Description of CL				
Project participant response				Date: DD/MM/YYYY
-				
Documentation provided by project participant				
-				
DOE assessment				Date: DD/MM/YYYY

Table 3. CAR from this verification

CARL ID	01	Section no.	4.3	Date: 14-June-2023
Description of CAR				
The exact number of project activity instances included in the project in the current joint PD-MR is to be defined clearly with their location.				
Project participant response				Date: 14 June 2023
The exact number of project activity instances included in the project in the current joint PD-MR is defined clearly in section 1.1 with location “Ghana”.				
Documentation provided by project participant				
The database that contains information on the precise number of ICS project activity instances, including their unique serial numbers, names and addresses, installation dates, etc. – Folder “Database”				
DOE assessment				Date: 14/06/2023
The project participant has considered one cookstove as one project activity instance for this group project activity. There are 20,102 project activity instances (ICS) have been implemented till the end of this monitoring period i.e., 28-February-2023. The same is described appropriately in the revised joint PD-MR submitted.				
CAR is closed.				

CARL ID	02	Section no.	1.11	Date: 14-June-2023
Description of CAR				
The Project participant is requested to submit documentary evidences for the				
1. technical specifications and life time of the ICS used in the project activity instances under consideration. 2. Test certificate for high thermal efficient cookstoves 3. Annual loss of 5% or non-operation of ICS assumption in section 1.10 of VCS PD 4. Document evidence for technical details/manufacturer’s specifications of cookstoves 5. Latest forest survey report on the demand and internal production of firewood in the country compared to 1987 and 1998				
Project participant response				Date: 14-June-2023

1. Technical specifications and life time of the ICS used in the project activity instances has now provided. 2. Test certificate for high thermal efficient cookstoves has provided. 3. In monitoring survey, it was found that all cookstove were working, so annual loss or non-operation of ICS 0% is considered for actual ER calculations. Hence now this paragraph is removed and updated in section 5.4 of VCS Joint PD & MR. 4. Document evidence for technical details/manufacturer’s specifications of cookstoves has now been provided. 5. Latest forest survey report used “D.Nje et al., Greening The Wood Fuel Sector Of Ghana, (2019)" according to a Ghana’s national report (2017) in PD-MR on the demand and internal production of firewood in the country compared to 1987 and 1998.				
Documentation provided by project participant				
1. Technical specifications and life time of the ICS – Folder “Efficiency” 2. Test certificate for high thermal efficient cookstove – Folder “Efficiency” 3. Monitoring Survey Result – Folder “Monitoring survey” 4. Technical details/manufacturer’s specifications of cookstoves – Folder “Efficiency”				
DOE assessment				Date: 14-June-2023
1. The technical life time of the ICSs used in the project is 7 years. The manufacturer’s specifications submitted by the project participant has been checked and found to be appropriate. 2. The thermal efficiencies of the two models used in the project activity so far has been considered separately. Separate certificate for the test conducted Technology Consultancy Centre, Knust, Kumai submitted by the project participant is verified and found to be appropriate. 3. The revised joint PD-MR has been checked and found that the correction has been done. 4. The manufacturer’s specification submitted by the project owner has been check and found to be appropriate. 5. The reference of the forest survey reports used are found to be referred suitably in the revised joint PD-MR submitted by the project participant. CAR is closed.				
CARL ID	03	Section no.	1.7	Date: 14-June-2023
Description of CAR				

In regard to project ownership, the project participant is requested to submit the following documents:	
- Declarations from household to transfer the ownership rights of the carbon assets generated from this project to the EKI Energy Services Ltd. - Undertakings from manufactures and distributor of the ICS to confirm that cook stove ownership is with EKI Energy Services Limited. - End user agreements.	
Project participant response	Date:
- End user agreement from household to transfer the ownership rights of the carbon assets generated from this project to the EKI Energy Services Ltd. are being provided - Undertakings from manufactures and distributor of the ICS to confirm that cook stove ownership is with EKI Energy Services Limited has now been provided - End user agreements has now been provided.	
Documentation provided by project participant	
- Declarations from household to transfer the ownership rights of the carbon assets – Folder “Enduser Agreement” - Undertakings from manufactures and distributor – Folder “Undertakings from manufactures and distributor” - End user agreements – Folder “Enduser Agreement”.	
DOE assessment	Date: 14-June-2023
- The sample copies of the end user agreements submitted by the project participant are verified to confirm that the ownership of the carbon credit generation by the use ICS lies with EKI Energy Services Ltd. - The undertakings from the manufacturer and the distributors submitted by the project participant are verified to confirm that the ownership of the carbon credit generation by the use ICS lies with EKI Energy Services Ltd. - The end user agreements submitted by the project participants are check and found to be appropriate. CAR is closed.	

CARL ID	04	Section no.	1.11	Date: 14-June-2023
Description of CAR				
The database maintained for the ICS with all the details including unique serial numbers, name and address of ICS household and date in installation etc.				
Project participant response				Date: 14-June-2023
Database of ICS distribution has now been provided along with this Joint PD-MR.				
Documentation provided by project participant				

The database maintained for the ICS with all the details including unique serial numbers, name and address of ICS household and date in installation etc. – Folder “Database”	
DOE assessment	Date: 14-June-2023
The details of ICSs distributed including the Serial No. /Unique ID, address, name and address of the person received the ICSs etc. are incorporated in the actual ER sheet submitted by the project participant. CAR is closed.	

CARL ID	05	Section no.	1.12	Date: 14-June-2023
Description of CAR				
The project participant is requested to include the extreme co-ordinates of the geographical regions where the project activity instanced are located. The physical map may be incorporated accordingly.				
Project participant response				Date: 14-June-2023
Extreme co-ordinates of the specific states as well as physical map has been incorporated accordingly in section 1.12 of Joint PD-MR.				
Documentation provided by project participant				
- KML File – “Ghana.kml”				
DOE assessment				Date: 14-June-2023
The revised joint PD-MR submitted by the project participant has been has been verified; the extreme co-ordinates of the geographical regions where the project activity instanced are located are found to be incorporated suitable. The physical maps are also found to be incorporated accordingly. CAR is closed.				

CARL ID	06	Section no.	1.8	Date: 14-June-2023
Description of CAR				
The project participant is requested to submit proof of project start date to the VVB.				
Project participant response				Date: 14-June-2023
First End user Agreement is considered as proof of project start date.				
Documentation provided by project participant				
Proof of project start date to the VVB - Folder “1st End user Agreement”				
DOE assessment				Date: 14-June-2023
The project participant has submitted the first end user agreement to support the start date of the project activity. The first ICS was distributed on 16-January-2022 which is verified from the end user agreement. Hence, 10-January-2022 has been considered as the project start date appropriately. CAR is closed.				

CARL ID	07	Section no.	5.1	Date: 14-June-2023
Description of CAR				

The detail calculation of fNRB is missing in the joint PD-MR. The project participant may provide the spread of calculation of fNRB, if any.	
Project participant response	Date: 14-June-2023
Detail calculation of fNRB has now provided in the section 5.4 of Joint PD-MR. fNRB calculation spread sheet has been also provided along with this Joint PD-MR.	
Documentation provided by project participant	
fNRB calculation spread sheet – Folder “fNRB”	
DOE assessment	Date: 14-June-2023
A detailed calculation sheet for fNRB is submitted the project participant. The same is verified by RINA; the calculation has been found correctly and the references for the values used in the calculation has also been found to be provided appropriately. CAR is closed.	

CARL ID	08	Section no.	2.2	Date: 14-June-2023
Description of CAR				
PP is requested to provide the documented evidence for local stakeholder consultation process and the date of local stakeholder consultation for the project activity in VCS PD.				
Project participant response				Date: 14-June-2023
The Public notice, Stakeholder attendance & Stakeholder Q&A are being provided as documented evidence for local stakeholder consultation process along with this DVR response. Also, the date of local stakeholder consultation for the project activity has been added in the VCS PD-MR under section 2.2.				
Documentation provided by project participant				
LSC documents – Folder “local Stakeholder consultation, Ghana”				
DOE assessment				Date: 14-June-2023
The details of the stakeholder consultation process and continuous interaction process with the stakeholders are found to be incorporated in section 2.2 of the revised joint PD-MR appropriately. The stakeholders meeting related documents i.e., public notice, attendance sheet and minutes of meeting submitted by the project participant are checked and found to be appropriate. CAR is closed.				

CAR ID	09	Section no.	2.4	Date: 14-June-2023
Description of CR				
The project participant is requested to elaborate and clarify on how the double accounting for carbon emissions associated with ICS will be avoided during the project cycle.				
Project participant response				Date: 14-June-2023

Each ICS in this project can be identified by its unique serial number. The serial number is a unique number which allows for a clear distinction between the stoves. No individual serial number can be repeated within the project, thus ensuring that each stove is counted only once in the project cycle. In addition, project participant is also having agreement with all ICS end users, manufacturer, distributors to ensure that double accounting for carbon emissions associated with each ICS can be avoided during the project cycle.	
Documentation provided by project participant	
- Undertakings from manufactures and distributor – Folder “Undertakings from manufactures and distributor” - End user agreements - – Folder “Enduser Agreement”.	
DOE assessment	Date: 14-June-2023
The complete ICS database mentioning the details of the users, their name and address and unique IDs is now incorporated in the actual (Ex-post) ER sheet. Each single ICS distributed is assigned with an individual unique IDs which eliminates the chances of double counting. Moreover, the end users, manufactures and distributors are bound by the agreements or undertakings not to claim any carbon credits generated by operation of the ICSs. Thus, further confirms that the carbon credits from the project would not be double counted. CAR is closed.	

CARL ID	10	Section no.	5.4	Date: 14-June-2023
Description of CAR				
The project participant is requested to provide ex-ante and ex-post calculation of emission reduction.				
Project participant response				Date: 14-June-2023
PP has now submitted the Estimated ER and actual ER calculation of emission reduction.				
Documentation provided by project participant				
ex-ante and ex-post calculation of emission reduction – Folder “ER Sheet”				
DOE assessment				Date: 14-June-2023
The project participant has now provided both ex-ante and ex-post calculation of emission reduction. The calculations in the ER sheets are verified by RINA and found to be correct. CAR is closed.				

CARL ID	11	Section no.	5	Date: 14-June-2023
Description of CAR				

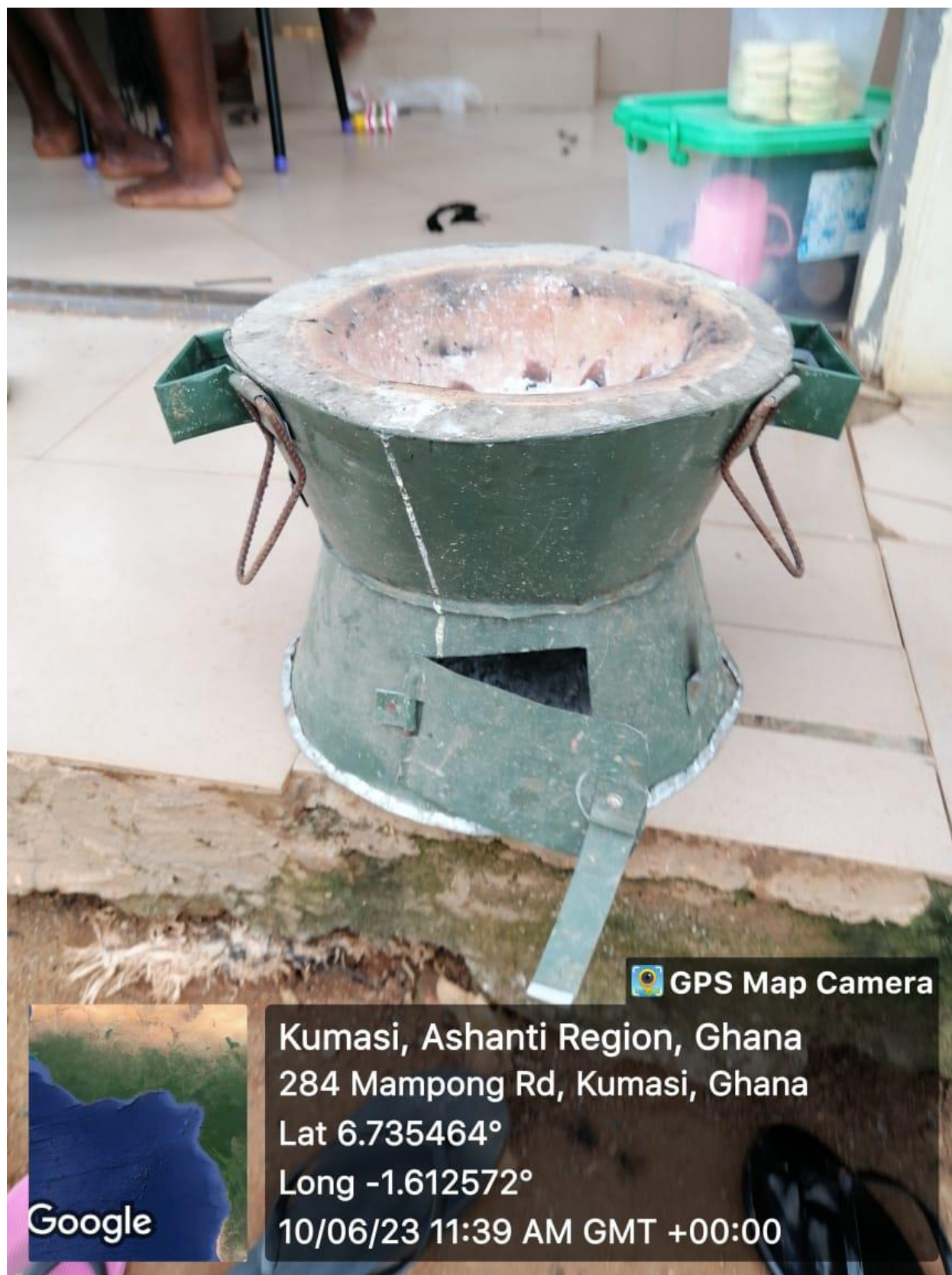
The project participant is requested to clarify and provide the documents for the following:	
1) Baseline survey report 2) Monitoring survey report for the quantity of woody biomass used by ICS 3) Survey, interview report/study of the end user and estimate of daily consumption of woody biomass of ICS 4) Records/documents of training to villagers/beneficiaries/households 5) Elaborate the usage of electronic/digital app for maintaining and monitoring of the data in section 5.3 of VCS PD	
Project participant response	Date: 14-June-2023
1) Baseline survey report has provided 2) Monitoring survey report for ICS's usage of woody biomass is also provided. 3) Survey, interview report/study of the end user and estimate of daily consumption of woody biomass of ICS are provided now. 4) Records/documents of training to villagers/beneficiaries/households are provided now. 5) Project Participant has now elaborated the usage of electronic/digital app for maintaining and monitoring of the data in section 6.3 of VCS PD-MR.	
Documentation provided by project participant	
1. Baseline survey forms 2. Monitoring survey report in Consolidated excel sheet. 3. Monitoring survey report in Consolidated excel sheet. 4. Monitoring Survey report in Consolidated excel sheet. 5. Distribution Training	
DOE assessment	Date: 14-June-2023
1) Baseline survey forms provided by the project participant are checked and found to be appropriate. 2) Monitoring survey report for the quantity of woody biomass used by ICS provided by the project participant is checked and found to be ok. 3) The survey result shared by the project participant is checked and found to be appropriate. 4) Declaration from the distribution team has now been provided. 5) the usage of electronic/digital app for maintaining and monitoring of the data in section 6.3 of VCS PD & MR is found to elaborated appropriately. CAR is closed.	

APPENDIX II: SITE PHOTOGRAPHS













APPENDIX III: TEAM QUALIFICATION



CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Vinay SINGH

è qualificato come¹:
is qualified as:

TEC – VAL – VER – TL – REG-EXP³

nello schema²:
for the scheme:

CDM – VCS – SCS – JI – CCB – UER – ISO14064-2

per le seguenti aree tecniche:
for the following technical areas:

1.1 – 1.2 – 3.1^(*) – 4.1 – 13.1 – 13.2 – 14.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
4.1	Cement and lime production	4
13.1	Solid waste and wastewater	13
13.2	Manure	13
14.1	Forestry	14

in accordo alle istruzioni dell'Unità responsabile (OU) per sostenibilità & cambiamenti climatici.
in accordance with the instructions of the responsible unit (OU) for the sustainability & climate change.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	04/05/2020	First issue
2	11/03/2022	Updated form
3	23/09/2022	Update TA 1.1, TA 4.1, TA 13.1, TA 13.2
4	12/01/2023	Update TA 3.1 (*) for voluntary schemes only
5	01/06/2023	ITR withdrawal

Scheme Manager
Scheme Manager



¹	VAL: Validator	²	CDM: Clean Development Mechanism
	VER: Verifier		VCS: Verified Carbon Standard
	TEC: Technical Expert		GS4GG: Gold Standard for Global Goals
	TL: Team Leader		SCS: Social Carbon Standard
	FIN-EXP: Financial Expert		JI: Joint Implementation
	REG-EXP: Regional Expert		ISO14064-2: International standard 14064 part 2
	ITR: Independent Reviewer		UER: Upstream Emission Reduction
	DET: Determiner		CCB: The Climate, Community & Biodiversity Alliance

³ India, Kenya, Uganda, Sri Lanka, Thailande, Mauritius.

RINA Services S.p.A. è accreditata da UNPCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS.

RINA Services S.p.A. is accredited by the UNPCCC as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS4GG Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports.

GHG_QUAL_CERT_EN(06-2021)

Page 1 of 1



CERTIFICATO DI QUALIFICA PER GLI SCHEMI VOLONTARI*
QUALIFICATION CERTIFICATE FOR VOLUNTARY SCHEMES*

Si attesta che il sig./sig.ra:
 We declare that Mr/Mrs/Ms:

Cyril Augustus Arokiasamy Amalorpavanathan

è qualificato come:
 is qualified as:

TEC, VAL, VER, TL, Local Expert, ITRP

per le seguenti aree tecniche:
 for the following technical areas:

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
3.1	Energy Demand	3
5.1	Chemical Industry	5
13.1	Solid Waste and wastewater	13

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19/07/2016	First issue with new template (this certificate is linked to CDM qualification)
2	09/10/2017	Qualification update as ITRP

Responsabile di schema
 Scheme Leader
 Laura SEVERINO



*SCHEMI VOLONTARI/ VOLUNTARY SCHEMES: ACR American Carbon Registry, CCB The Climate, Community & Biodiversity Alliance, GS Gold Standard, JI Joint Implementation, SCS Social Carbon Standard, VCS Verified Carbon Standard.

TEC: Technical expert; VAL: Validator; VER: Verifier; TL: Team leader; FIN EXP: Financial Expert; ITRP: Independent technical reviewer

RINA Services S.p.A. è accreditato/recognized da

RINA Services S.p.A. is accredited /recognized by

UNFCCC	Quali Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects
VCSA	per condurre la Validazione e la Verifica di Progetti VCS to carry out Validation and Verification of VCS Projects
GS Foundation	per condurre la Validazione e la Verifica di Progetti GS to carry out Validation and Verification of GS Projects
Ecologica Institute	per condurre la Validazione e la Verifica di rapporti SCS to carry out Validation and Verification of SCS Reports
American Carbon Registry ACR	per condurre la Validazione e la Verifica di Progetti ACR to carry out Validation and Verification of ACR projects
The Climate, Community & Biodiversity Alliance CCB	per condurre la Validazione e la Verifica di Progetti co-benefit CCB to carry out Validation and Verification of co-benefit CCB projects