



BIO-LITE AFRICA IMPROVED STOVE PROGRAM



DOCUMENT PREPARED BY



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CONTENTS

PROJECT DETAILS	4
1.1 Summary Description of the Implementation Status of the Project	4
1.2 Audit History.....	6
1.3 Sectoral Scope and Project Type	6
1.4 Project Proponent	6
1.5 Other Entities Involved in the Project	6
1.6 Project Start Date	6
1.7 Project Crediting Period	6
1.8 Project Location	7
1.9 Title and Reference of Methodology	11
1.10 Double Counting and Participation under Other GHG Programs	12
1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions.....	12
1.12 Sustainable Development Contributions	12
1.13 Commercially Sensitive Information.....	21
2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT	21
2.1 Stakeholder Engagement and Consultation.....	21
2.2 Risks to Stakeholders and the Environment.....	24
2.3 Respect for Human Rights and Equity	25
2.4 Ecosystem Health	27
3 IMPLEMENTATION STATUS	28
3.1 Implementation Status of the Project Activity	28
3.2 Deviations	29
3.3 Grouped Projects	29
3.4 Baseline Reassessment.....	31
4 DATA AND PARAMETERS.....	31
4.1 Data and Parameters Available at Validation	31
4.2 Data and Parameters Monitored.....	34
4.3 Monitoring Plan.....	37
5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	56
5.1 Baseline Emissions	56

5.2	Project Emissions	56
5.3	Leakage Emissions	57
5.4	GHG Emission Reductions and Carbon Dioxide Removals	57
APPENDIX 1: COMMERCIALY SENSITIVE INFORMATION.....		60

PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The purpose of this grouped project is to distribute improved cookstoves (“ICS”) in the households/small and medium-sized enterprises (SMEs) in Sub-Saharan African countries, viz Rwanda, Malawi, Nigeria, Mali, Madagascar, Senegal, Côte d’Ivoire, Democratic Republic of Congo, Zambia and Uganda as the host countries.

Despite efforts to increase global access to clean cooking, the Tracking SDG 7: Energy Progress Report 2024, Chapter 2¹ points to 2.1 billion people still using polluting fuels (e.g., charcoal, coal, crop waste, dung, kerosene, and wood) and technologies for most of their cooking needs. As per the same report, around three-quarter (74 percent) of the world’s population without access to clean cooking is found in only 20 countries. In 8 of these 20 countries, less than 10 percent of the population has access to clean fuels and technologies for cooking. Four of these eight countries (Democratic Republic of Congo, Madagascar, Mali and Uganda) are covered under this grouped project. If current trends continue, every ~6 out of 10 people without clean cooking access will reside in Sub-Saharan Africa in 2030, with little or no improvement expected by 2050. In fact, in Sub-Saharan Africa, the deficit in access to clean cooking has a clear upward trend, as progress toward clean cooking has not been able to keep pace with the region’s growing population.

Additionally, the use of solid biomass fuels (e.g., charcoal, wood etc.) in inefficient traditional stoves and/or open three stone fires release large amounts of particulate matter (PM), creating hazardous levels of indoor air pollution (IAP). IAP generated by inefficient and poorly ventilated stoves burning biomass fuels is responsible for the deaths of an estimated 3.2 million people annually. Almost half of these deaths occur among children under five years of age². The use of the traditional inefficient biomass stoves is a significant driver of deforestation. Widespread usage of unsustainably sourced, non-renewable biomass (NRB) for cooking results in equivalent GHG emissions attributed to use of non-renewable biomass.

Technology/ Measure

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

¹ <https://iea.blob.core.windows.net/assets/cdd62b11-664f-4a85-9eb6-7f577d317311/SDG7-Report2024-0611-V9-highresforweb.pdf>

² <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>

For the current monitoring period, the following models of ICSs were disseminated, under the grouped project.

Stove Model	Jiko Fresh	Jiko Malkia	Jiko Bora Mama Yao	Jiko Safi
Photo				
Thermal Efficiency	45.70%	50.07%	55.10%	56.90%
Estimated Life	7 Years	7 Years	7 Years	7 Years
Weight	6 kg	5.3 kg	5.8 kg	3.7 kg
Dimensions (cm)	27.5 x 27.5 x 22.5	40 x 21 x 8.8	29 x 29 x 26.5	33.8 x 33.8 x 22.1
Fixed/Portable	Portable	Portable	Portable	Portable
Grate/Chimney	Grate	Grate	Grate	Grate

Figure 1: Project ICS distributed in the current Monitoring period

Status of Implementation

The distribution of project ICSs (implementation of the grouped project) begun on 01-June-2022, which is also the start date of crediting period for this grouped project. Given below is the ICS distribution summary, at the end of this monitoring period.

ICS Type	Year			Total
	2022	2023	2024	
Jiko Fresh	3,524	11,615	2,682	17,821
Jiko Malkia	2,758	11,977	6,685	21,420
Jiko Bora Mama Yao	4,351	19,551	12,101	36,003
Jiko Safi	0	0	228	228
Total	10,633	43,143	21,696	75,472

Additionally, for implementation status of each PA within the grouped project, please refer section 3.1 below.

Over the current monitoring period³ (01-06-2022 till 31-05-2024), the project has achieved emission reductions of 220,615 tCO₂e. The vintage and country-wise breakup of the same is as follows:

Country	Emission Reductions			Total Emission Reductions Achieved
	2022	2023	2024	
Rwanda	6,614	46,624	53,135	106,373
Nigeria	932	8,936	22,271	32,139
Mali	188	5,508	3,889	9,585
Madagascar	763	4,422	4,339	9,524
Senegal	953	10,421	7,901	19,275
Côte d'Ivoire	1,171	12,220	10,740	24,131
DRC	430	7,369	6,702	14,500
Uganda	0	848	4,238	5,086
Total	11,051	96,348	113,215	220,615

³ The current monitoring period consists of two annual monitoring sessions viz MS1 and MS2 as follows:

Monitoring Session (MS) #	Start Date	End Date
MS 1	01 June 2022	31 May 2023
MS 2	01 June 2023	31 May 2024

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	24-April-2023 -09-June-2023	VCS	Carbon Check India Private Limited	6 weeks and 4 days
Verification	01-June-2022 -31-May- 2024	VCS	SustainCert S.A.	2 years

1.3 Sectoral Scope and Project Type

Sectoral scope ⁴	03- Energy Demand
Project activity type	Grouped Project - Energy Efficiency

1.4 Project Proponent

Organization name	BioLite
Contact person	Erik Wurster
Title	VP, Environmental Markets and Sustainability
Address	c/o Loita Management Services Ltd, 1/f River Court, 6 St Denis Street, Port Louis, Mauritius
Telephone	+1 347 529 5720
Email	erik@bioliteenergy.com

1.5 Other Entities Involved in the Project

Organization name	Climate Secure
Role in the project	Entity completing the Monitoring Report
Contact person	Rohit Lohia
Title	Director
Address	P.O. Box 515000, Sharjah Media City, Sharjah, UAE
Telephone	+91 9717093552
Email	rohit.lohia@climate-secure.com

1.6 Project Start Date

Project start date	01-June-2022
Justification	The date of distribution of first ICS under the Grouped project, as well as the start date of PA-1

1.7 Project Crediting Period

Crediting period	☒ Seven years, twice renewable ☐ Ten years, fixed ☐ Other (state the selected crediting period and justify how it conforms with the VCS Program requirements)
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⁴ Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: <https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes>

Start and end date of first or fixed crediting period

01-June-2022 to 31-May-2029

1.8 Project Location

The project activity instances (ICs) under the current monitoring period have been distributed in the following countries.

PA-1:

Host Country: Rwanda

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

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

Physical/Geographical location:

Project Location ⁵	Geodetic Coordinates (Northernmost Point)	Geodetic Coordinates (Southernmost Point)	Geodetic Coordinates (Easternmost Point)	Geodetic Coordinates (Westernmost Point)
Rwanda	01°03' S	02°51' S	30°53' E	28°52' E

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



Figure 2: Map of Rwanda

PA-3:

Host Country: Nigeria

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

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

Physical/Geographical location:

Project Location	Geodetic Coordinates (Northernmost Point)	Geodetic Coordinates (Southernmost Point)	Geodetic Coordinates (Easternmost Point)	Geodetic Coordinates (Westernmost Point)
Nigeria	13°53' N	4°16' N	14°40' E	2°42' E

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

⁵ <https://worldpopulationreview.com/>



Figure 3: Map of Nigeria

PA-4:

Host Country: Mali

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

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

Physical/Geographical location:

Project Location	Geodetic Coordinates (Northernmost Point)	Geodetic Coordinates (Southernmost Point)	Geodetic Coordinates (Easternmost Point)	Geodetic Coordinates (Westernmost Point)
Mali	25°00' N	10°09' N	4°00' E	12°00' W

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



Figure 4: Map of Mali

PA-5:

Host Country: Madagascar

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

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

Physical/Geographical location:

Project Location	Geodetic Coordinates (Northernmost Point)	Geodetic Coordinates (Southernmost Point)	Geodetic Coordinates (Easternmost Point)	Geodetic Coordinates (Westernmost Point)
Madagascar	11°57' S	25°37' S	50°40' E	43°30' E

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



Figure 5: Map of Madagascar

PA-6:

Host Country: Senegal

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

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

Physical/Geographical location:

Project Location	Geodetic Coordinates (Northernmost Point)	Geodetic Coordinates (Southernmost Point)	Geodetic Coordinates (Easternmost Point)	Geodetic Coordinates (Westernmost Point)
Senegal	16°41' N	12°18' N	11°22' W	17°27' W

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



Figure 6: Map of Senegal

PA-7:

Host Country: Côte d'Ivoire

Region/State/Province etc.: All regions of Côte d'Ivoire

City/Town/Community etc.: All cities and towns in Côte d'Ivoire

Physical/Geographical location:

Project Location	Geodetic Coordinates	Geodetic Coordinates	Geodetic Coordinates	Geodetic Coordinates
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	(Northernmost Point)	(Southernmost Point)	(Easternmost Point)	(Westernmost Point)
Côte d'Ivoire	10°44' N	4°21' N	2°29' W	8°36' W

The map of Côte d'Ivoire, for reference purpose, is as follows:



Figure 7: Map of Côte d'Ivoire

PA-8:

Host Country: Democratic Republic of Congo

Region/State/Province etc.: All regions of Democratic Republic of Congo

City/Town/Community etc.: All cities and towns in Democratic Republic of Congo

Physical/Geographical location:

Project Location	Geodetic Coordinates (Northernmost Point)	Geodetic Coordinates (Southernmost Point)	Geodetic Coordinates (Easternmost Point)	Geodetic Coordinates (Westernmost Point)
DRC	5°23' N	13°27' S	30°56' E	12°12' E

The map of Democratic Republic of Congo, for reference purpose, is as follows:

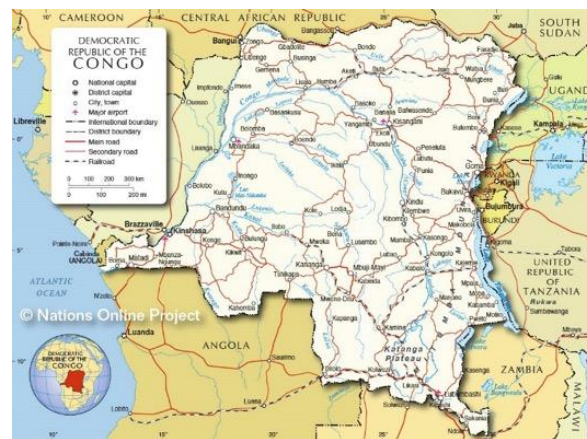


Figure 8: Map of Democratic Republic of Congo

PA-10:

Host Country: Uganda

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

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

Physical/Geographical location:

Project Location	Geodetic Coordinates (Northernmost Point)	Geodetic Coordinates (Southernmost Point)	Geodetic Coordinates (Easternmost Point)	Geodetic Coordinates (Westernmost Point)
Uganda	04°14' N	01°29' S	35°02' E	29°34' E

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



Figure 9: Map of Uganda

1.9 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	VMR0006 ⁶	Methodology for Installation of High Efficiency Firewood Cookstoves	Version 1.1, dated 22-July-2021
Tool	CDM Tool:01 ⁷	TOOL01: Tool for demonstration and assessment of additionality	Version 7.0.0
Tool	CDM Tool:27 ⁸	TOOL27: Investment analysis	Version 11.0
Tool	CDM Tool:30 ⁹	TOOL30: Calculation of the fraction of non-renewable biomass	Version 4.0

⁶<https://verra.org/wp-content/uploads/2021/07/VMR0006-Methodology-for-Installation-of-High-Efficiency-Firewood-Cookstoves-v1.1.pdf>

⁷<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

⁸<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v11.0.pdf>

⁹<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v4.0.pdf>

1.10 Double Counting and Participation under Other GHG Programs

1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

1.10.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.11.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

1.11.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

1.11.3 Supply Chain (Scope 3) Emissions

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

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

1.12 Sustainable Development Contributions

Summary description of project activities implemented during the monitoring period that result in SD contributions:

The project activities (PA-1 to PA-10) involve dissemination of improved cookstoves ("ICS") to replace existing traditional cookstoves in domestic households and communities in the baseline. Till the end of the current monitoring period, 75,472 units of ICS (project activity instances) were distributed within the grouped project boundary. Of the 10 PAs in the grouped project, project activity instances (ICSs) were distributed in 8 PAs only (till the end of the monitoring period) as follows: Rwanda, Nigeria, Mali, Madagascar, Senegal, Côte d'Ivoire, Democratic Republic of Congo and Uganda.

Explanation of how project activities result in the SD contributions described in Table 1 and contribution to nationally stated SD priorities:

Please refer to the table below:

Impact Category	SDG Indicator	Justification achieving Sustainable Development Benefits of the	Nationally stated Sustainable Development Priority	
			Country	Priority SDG (Yes/ No)
Economic Well-Being	Project Indicator: Specific Average monthly household savings due to decrease in expenditure on purchased fuel after shifting to project technology	Household expenditures on purchased cooking fuel gets reduced with usage of project ICS owing to its increased efficiency. Thus, project ICS results in money savings in beneficiary households.	Rwanda ¹⁰	No
			Nigeria ¹¹	Yes
			Mali ¹²	No
			Madagascar ¹³	Yes
			Senegal ¹⁴	No
			Côte d'Ivoire ¹⁵	Yes
			DRC ¹⁶	No
			Uganda ¹⁷	Yes
	8.5.1 Average hourly earnings of employees, by sex, age, occupation and persons with disabilities	The project creates local employment opportunities in operational and management roles, as well as in manufacturing, distribution, and logistics.	Country	Priority SDG (Yes/ No)
			Rwanda	No
			Nigeria	Yes
			Mali	No
			Madagascar	Yes
			Senegal	No
			Côte d'Ivoire	Yes
			DRC	Yes
			Uganda	Yes
Social Well-Being	5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age, and location	The project ICS saves time in cooking activities (by faster cooking) as well as save time in fuel procurement (reduced collection time or reduced fuel purchase trips to market) due to reduced fuel consumption. This shall save time spent by the women involved in	Country	Priority SDG (Yes/ No)
			Rwanda	No
			Nigeria	Yes
			Mali	Yes
			Madagascar	Yes
			Senegal	Yes
			Côte d'Ivoire	No

¹⁰ <https://hlpf.un.org/countries/rwanda/voluntary-national-reviews-2023>

¹¹ https://sustainabledevelopment.un.org/content/documents/26309VNR_2020_Nigeria_Report.pdf

¹² <https://hlpf.un.org/countries/mali/voluntary-national-review-2022>

¹³ <https://hlpf.un.org/countries/madagascar/voluntary-national-review-2021>

¹⁴ [Senegal Link](#)

¹⁵ <https://nec.undp.org/sites/default/files/2021-07/C%C3%B4te%20d%E2%80%99Ivoire%202017.pdf>

¹⁶ https://data.undp.org/sites/g/files/zskgke476/files/2023-11/undp_-_sdg_drc.pdf

¹⁷ <https://sdgs.opm.go.ug/wp-content/uploads/2024/07/SDG-VNR-FACT-SHEET-2024-PV.pdf>

		these activities (unpaid work) to be utilized in more productive and income generating tasks.	DRC	No
			Uganda	Yes
	7.1.2 Proportion of population with primary reliance on clean fuels and technology.	The project activity by distributing ICS provide access to clean cooking with primary reliance on clean fuels and technology. The project ICS is made available at a subsidized cost to beneficiary households.	Country	Priority SDG (Yes/ No)
			Rwanda	Yes
			Nigeria	No
			Mali	No
			Madagascar	No
			Senegal	No
			Côte d'Ivoire	Yes
			DRC	No
			Uganda	Yes
Environmental well-being	Project Specific Indicator: % users reporting reduction in Smoke/ PM after shifting to ICS in project.	The indoor pollutants emissions attributed to inefficient burning of solid biomass fuels in the beneficiary households shall be reduced. The project ICS shall aid improved combustion of solid biomass fuel thereby reducing smoke and Particulate matter (PM) emissions.	Country	Priority SDG (Yes/ No)
			Rwanda	No
			Nigeria	Yes
			Mali	No
			Madagascar	Yes
			Senegal	No
			Côte d'Ivoire	Yes
			DRC	Yes
			Uganda	Yes
	13.2.2 Total greenhouse gas emissions per year	The project by replacing the inefficient traditional stove with the energy-efficient ICS shall reduce equivalent GHG emissions for meeting similar thermal energy needs as that in the baseline.	Country	Priority SDG (Yes/ No)
			Rwanda	No
			Nigeria	No
			Mali	No
			Madagascar	No
			Senegal	No
			Côte d'Ivoire	Yes
			DRC	No
			Uganda	Yes
	15.2.1 Progress towards sustainable forest management	The project helps in reduction of the use of non-renewable biomass from forests, thus assisting in conserving existing forest stock and the protection of natural forest eco-systems and wildlife habitats.	Country	Priority SDG (Yes/ No)
			Rwanda	No
			Nigeria	No
			Mali	Yes
			Madagascar	Yes
			Senegal	Yes

			Côte d'Ivoire	Yes
			DRC	No
			Uganda	Yes

Table 1: Sustainable Development Contributions

Row	SDG	SDG indicator	Net impact on SDG indicator	Current project contributions			Contributions over project lifetime	
1)	1.4	Project Specific Indicator – Average monthly household savings due to reduction in expenditure on purchase fuel after shifting to project technology	Implemented activities to increase	Monthly savings ¹⁸ on purchased cooking fuel after switching to project ICS			Average value of monthly savings reported in MS1 and MS2 on purchased cooking fuel after switching to project ICS	
				Country	Monthly Savings_MS1	Monthly Savings_MS2	Country	Monthly Savings over MP
				Rwanda	3,056	2,937	Rwanda	2,996.50
				Nigeria	635	1,626	Nigeria	1,130.50
				Mali	2,094	1,543	Mali	1,818.50
				Madagascar	3	5	Madagascar	4
				Senegal	891	960	Senegal	925.50
				Côte d'Ivoire	1,167	958	Côte d'Ivoire	1,062.50
				DRC	14,192	14,412	DRC	14,302
				Uganda	-	8,315	Uganda	8,315

¹⁸ The monthly savings for each PA is reported in the following currencies:

Country	Rwanda	Nigeria	Mali	Madagascar	Senegal	Cote d'Ivoire	DRC	Uganda
Currency used in reporting SDG 1 contributions	RWF	NGN	XOF/CFA	\$	XOF/CFA	XOF/CFA	CDF	UGX

2)	3.9	Project Specific Indicator – % users reporting reduction in Smoke/PM emissions after shifting to ICS in project	Implemented activities to increase	Beneficiaries reporting reduced exposure to smoke / PM emission after switching to project ICS	Average beneficiaries in MS1 and MS2 reporting reduced exposure to smoke / PM emission after switching to project ICS																																													
				<table><tr><th>Country</th><th>% Beneficiaries MS1</th><th>% Beneficiaries MS2</th></tr><tr><td>Rwanda</td><td>95.74%</td><td>84.78%</td></tr><tr><td>Nigeria</td><td>98.00%</td><td>92.00%</td></tr><tr><td>Mali</td><td>90.00%</td><td>90.00%</td></tr><tr><td>Madagascar</td><td>94.00%</td><td>91.84%</td></tr><tr><td>Senegal</td><td>93.62%</td><td>90.00%</td></tr><tr><td>Côte d'Ivoire</td><td>92.00%</td><td>89.58%</td></tr><tr><td>DRC</td><td>92.00%</td><td>89.36%</td></tr><tr><td>Uganda</td><td>-</td><td>85.11%</td></tr></table>	Country	% Beneficiaries MS1	% Beneficiaries MS2	Rwanda	95.74%	84.78%	Nigeria	98.00%	92.00%	Mali	90.00%	90.00%	Madagascar	94.00%	91.84%	Senegal	93.62%	90.00%	Côte d'Ivoire	92.00%	89.58%	DRC	92.00%	89.36%	Uganda	-	85.11%	<table><tr><th>Country</th><th>% Beneficiaries</th></tr><tr><td>Rwanda</td><td>90.26%</td></tr><tr><td>Nigeria</td><td>95.00%</td></tr><tr><td>Mali</td><td>90.00%</td></tr><tr><td>Madagascar</td><td>92.92%</td></tr><tr><td>Senegal</td><td>91.81%</td></tr><tr><td>Côte d'Ivoire</td><td>90.79%</td></tr><tr><td>DRC</td><td>90.68%</td></tr><tr><td>Uganda</td><td>85.11%</td></tr></table>	Country	% Beneficiaries	Rwanda	90.26%	Nigeria	95.00%	Mali	90.00%	Madagascar	92.92%	Senegal	91.81%	Côte d'Ivoire	90.79%	DRC	90.68%	Uganda	85.11%
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Uganda	85.11%																																																	
3)	5.4	5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age, and location	Decrease	Time savings (hours per day) per household from cooking / fuel procurement activities	Average time savings (hours per day) per household from cooking / fuel procurement activities in MS1 and MS2																																													
				<table><tr><th>Country</th><th>Time savings (hours/day) MS1</th><th>Time savings (hours/day) MS2</th></tr><tr><td>Rwanda</td><td>0.97</td><td>0.88</td></tr><tr><td>Nigeria</td><td>1.56</td><td>2.18</td></tr><tr><td>Mali</td><td>0.69</td><td>0.68</td></tr><tr><td>Madagascar</td><td>0.57</td><td>0.34</td></tr><tr><td>Senegal</td><td>0.63</td><td>0.61</td></tr><tr><td>Côte d'Ivoire</td><td>0.72</td><td>0.54</td></tr><tr><td>DRC</td><td>0.87</td><td>0.91</td></tr><tr><td>Uganda</td><td>-</td><td>0.92</td></tr></table>	Country	Time savings (hours/day) MS1	Time savings (hours/day) MS2	Rwanda	0.97	0.88	Nigeria	1.56	2.18	Mali	0.69	0.68	Madagascar	0.57	0.34	Senegal	0.63	0.61	Côte d'Ivoire	0.72	0.54	DRC	0.87	0.91	Uganda	-	0.92	<table><tr><th>Country</th><th>Time savings (hours/day)</th></tr><tr><td>Rwanda</td><td>0.93</td></tr><tr><td>Nigeria</td><td>1.87</td></tr><tr><td>Mali</td><td>0.69</td></tr><tr><td>Madagascar</td><td>0.46</td></tr><tr><td>Senegal</td><td>0.62</td></tr><tr><td>Côte d'Ivoire</td><td>0.63</td></tr><tr><td>DRC</td><td>0.89</td></tr><tr><td>Uganda</td><td>0.92</td></tr></table>	Country	Time savings (hours/day)	Rwanda	0.93	Nigeria	1.87	Mali	0.69	Madagascar	0.46	Senegal	0.62	Côte d'Ivoire	0.63	DRC	0.89	Uganda	0.92
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Uganda	0.92																																																	

4)	7.1	7.1.2 Proportion of population with primary reliance on clean fuels and technology.	Increase	Country	ICS Distributed MS1	ICS Distributed MS2	Country	ICS Distributed over MP	
				<i>Rwanda</i>	6,960	32,733	<i>Rwanda</i>	32,733	
				<i>Nigeria</i>	1,335	13,253	<i>Nigeria</i>	13,253	
				<i>Mali</i>	1,536	3,092	<i>Mali</i>	3,092	
				<i>Madagascar</i>	1,183	3,252	<i>Madagascar</i>	3,252	
				<i>Senegal</i>	3,461	7,113	<i>Senegal</i>	7,113	
				<i>Côte d'Ivoire</i>	3,494	8,796	<i>Côte d'Ivoire</i>	8,796	
				<i>DRC</i>	1,503	3,965	<i>DRC</i>	3,965	
				<i>Uganda</i>	-	3,268	<i>Uganda</i>	3,268	
		Country	ICS Usage Rate (%) MS1	ICS Usage Rate (%) MS2	Country	Average ICS Usage Rate (%) over MP			
		<i>Rwanda</i>	95.74%	89.39%	<i>Rwanda</i>	92.57%			
		<i>Nigeria</i>	98.00%	93.15%	<i>Nigeria</i>	95.58%			
		<i>Mali</i>	96.00%	91.99%	<i>Mali</i>	94.00%			
		<i>Madagascar</i>	96.00%	93.91%	<i>Madagascar</i>	94.96%			
		<i>Senegal</i>	93.62%	91.97%	<i>Senegal</i>	92.80%			
		<i>Côte d'Ivoire</i>	96.00%	93.77%	<i>Côte d'Ivoire</i>	94.89%			
		<i>DRC</i>	94.00%	91.47%	<i>DRC</i>	92.74%			
		<i>Uganda</i>	-	87.23%	<i>Uganda</i>	87.23%			

5)	8.5	8.5.1 Average hourly earnings of female and male employees, by occupation, age, and persons with disabilities	Increase	Country	Employment Generated MS1	Employment Generated MS2	Country	Employment Generated over MP
				<i>Rwanda</i>	231 (110- Male, 121-Female)	1,160 (560- Male, 600- Female)	<i>Rwanda</i>	1,160 (560- Male, 600- Female)
				<i>Nigeria</i>	33 (08- Male, 25- Female)	33 (08- Male, 25- Female)	<i>Nigeria</i>	33 (08- Male, 25- Female)
				<i>Mali</i>	20 (19- Male, 01- Female)	20 (19- Male, 01- Female)	<i>Mali</i>	20 (19- Male, 01- Female)
				<i>Madagascar</i>	36 (18- Male, 18- Female)	96 (48- Male, 48- Female)	<i>Madagascar</i>	96 (48- Male, 48- Female)
				<i>Senegal</i>	25 (01- Male, 24- Female)	25 (01- Male, 24- Female)	<i>Senegal</i>	25 (01- Male, 24- Female)
				<i>Côte d'Ivoire</i>	35 (08- Male, 27- Female)	34 (08- Male, 26- Female)	<i>Côte d'Ivoire</i>	35 (08- Male, 27- Female)
				<i>DRC</i>	06 (02- Male, 04- Female)	06 (02- Male, 04- Female)	<i>DRC</i>	06 (02- Male, 04- Female)
				<i>Uganda</i>	-	13 (05- Male, 08- Female)	<i>Uganda</i>	13 (05- Male, 08- Female)
6)	13.2	13.2.2 Total greenhouse gas emissions per year	Decrease	Country	Emission Reductions MS1	Emission Reductions MS2	Country	Emission Reductions over MP
				<i>Rwanda</i>	18,098	88,275	<i>Rwanda</i>	106,373
				<i>Nigeria</i>	3,012	29,127	<i>Nigeria</i>	32,139
				<i>Mali</i>	1,792	7,794	<i>Mali</i>	9,585
				<i>Madagascar</i>	1,954	7,570	<i>Madagascar</i>	9,524
				<i>Senegal</i>	3,918	15,357	<i>Senegal</i>	19,275
				<i>Côte d'Ivoire</i>	4,278	19,853	<i>Côte d'Ivoire</i>	24,131
				<i>DRC</i>	2,485	12,016	<i>DRC</i>	14,500
				<i>Uganda</i>	0	5,086	<i>Uganda</i>	5,086

7)	15.2	15.2.1 Progress towards sustainable forest management	Increase	Country	NRB saved (wood eq.) MS1	NRB saved (wood eq.) MS2	Country	NRB saved (wood eq.) over MP
				<i>Rwanda</i>	8,393	40,963	<i>Rwanda</i>	49,329
				<i>Nigeria</i>	1,397	13,507	<i>Nigeria</i>	14,904
				<i>Mali</i>	831	3,614	<i>Mali</i>	4,445
				<i>Madagascar</i>	906	3,511	<i>Madagascar</i>	4,417
				<i>Senegal</i>	1,817	7,122	<i>Senegal</i>	8,939
				<i>Côte d'Ivoire</i>	1,984	9,207	<i>Côte d'Ivoire</i>	11,191
				<i>DRC</i>	1,152	5,572	<i>DRC</i>	6,724
				<i>Uganda</i>	-	2,359	<i>Uganda</i>	2,359

1.13 Commercially Sensitive Information

The information related to ICS beneficiary(ies) personal details (Name, Address and Phone number) has been redacted in the project documents (ICS distribution database and ER calculator) for personal data privacy and protection. Other than aforesaid, no commercially sensitive information has been excluded from the public version of the project documents.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

The Stakeholder makeup has not changed since validation. Prior to the start of validation, PP conducted a comprehensive stakeholder consultation event as described in section 2.2 of VCS PD. The PP has a grievance mechanism / ongoing communication provision for stakeholders to raise any concerns about potential negative impacts of the project during project implementation.

Stakeholder Identification	There have been no changes in the stakeholder composition since the validation. Hence this is not deemed applicable.
Legal or customary tenure/access rights	This is not applicable, as the PA-1 to PA-10 involves distribution of improved cookstoves to individual households at their discretion and in the context of this grouped project, there are no legal or customary tenure/access rights to territories and resources, including collective and conflicting rights, held by stakeholders, indigenous people (IPs), local communities (LCs), or customary rights holders.
Stakeholder diversity and changes over time	Refer section 2.2 of registered PD. No changes have been observed in the composition of stakeholders.
Expected changes in well-being	The PA(s) generates positive outcomes for stakeholders by reducing fuel consumption, lowering smoke and particulate matter (PM) emissions, and cutting fuel expenses. It also improves stakeholders' social and economic conditions by saving cooking time and creating local job opportunities in operations, management, distribution, and logistics.
Location of stakeholders	The individuals impacted by the PA(s) include recipients of the improved cookstoves and those employed through the project. Since the effects of the improved cookstoves are localized, it is not anticipated that areas outside the project boundaries will be impacted.
Location of resources	The PA(s) involves distribution of improved cookstoves to individual households and communities, without infringing on any land, territorial, or resource rights. The initiative helps in reducing the demand for biomass fuel, thereby alleviating pressure on forest resources and contributing to the

conservation of natural resources on stakeholders' customary lands.

2.1.2 Stakeholder Consultation and Ongoing Communication

Ongoing consultation	The ICS beneficiaries (and other stakeholders) have been informed about the availability of a grievance register maintained at the local offices of the Implementation Partner / distribution agencies. Field staff and resource personnel—recruited locally—also act as intermediaries for escalating any grievances raised by beneficiaries in their respective operational zones to the PP. Any relevant concern received during operation of PA-1 to PA-10 is addressed according to its merit.																				
Date(s) of stakeholder consultation	No stakeholder consultation has been conducted during the monitoring period. For documentation of stakeholder engagement conducted prior to project validation, refer to Section 2.2 of the registered Project Design Document (PD). As part of ongoing communication, no significant grievances were reported by the stakeholders during this monitoring period. Minor grievances received were duly addressed during the monitoring period.																				
Communication of monitored results	Information related to the project design, implementation, and monitoring outcomes was publicly disseminated through the website of the PP¹⁹, thereby ensuring inclusive access to all stakeholders. To further enhance accessibility, physical copies of the monitoring results were displayed on noticeboards at the PP’s office, thereby ensuring wider outreach to relevant stakeholders.																				
Consultation records	PP ensures that all stakeholder concerns are documented and addressed appropriately, based on their relevance and severity. Minor grievances received were duly addressed during the monitoring period. A summary of grievances received is as follows: <table><tr><th>Country</th><th>Description</th><th>Number of instances</th><th>Action taken</th></tr><tr><td>Cote d'Ivoire</td><td>Physical Damage - Combustion Chamber Failure</td><td>8 (~0.09% of total sales in Cote d'Ivoire)</td><td>Stove replaced</td></tr><tr><td>Cote d'Ivoire</td><td>Physical Damage - Dented stove</td><td>8 (~0.09% of total sales in Cote d'Ivoire)</td><td>Stove replaced</td></tr><tr><td>Madagascar</td><td>Physical Damage - Combustion Chamber Failure</td><td>30 (~0.93% of total sales in Madagascar)</td><td>Stove replaced</td></tr><tr><td>Mali</td><td>Physical Damage - Stove Loose / Missing Parts</td><td>2 (~0.07% of total sales in Mali)</td><td>Stove replaced</td></tr></table>	Country	Description	Number of instances	Action taken	Cote d'Ivoire	Physical Damage - Combustion Chamber Failure	8 (~0.09% of total sales in Cote d'Ivoire)	Stove replaced	Cote d'Ivoire	Physical Damage - Dented stove	8 (~0.09% of total sales in Cote d'Ivoire)	Stove replaced	Madagascar	Physical Damage - Combustion Chamber Failure	30 (~0.93% of total sales in Madagascar)	Stove replaced	Mali	Physical Damage - Stove Loose / Missing Parts	2 (~0.07% of total sales in Mali)	Stove replaced
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Mali	Physical Damage - Stove Loose / Missing Parts	2 (~0.07% of total sales in Mali)	Stove replaced																		

¹⁹ <https://global.bioliteenergy.com/pages/carbon-monitoring-results>

	Rwanda	Physical Damage - Combustion Chamber Failure	177 (~0.54% of total sales in Rwanda)	Combustion chamber replaced
	Rwanda	Physical Damage - Combustion Chamber Failure	30 (~0.09% of total sales in Rwanda)	Stove replaced
	Rwanda	Physical Damage - Ash tray heat damage	1 (~0.003% of total sales in Rwanda)	Ash tray replaced
	Rwanda	Physical Damage - Stove feet melted	7 (~0.021% of total sales in Rwanda)	Stove replaced
	Rwanda	Physical Damage - Loose screws	1 (~0.003% of total sales in Rwanda)	Screws fixed
Stakeholder input		Refer to Section 2.2 of the registered PD for consultation conducted prior to validation. No major grievances were reported during the operational phase of the grouped project. All minor grievances raised were addressed in accordance with the established procedures, as detailed above.		

2.1.3 Free, Prior, and Informed Consent

Consent	Refer section 2.2 of the registered PD for details of consultation conducted prior to validation. The PA(s) involves distribution of improved cookstoves to individual households and communities, and it does not require acquisition of property. Participation is voluntary, with beneficiaries having the freedom to choose whether to engage with the initiative. At the point of stove distribution, beneficiaries provide informed consent and formally transfer the rights to any carbon credit generated from their use of the ICS to the Project Proponent (PP) through a signed agreement. This process ensures that Free, Prior, and Informed Consent (FPIC) is duly obtained.
Outcome of FPIC	The Project Proponent holds complete and undisputed ownership of all carbon credits generated through the beneficiaries use of the distributed ICS units.

2.1.4 Grievance Redress Procedure.

Grievances received		Resolution and outcome			
Country	Description	Country	Description	Number of instances	Action taken
Cote d'Ivoire	Grievances related to physical damages on the ICS body and some ICS handles breakage during transit were received	Cote d'Ivoire	Physical Damage - Combustion Chamber Failure	8 (~0.09% of total sales in Cote d'Ivoire)	Stove replaced
Cote d'Ivoire					
Madagascar		Cote d'Ivoire	Physical Damage - Dented stove	8 (~0.09% of total sales in Cote d'Ivoire)	Stove replaced
Mali					
Rwanda		Madagascar	Physical Damage - Combustion Chamber Failure	30 (~0.93% of total sales in	Stove replaced

Rwanda				Madagascar)	
Rwanda		Mali	Physical Damage - Stove Loose / Missing Parts	2 (~0.07% of total sales in Mali)	Stove replaced
Rwanda		Rwanda	Physical Damage - Combustion Chamber Failure	177 (~0.54% of total sales in Rwanda)	Combustion chamber replaced
Rwanda		Rwanda	Physical Damage - Combustion Chamber Failure	30 (~0.09% of total sales in Rwanda)	Stove replaced
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		Rwanda	Physical Damage - Loose screws	1 (~0.003% of total sales in Rwanda)	Screws fixed

The procedure for grievances registration is readily accessible to stakeholders for ongoing consultation. To facilitate transparent communication, distribution partners maintain grievance registers at their respective local office locations. The end users/stakeholders are free to voice grievances regarding the PA(s) in the grievance register or on implementation partner's official phone number.

Local people employed as field staff, and resource persons also serve as medium to escalate grievances received from the project beneficiaries in their respective zones to PP.

2.1.5 Public Comments

Summary of comments received	Actions taken
No comments received during the monitoring period.	Not applicable
Refer section 2.4 of the registered PD for comments received during the stakeholder consultation conducted prior to validation.	

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

BioLite (Project Proponent) possesses extensive experience in the development of carbon projects across various standards and has successfully implemented several community-based initiatives. BioLite is supported by Climate Secure, serving as the Carbon Advisor. With over a decade of experience in developing similar projects across multiple countries, the combined expertise of BioLite and Climate Secure ensures effective implementation of this grouped project. No new entities have been included in the design or implementation of the project during this monitoring period.

2.2.2 Risk assessment

	Risk identified	Mitigation or preventative measure taken
Natural and human-induced risks to	No risk identified	The project ICS units are produced following safety protocols aligned with standardized design and material

stakeholders' wellbeing		specifications to ensure optimal functionality and user safety. The shift from traditional cooking methods to project ICS offers a sustainable, safer alternative to meet energy needs, delivering environmental and health benefits without introducing new risks.
Risks to stakeholder participation	No risk identified	Not Applicable, on the contrary, the grouped project is expected to enhance the social, economic, and environmental well-being of stakeholders directly or indirectly affected by the project.
Working conditions	No risk identified	Not Applicable, PP promotes a work environment grounded in mutual respect, free from harassment, discrimination, or human rights violations. Additionally, the PP confirms that employee wages meet or exceed industry standards and comply with minimum wage regulations as prescribed by state or local authorities.
Safety of women and girls	No risk identified	Not applicable. Since ICS are installed in beneficiary kitchens, and women and girls typically manage cooking responsibilities, the project ICS significantly reduce the burden and safety risks associated with fuel collection, as well as health risks from prolonged exposure to indoor air pollution (IAP), by virtue of the increased efficiency and design of the project ICS.
Safety of minority and marginalized groups, including children	No risk identified	Not Applicable, the grouped project does not involve any activities that compromise the safety of minority and marginalized groups, (including children). Rather, the project contributes positively to the sustainable development of the community as a whole.
Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	No risk identified	Not Applicable, the grouped project does not involve the manufacture, trade, release, and/ or use of hazardous chemicals and/or materials. Instead, the ICS are going to decrease the GHG emission levels, which is attributed to improved performance and design of the project ICSs. The grouped project intervention includes replacement of baseline stoves with improved project ICS.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

	Risks identified²⁰	Mitigation or preventative measure(s) taken
Discrimination	No risk identified	The Project Proponent (PP) fosters an environment of mutual respect, where employees and business partners collaborate free from harassment, discrimination, or human rights violations. The grouped project does not endorse any form of discrimination based on gender, sexual orientation, religion, race etc. Relevant policies including the Employee Handbook, Environment and Social Policy, and Anti-Money Laundering Policy are

²⁰ The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

		implemented to safeguard against discrimination and sexual harassment within the project framework.
Sexual harassment	No risk identified	Please refer above
Gender equity in labor and work	No risk identified	The PP maintains a strict non-discriminatory approach regarding gender and promotes equal pay for equal work. Furthermore, the PP confirms that employee wages meet or exceed industry standards and comply with the minimum wage requirements prescribed by applicable state and/or local regulations.
Forced labor	No risk identified	The PP neither endorses nor is involved in child labor, the exploitation of human trafficking victims, or the utilization of forced labor. PP has relevant policies such as BioLite Environment and Social Policy to make sure that no such workplace risk exists. The right for decent work, observance of minimum age employment, fair and equal treatment and opportunity, respect for health and safety, freedom of association and recognition of the right to collective bargaining are all good practices as defined by the International Labor Organization (ILO) Core Labor Standards (CLS). In all operations PP ensure as a minimum requirement that these rights are required to be upheld.
Child labor	No risk identified	Please refer above
Human trafficking	No risk identified	Please refer above

2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	The grouped project involves distribution of improved cookstoves to individual households and in the context of the grouped project, there are no legal or customary tenure/access rights to territories and resources, including collective and conflicting rights held by stakeholders, indigenous people (IPs), local communities (LCs), or customary rights holders.

2.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Mitigation(s) or preventative measure taken
No risk identified	The ICSs are portable and do not interfere with any sites, structures, or objects with historical, cultural, artistic, traditional, or religious values or intangible forms of culture.

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	Not applicable. The grouped project entails distributing improved cookstoves to individual households and communities without requiring any property acquisition. Participation is entirely voluntary, and households are free to decide whether or not to take part.

2.3.5 Benefit Sharing

Summary of the benefit sharing plan	Not applicable, the grouped project involves distribution of improved cookstoves to individual households and communities. Further, the beneficiaries are being provided with a project stove at a discounted price against the transfer of ownership of credits to the PP.
Benefit sharing during the monitoring period	Not applicable

2.4 Ecosystem Health

	Risk identified	Mitigation or preventative measure taken during the monitoring period
Impacts on biodiversity and ecosystems	No risk identified	The improved cookstoves (ICSs) contribute to a reduction in GHG emissions due to their enhanced design and efficiency. The project does not involve any baseline fuel changes or other interventions that could negatively affect biodiversity or ecosystems. Therefore, it does not impact intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas, or designated sites.
Soil degradation and soil erosion	No risk identified	By reducing biomass fuel demand in the region, the grouped project alleviates pressure on forests, which helps prevent deforestation and indirectly mitigates soil erosion linked to tree removal.
Water consumption and stress	No risk identified	The fuel type in project ICS is the same as that in the baseline scenario. Since there is no fuel change, albeit much reduced in volume attributed to ICS efficiency, there are no potential impacts on natural or pre-existing patterns of watercourses, groundwater and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity.

2.4.1 Rare, Threatened, and Endangered species

Species or habitat	Not applicable, the project ICS have no relevance to be located in, or adjacent to habitats for rare, threatened, or endangered species.
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	Risk identified	Mitigation or preventative measure(s) taken
Habitats for rare, threatened, and endangered species	No risk identified	Not applicable, the project activity is not located in or adjacent to habitats for rare, threatened, or endangered species.
Areas for habitat connectivity	No risk identified	Not applicable, the project activity is not located in or adjacent to areas for habitat connectivity.

2.4.2 Introduction of species

Species introduced	Classification	Justification for use	Adverse effects and mitigation
None	NA	NA	NA

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species
None	NA

	Risks identified	Mitigation or preventative measure(s) taken
Invasive species	No risk identified	Not applicable, the grouped project does not involve the introduction of any invasive species.

2.4.3 Ecosystem conversion

	Risks identified	Mitigation or preventative measure(s) taken
Ecosystem conversion	No risk identified	Not applicable, the grouped project is not an ARR, ALM, WRC or ACoGS project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The following table details the Implementation Status of PAs covered under the grouped project:

PA #	Country	Status of Implementation (number of ICS (PAIs) distributed)										Total
		Jiko Fresh			Jiko Malkia			Jiko Bora Mama Yao			Jiko Safi	
		2022	2023	2024	2022	2023	2024	2022	2023	2024	2024	
1	Rwanda	0	0	0	0	0	0	4,351	17,915	10,467	0	32,733
2	Malawi	0	0	0	0	0	0	0	0	0	0	0
3	Nigeria	439	2,269	1,233	518	3,389	2,135	0	1,636	1,634	0	13,253
4	Mali	433	2,143	145	117	244	10	0	0	0	0	3,092
5	Madagascar	287	752	295	411	993	514	0	0	0	0	3,252
6	Senegal	984	2,756	180	727	1,841	625	0	0	0	0	7,113
7	Côte d'Ivoire	1,075	2,575	380	548	3,453	765	0	0	0	0	8,796
8	DRC	306	1,120	449	437	1,054	599	0	0	0	0	3,965
9	Zambia	0	0	0	0	0	0	0	0	0	0	0
10	Uganda	0	0	0	0	1,003	2,037	0	0	0	228 ²¹	3,268
Total		3,524	11,615	2,682	2,758	11,977	6,685	4,351	19,551	12,101	228	75,472

²¹ Due to small number of Jiko Safi ICS distributed in Uganda, it was not viable to conduct sample-based monitoring on these ICSs, under a separate independent sampling frame. Also, due to the rated thermal efficiency difference between Jiko Safi and other ICS models distributed in Uganda being more than 5% points, it was not deemed appropriate to consider Jiko Safi ICS population in a single sampling frame with other ICS models in Uganda. Thus, the PP has considered the monitoring results of Jiko Malkia ICS for determining emission reductions from Jiko Safi ICS units. This is deemed conservative given the operational thermal efficiency of Jiko Safi is >5 percentage points higher than that of Jiko Malkia.

The PA-1 to PA-10 have been under continued operation since their start date, and being implemented as per the registered PD. No events have occurred during the monitoring period that impact the GHG emission reductions or monitoring as per the registered PD. Additionally, there have been no changes to the project proponent or other entities involved in this project during the monitoring period.

3.2 Deviations

3.2.1 Methodology Deviations

Not applicable, no methodology deviations have been applied.

3.2.2 Project Description Deviations

Not applicable, no project description deviations have been applied.

3.3 Grouped Projects

Clause 3.6.11 of VCS Standard v4.7 specifies that initial project activity instances may include planned project activity instances. Section 1.4 of the registered VCS-PD, page 09-11, already demonstrates how the PAIs included in this grouped project must comply with the required set of eligibility criteria in line with 3.6.17 of VCS Standard v4.7.

No.	Eligibility Criterion	Means of Verification / Supporting evidence for inclusion	Justification
1	Applicability Conditions	PA shall demonstrate compliance with VMR0006 version 1.1 in the PD or Joint PD MR, as applicable. MoV: PD/ Joint PD MR section 3.2 justifying the applicability criteria of applied methodology.	The 75,472 PAIs distributed follow the methodology applicability as justified in the registered VCS-PD. Although compliance with the methodology applicability criteria has been substantiated at the grouped project level in the VCS-PD already, the PAIs distributed under this grouped project meet the (technology related) applicability conditions of methodology (VMR0006 version 1.1) by virtue of compliance with the eligibility criteria as specified below in this table.
2	Geographical Area	All ICS implemented / distributed in a PA shall be within the Geographic boundary of Grouped Project. MoV: ICS installation database showing ICS location to be in corresponding country.	The 75,472 PAIs distributed under this grouped project are limited to the host countries specified in the registered VCS-PD and fall within the geographical boundary of Rwanda, Nigeria, Mali, Madagascar, Senegal, Côte d'Ivoire, Democratic Republic of the Congo and Uganda. The ICS distribution database lists the address of each PAI which is within the designated geographic

			area as defined under section 1.12 of registered VCS PD.
3	Baseline Scenario	PA shall capture the baseline fuel of project ICS beneficiaries to show that the baseline scenario is use of non-renewable biomass. MoV: ICS installation database / user registration records showing baseline fuel for ICS distributed.	The ICS distribution database objectively confirms the primary baseline fuel for all 75,472 PAI beneficiaries to be biomass.
4	Technology Type	Only ICS having more than 25% rated thermal efficiency shall be allowed to register in the grouped project. MoV: Manufacturer specifications / Manufacturer Certificate / laboratory testing WBT certificates for ICS	All 75,472 PAIs pertain to having a rated thermal efficiency of more than 25%, as per the manufacturer specification certificates (being made available to the VVB for review and objective assessment). Further please refer to section 1.1 of MR for more details on ICS specifications.
5	Additionality	The PA shall be demonstrated as additional via the following: Demonstrate that 1. The new PAI 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. 2. New PAIs are distributed stoves at zero cost to the end-user and/or has no other source of revenue other than the sale of GHG credits as confirmed by the PP. Or 3. Where new PAIs are not provided at zero cost / free to the end-user or has source of revenues other than the sale of GHG credits, demonstrate that the proposed project activity is either: 1) not the most economically or financially attractive, or 2) not economically or financially feasible using investment analysis.	As per section 7 of VMR0006 version 1.1: 1. By the end of this monitoring period. There are no laws and regulations governing the use of improved cookstoves in PA countries households, making the distribution of the 75,472 PAIs purely voluntary in nature. 2. All 75,472 PAIs have been distributed at a subsidized price to the end users. Although some revenue was generated from the distribution of ICS, it is relatively small compared to the total cost to CME for delivering ICS to a beneficiary (including product cost, distribution and logistics cost, data collection cost etc.). Thus, the PAIs are not financially viable without the support of carbon revenues from sale of VCU and are additional. This is objectively verifiable against the agreement with distribution partners confirming that the PAIs have been distributed at a discounted price.
6	Start Date	The start date of grouped project is considered as 01/06/2022 which is also the start date of (the date of	None of the 75,472 PAIs have been distributed before 01/06/2022. The ICS distribution database

		distribution of first ICS). The start date of all other PAs to be included in the grouped project shall be after this date. MoV: Distribution record / user agreement showing the date of distribution for the	objectively confirms the date of distribution of each of the 75,472 PAIs to be on or after 01/06/2022.
7	Crediting Period	Refer PA PD / Joint PD and MR section 1.9	The crediting period for all 75,472 PAIs follows the renewable (7 years, renewable twice) cycle.
8	Double Counting	MoV: Declaration by the Project Owner / Project Developer	Each of the 75,472 PAI bears a unique serial number to avoid double counting. Further, the PP confirms that these PAIs have been singularly included in this grouped project and are not claiming any other forms of environmental attributes in any other standard.
9	Project Ownership	MoV: End user agreement for ICS under the PA Or Product packaging/ warranty card template	For each PAI, the agreement between the beneficiary and PP transfers uncontested and full rights to the ownership of credits to the PP.

3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes ☒ No

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

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

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

Data / Parameter	η_p												
Data unit	Fraction												
Description	Efficiency of project stove at the start of PA-1 to PA-10												
Source of data	Manufacturer's specification												
Value applied	<table> <tr> <th>ICS Model</th><th>Manufacturer Efficiency</th></tr> <tr> <td>Dura Stove</td><td>38.10%</td></tr> <tr> <td>Jiko Fresh</td><td>45.70%</td></tr> <tr> <td>Jiko Bora Mama Yao</td><td>55.10%</td></tr> <tr> <td>Jiko Malkia</td><td>50.07%</td></tr> <tr> <td>Jiko Safi</td><td>56.90%</td></tr> </table>	ICS Model	Manufacturer Efficiency	Dura Stove	38.10%	Jiko Fresh	45.70%	Jiko Bora Mama Yao	55.10%	Jiko Malkia	50.07%	Jiko Safi	56.90%
ICS Model	Manufacturer Efficiency												
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Jiko Fresh	45.70%												
Jiko Bora Mama Yao	55.10%												
Jiko Malkia	50.07%												
Jiko Safi	56.90%												

Justification of choice of data or description of measurement methods and procedures applied	As per the specification sheet provided by the manufacturer
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	f_{NRB}																						
Data unit	Fraction																						
Description	Fraction of woody biomass that can be established as non-renewable biomass																						
Source of data	Calculated																						
Value applied	<table border="1"> <thead> <tr> <th>Country</th><th>f_{NRB}</th></tr> </thead> <tbody> <tr><td>Rwanda</td><td>0.8511</td></tr> <tr><td>Malawi</td><td>0.7084</td></tr> <tr><td>Nigeria</td><td>0.8230</td></tr> <tr><td>Mali</td><td>0.6107</td></tr> <tr><td>Madagascar</td><td>0.6297</td></tr> <tr><td>Senegal</td><td>0.5437</td></tr> <tr><td>Côte d'Ivoire</td><td>0.7642</td></tr> <tr><td>DRC</td><td>0.7692</td></tr> <tr><td>Zambia</td><td>0.8003</td></tr> <tr><td>Uganda</td><td>0.7383</td></tr> </tbody> </table>	Country	f_{NRB}	Rwanda	0.8511	Malawi	0.7084	Nigeria	0.8230	Mali	0.6107	Madagascar	0.6297	Senegal	0.5437	Côte d'Ivoire	0.7642	DRC	0.7692	Zambia	0.8003	Uganda	0.7383
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Senegal	0.5437																						
Côte d'Ivoire	0.7642																						
DRC	0.7692																						
Zambia	0.8003																						
Uganda	0.7383																						
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per the "TOOL30: Calculation of the fraction of non-renewable biomass", version 4.0																						
Purpose of Data	Calculation of baseline emissions																						
Comments	--																						

Data / Parameter	$NCV_{woodfuel}$
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass
Source of data	Default value (VMR0006 ver. 1.1, page 10)
Value applied	0.0156
Justification of choice of data or description of measurement methods and procedures applied	IPCC default for wood fuel, based on the gross weight of the wood that is 'air-dried', may be used if fuel used in the project device is woody biomass/renewable biomass.
Purpose of Data	Calculation of baseline emissions
Comments	Although the baseline and project fuel is charcoal, however, since a charcoal to wood conversion factor of 6 has been applied to parameter $B_{y=1,new,i,survey}$ for emission reduction calculations, hence $NCV_{woodfuel}$ has been applied accordingly.

Data / Parameter	EF_{wf,CO_2}
Data unit	tCO ₂ /TJ
Description	CO ₂ Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass
Source of data	Default value (VMR0006 ver. 1.1, page 10)
Value applied	112

Justification of choice of data or description of measurement methods and procedures applied	IPCC default value for wood fuel
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	$EF_{wf,non\ CO_2}$
Data unit	tCO ₂ /TJ
Description	Non-CO ₂ Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass
Source of data	Default value (VMR0006 ver. 1.1, page 10)
Value applied	26.23
Justification of choice of data or description of measurement methods and procedures applied	IPCC default value for wood fuel
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	η_{old}
Data unit	Fraction
Description	Thermal efficiency of baseline cookstove
Source of data	Default value (VMR0006 ver. 1.1)
Value applied	0.10 for Firewood 0.20 for Charcoal
Justification of choice of data or description of measurement methods and procedures applied	A default value of 0.1 shall be used if the baseline device is a three-stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is, without a grate or a chimney. A default value of 0.2 shall be used for other types of devices. Further as per the methodology, this value has been fixed for each household that receives project ICS, during the project crediting period.
Purpose of Data	Calculation of baseline emissions
Comments	As per the methodology, this value has been fixed for each household that receives project ICS, during the project crediting period. To be updated at renewal of crediting period. Further, if wood baseline technology is replaced by project charcoal ICS, then in that case PP will apply leakage against charcoal fuel usage as per para 41 of AMS II.G. v 11.1.

Data / Parameter	DF_n
Data unit	Fraction
Description	Discount factor to account for efficiency loss of project cookstove per year of operation (fraction).
Source of data	Default value
Value applied	0.99

Justification of choice of data or description of measurement methods and procedures applied	As per the applied methodology																																																				
Purpose of Data	Calculation of baseline emissions																																																				
Comments	--																																																				
Data / Parameter	$\eta_{new,i,j}$																																																				
Data unit	Percentage																																																				
Description	Efficiency of the device of each type i and batch j implemented as part of PA-1 to PA-10																																																				
Source of data	Calculation																																																				
Value applied	As per equation (5) above, the applicable efficiency of distributed ICS models (for year 1) has been used in Ex-post ER calculations as follows: <table><tr><th colspan="9">$\eta_{new,i,j}$ (Applying degradation rate as per equation (5) for each age)</th></tr><tr><th rowspan="2">ICS Model</th><th rowspan="2">Symbol</th><th colspan="7">Age</th></tr><tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th></tr><tr><td>Jiko fresh</td><td>$\eta_{new, Jiko Fresh}$</td><td>42.96%</td><td>42.53%</td><td>42.10%</td><td>41.68%</td><td>41.27%</td><td>40.85%</td><td>40.44%</td></tr><tr><td>Jiko Bora Mama Yao</td><td>$\eta_{new, Mama Yao}$</td><td>51.79%</td><td>51.28%</td><td>50.76%</td><td>50.26%</td><td>49.75%</td><td>49.26%</td><td>48.76%</td></tr><tr><td>Jiko Malkia</td><td>$\eta_{new, Jiko Malkia}$</td><td>47.07%</td><td>46.60%</td><td>46.13%</td><td>45.67%</td><td>45.21%</td><td>44.76%</td><td>44.31%</td></tr></table>	$\eta_{new,i,j}$ (Applying degradation rate as per equation (5) for each age)									ICS Model	Symbol	Age							1	2	3	4	5	6	7	Jiko fresh	$\eta_{new, Jiko Fresh}$	42.96%	42.53%	42.10%	41.68%	41.27%	40.85%	40.44%	Jiko Bora Mama Yao	$\eta_{new, Mama Yao}$	51.79%	51.28%	50.76%	50.26%	49.75%	49.26%	48.76%	Jiko Malkia	$\eta_{new, Jiko Malkia}$	47.07%	46.60%	46.13%	45.67%	45.21%	44.76%	44.31%
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Justification of choice of data or description of measurement methods and procedures applied	Option V given in the methodology: “Efficiency of the improved cookstoves to be estimated using equation 5 of applied approved methodology where, loss in efficiency per year is calculated, and therefore this parameter does not need to be monitored”																																																				
Purpose of Data	Calculation of baseline emissions																																																				
Comments	In case of inclusion of other/new models, during project lifetime, corresponding rated thermal efficiency values shall be used for Ex-post ER calculations.																																																				

4.2 Data and Parameters Monitored

Data / Parameter	N _{y,i,j}																				
Data unit	Number																				
Description	Number of project devices of type i and batch j operating during year y																				
Source of data	Installation database and monitoring survey																				
Description of measurement methods and procedures to be applied	PP maintains a database of all ICS distributed. The usage rate of installed ICS has been measured based on a representative sample. CDM Sampling standard has been used for determining the sample size to achieve 90/10 confidence precision according to the latest version of CDM Standard for sampling and surveys for project activities and programme of activities.																				
Frequency of monitoring/recording	At least once every two years																				
Value monitored	<table><tr><th>Country</th><th>MS 1</th><th>MS 2</th></tr><tr><td>Rwanda</td><td>6,663</td><td>29,258</td></tr><tr><td>Nigeria</td><td>1,308</td><td>12,344</td></tr><tr><td>Mali</td><td>1,474</td><td>2,844</td></tr><tr><td>Madagascar</td><td>1,135</td><td>3,053</td></tr><tr><td>Senegal</td><td>3,240</td><td>6,541</td></tr></table>			Country	MS 1	MS 2	Rwanda	6,663	29,258	Nigeria	1,308	12,344	Mali	1,474	2,844	Madagascar	1,135	3,053	Senegal	3,240	6,541
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Uganda	-	2,651																										
Total	18,586	68,565																										
Monitoring equipment	Sampling based Monitoring survey																											
QA/QC procedures to be applied	In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of ICS.																											
Purpose of data	Calculation of baseline emissions																											
Calculation method	The results from sample-based monitoring will be used to calculate $N_{y,i,j}$ as follows $N_{y,i,j} = (n_{i,j,operational} / n_{i,j,total}) * N_{y,i,j,distributed}$ Where: N = number of stoves n = number of samples																											
Comments	During the stove distribution only one unit of ICS was distributed to each household to ensure that there is no ICS stacking in each household. Additionally, the presence of multiple project ICSs in a household was also determined ex-post during sampling surveys. No household was found using more than one project ICS and adjustment to ICS population is not applicable. The monitored usage rate for the monitoring periods is as follows. <table><tr><th>Country</th><th>Usage Rate MS1</th><th>Usage Rate MS2</th></tr><tr><td>Rwanda</td><td>95.74%</td><td>89.39%</td></tr><tr><td>Nigeria</td><td>98.00%</td><td>93.15%</td></tr><tr><td>Mali</td><td>96.00%</td><td>91.99%</td></tr><tr><td>Madagascar</td><td>96.00%</td><td>93.91%</td></tr><tr><td>Senegal</td><td>93.62%</td><td>91.97%</td></tr><tr><td>Cote d'Ivoire</td><td>96.00%</td><td>93.77%</td></tr><tr><td>DRC</td><td>94.00%</td><td>91.47%</td></tr><tr><td>Uganda</td><td>-</td><td>87.23%</td></tr></table> Further, the concerned parameter fully meets the desired precision as per the registered monitoring plan and the monitoring methodology.	Country	Usage Rate MS1	Usage Rate MS2	Rwanda	95.74%	89.39%	Nigeria	98.00%	93.15%	Mali	96.00%	91.99%	Madagascar	96.00%	93.91%	Senegal	93.62%	91.97%	Cote d'Ivoire	96.00%	93.77%	DRC	94.00%	91.47%	Uganda	-	87.23%
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DRC	94.00%	91.47%																										
Uganda	-	87.23%																										
Data / Parameter	Life Span																											
Data unit	Number of years																											
Description	Operating lifetime of the project device for projects opting Equation 5 for determining project stove efficiency																											
Source of data	Manufacturer's specification																											
Description of measurement methods and procedures to be applied	The ICSs follows fixed design specifications and are standardized with respect to dimensions and performance.																											
Frequency of monitoring/recording	Once at the time of project stove installation																											
Value monitored	7.0 years																											

Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of data	Calculation of emission reductions
Calculation method	-
Comments	-

Data / Parameter	$B_{y=1,new,i,survey}$
Data unit	tonnes/device/year
Description	Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i, determined in the first year of the implementation of the project through a sample survey
Source of data	Project fuel measurement campaigns/ survey
Description of measurement methods and procedures to be applied	Determined in the first year of the introduction of the devices (e.g., during the first year of the crediting period, $y=1$) through fuel measurement campaigns (project KPTs) at representative households and sample survey.
Frequency of monitoring/recording	Determined in the first year of project implementation

Value monitored	<table> <tr> <th>Country</th><th>$B_{y=1,new,i,j,survey}$</th></tr> <tr> <td>Rwanda</td><td>0.299</td></tr> <tr> <td>Nigeria</td><td>0.353</td></tr> <tr> <td>Mali</td><td>0.414</td></tr> <tr> <td>Madagascar</td><td>0.378</td></tr> <tr> <td>Senegal</td><td>0.375</td></tr> <tr> <td>Côte d'Ivoire</td><td>0.276</td></tr> <tr> <td>DRC</td><td>0.423</td></tr> <tr> <td>Uganda</td><td>0.409</td></tr> </table>	Country	$B_{y=1,new,i,j,survey}$	Rwanda	0.299	Nigeria	0.353	Mali	0.414	Madagascar	0.378	Senegal	0.375	Côte d'Ivoire	0.276	DRC	0.423	Uganda	0.409
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Uganda	0.409																		

The equipment's were duly calibrated and/or newly purchased at the time of use, so measurements were done with the necessary guarantees. The KPTs were conducted during 08-August-2023 - 26-November-2024. The detail of monitoring equipment is given below:

Weighing Scale:

Country	Brand	Model	Number of units	Date of calibration
Uganda	Crane Scale	Hanging Scale	1	02-June-2024
Rwanda	WeiHeng	Ebalance	1	01-September-2023
DRC	RenkMhe	Spring Balance	1	No calibration, Scale brand new
Nigeria	Shahin	JP Series	1	22-July-2023
Cote d'Ivoire	WeiHeng	WH-A08	7	No calibration, Scale brand new
Mali	WeiHeng	WH-A08	5	No calibration, Scale brand new
Senegal	EureCare	Hanging Scale	1	20-October-2023
Madagascar	WeiHeng	WH-A08	1	21-September-2023

QA/QC procedures to be applied	In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the parameter
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	value. Given, the desired precision was achieved, hence lower bound values are not applicable.
Purpose of Data	Calculation of emissions reduction
Calculation method	--
Comments	The values specified above are in units of tonnes of charcoal/device/year. The same has been multiplied with a factor of 6 to convert the value to firewood equivalent.

4.3 Monitoring Plan

a) **Management Plan, Organizational Structure, Role, Responsibilities:**

BioLite is the PP of this grouped project. The project is being implemented according to the following plan for measuring, recording, storing, aggregating, collating and reporting on monitored data and parameters. Role of entity's involved in the project is given in table below:

Entity	Roles and responsibilities
Project Proponent / Implementer	1. The PP oversees the general management of the project, including appointing all personnel / groups of personnel involved in the project development and implementation. 2. The distribution of ICS is managed via a network of Distribution partners. 3. The PP, during ICS distribution confirmed the waiver/transfer of exclusive and unconditional rights to the carbon credits generated by use of project ICS, in favour of PP, from the project beneficiaries, via customer agreement. 4. The PP maintained an ICS distribution database collecting requisite distribution data (including beneficiary information) as follows: a) Date of distribution of ICS b) Geographic area of distribution c) Model/type of project ICS distributed d) Quantity of project ICS distributed e) Unique serial number of project ICS f) Name of the beneficiary, address, and telephone number (if available) g) Primary Baseline fuel / technology being replaced 5. The ICS distribution database was checked by the Database team to eliminate any incomplete, invalid entries while simultaneously ensuring no double counting of ICS. The finalized database was used for ex-post sampling and monitoring purposes with the unique ICS serial number serving as the distinct identifier for each ICS. 6. The PP coordinated ex-post monitoring activities as follows: a) Implemented the monitoring plan and QA/AC measures, as applicable. b) Determined the sample size as per sampling plan and identified the samples monitored. c) Conducted ex-post monitoring - the usage data was collected using survey questionnaires designed by experts. d) PP ensured that staff responsible for monitoring and reporting had received adequate training, as applicable. e) KPTs, were conducted using calibrated/new equipment by experienced/trained personnel. f) The monitoring results and statistical robustness were reviewed internally and approved by competent staff.

	7. The data collected was subsequently use for emissions reduction calculations.
ICS Manufacturer or Supplier	1. Designed and supplied ICS units according to specified standards and project plans from the Project Proponent. 2. Confirmed / certified technical parameters and efficiency information at the time of supply.
Local Partners/ Distribution Partners	1. Provided support and assistance to the PP to accomplish the project's objectives. 2. Executed agreements with end users, including the transfer of rights of carbon credit generated from using ICS, to the Project Proponent. 3. Maintained organized record-keeping systems for compiling, calculating, and storing distribution data, following Project Proponent's directives. 4. Provided post-sales maintenance services to ICS beneficiaries based on agreed terms and conditions. 5. Performed any other responsibilities assigned by the Project Proponent
Monitoring Staff/External third party	1. Carried out ex-post project monitoring as instructed by the Project Proponent. 2. Used experienced / trained staff for monitoring tasks. 3. Managed monitoring data and records, shared them with the Project Proponent.

b) Competencies of Personnel Involved in the Monitoring Activity:

The personnel engaged in monitoring and reporting underwent training to ensure a comprehensive understanding and proper execution of the applicable monitoring and reporting protocols outlined in the monitoring plan above. PP ensured that the staff responsible for monitoring and reporting had received adequate training, as applicable.

c) Procedures for handling non-conformances, Internal Auditing and QA/QC:

QA/QC measures were followed as per section 5.2 of the PD. The monitoring results and statistical robustness were reviewed internally and approved by competent personnel to minimize the risk of any potential oversights and address any non-conformances. Through regular internal audit of project databases, the project's integrity is upheld, and associated risks are minimized, safeguarding the overall quality of the project.

d) Description of implemented sampling design:

Due to the large number of ICS envisioned to be distributed as part of the PAs, it is not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling was undertaken as part of Sampling Plan in line with the requirements of the methodology applied and the Standard: Sampling and surveys for CDM project activities and programmes of activities, version 9.0. and as per option (b) on page 12 of the VMR0006 v1.1.

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

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

Target population and sampling frame – The target population is the total ICS population served under the Pas (individually for each PA), and the sampling frame consists of aggregated data of end-users of the ICS as recorded in the Project ICS Database for an individual PA.

Sample method – Sampling was conducted using stratified random sampling technique over the sampling frame, and detailed calculations are provided below as per CDM guidelines “Sampling and surveys for CDM project activities and programmes of activities” v 9.0 and option (b) on page 12 of the methodology. ICSs with rated thermal efficiencies within +5% threshold of each other, were combined under a single sampling stratum. Subsequently, the ICSs in the sampling frame were stratified in Batches as per their date of distribution, with ICS distributed within one year of the project start date termed as “Batch 1”.

The sample size was determined using the following formula, also taking into consideration the minimum sample size prescribed by option (b) on page 12 of the methodology:

Sample size determination as per CDM Standard:

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

Where,

n = number of ICS to be sampled

N = Total number of ICS in the population

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

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

Where for proportion-based parameters:

$$V = \frac{SD^2}{p^2}$$

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

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

Where,

SD² = Weighted Overall Standard deviation

g_i = weight of strata i in the population

p_i = expected proportion of strata i in the population

k = total number of strata in the population

And for mean-based parameters:

$$V = \frac{SD^2}{mean^2}$$

$$SD^2 = \frac{\sum g_i * SD_i^2}{N}$$

$$mean = \frac{\sum g_i \times m_i}{N}$$

Where,

Mean = weighted overall mean

mi = Mean of strata i

Sample size as per option (b) on page 12 of methodology:

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

1. Project target population < 300: Minimum sample size 30
2. Project target population 300 to 1000: Minimum sample size 10% of group size
3. Project target population > 1000: Minimum sample size 100

For the fuel measurement campaign, the sample size was determined as per CDM Standard v 9.0 and KPT protocol v3.0 provided by clean cooking alliance. The expected mean/proportion value for a parameter was based on the PP's own knowledge / experience of the data (as per para 13 of Sampling Standard). To cover for potential non-response from the sampled population slight over-sampling was used.

Sample Size Determination for parameter $N_{y,i,j}$ (MS1):

Rwanda				
Monitoring parameter(s)		Stove Operating Fraction for determination of $N_{y,i,j}$		
Sampling frame(s)		1 Frame All charcoal ICS (MY) in Rwanda distributed till 31st May, 2023		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Batch#	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Bora Mama Yao	Batch-1	6960	0.900	30
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
$V_{SOF} = (SD/p)^2$				0.11
Sample Size required (SOF)				30

Nigeria				
Monitoring parameter(s)		Stove Operating Fraction for determination of $N_{y,i,j}$		
Sampling frame(s)		1 Frame All charcoal ICS (JF/JM) in Nigeria distributed till 31st May, 2023		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Batch#	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	1335	0.900	30
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
$V_{\text{SOF}} = (\text{SD}/p)^2$				0.11
Sample Size required (SOF)				30

Mali				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,i,j}		
Sampling frame(s)		1 Frame All charcoal ICS (JF/JM) in Mali distributed till 31st May, 2023		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Batch#	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	1536	0.900	30
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{SOF} = (SD/p) ²				0.11
Sample Size required (SOF)				30

Madagascar				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,i,j}		
Sampling frame(s)		1 Frame All charcoal ICS (JF/JM) in Madagascar distributed till 31st May, 2023		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Batch#	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	1183	0.900	30
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{SOF} = (SD/p) ²				0.11
Sample Size required (SOF)				30

Senegal				
Monitoring parameter(s)		Stove Operating Fraction for determination of $N_{y,i,j}$		
Sampling frame(s)		1 Frame All charcoal ICS (JF/JM) in Senegal distributed till 31st May, 2023		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Batch#	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	3461	0.900	30
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
$V_{\text{SOF}} = (\text{SD}/p)^2$				0.11
Sample Size required (SOF)				30

Cote d'Ivoire				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,i,j}		
Sampling frame(s)		1 Frame All charcoal ICS (JF/JM) in Cote d'Ivoire distributed till 31st May, 2023		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Batch#	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	3494	0.900	30
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{SOF} = (SD/p) ²				0.11
Sample Size required (SOF)				30

DRC				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,i,j}		
Sampling frame(s)		1 Frame All charcoal ICS (JF/JM) in DRC distributed till 31st May, 2023		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Batch#	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	1503	0.900	30
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{sof} = (SD/p) ²				0.11
Sample Size required (SOF)				30

Sample Size Determination for parameter $B_{y=1,new,survey}$

Rwanda				
Monitoring Parameter	$B_{y=1,new,i,survey}$			
Sampling frame(s)	Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023			
Sampling approach	Stratified random sampling across identified sampling frame			
Sample size determination				
Sampling frame	ICS population	Expected Value (Kg/person-meal/day)	Expected SD	Calculated Sample Size
Charcoal ICS	6960	0.15	0.02	5
$V_{mean} = (SD/mean)^2$				0.01
Minimum Sample Size required (efficiency)				3
tDistribution sample size adjustment	Iteration 1			9
	Iteration 2			4
	Iteration 3			6
	Iteration 4			5
	Iteration 5			5
	Iteration 6			5

Nigeria				
Monitoring Parameter	$B_{y=1, new, i, survey}$			
Sampling frame(s)	Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023			
Sampling approach	Stratified random sampling across identified sampling frame			
Sample size determination				
Sampling frame	ICS population	Expected Value (Kg/person-meal/day)	Expected SD	Calculated Sample Size
Charcoal ICS	1335	0.15	0.02	5
$V_{mean} = (SD/mean)^2$				0.01
Minimum Sample Size required (efficiency)				3
tDistribution sample size adjustment	Iteration 1			9
	Iteration 2			4
	Iteration 3			6
	Iteration 4			5
	Iteration 5			5
	Iteration 6			5

Mali				
Monitoring Parameter		B _{y=1, new, i, survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023		
Sampling approach		Stratified random sampling across identified sampling frame		
Sample size determination				
Sampling frame	ICS population	Expected Value (Kg/person-meal/day)	Expected SD	Calculated Sample Size
Charcoal ICS	1536	0.15	0.02	5
V _{mean} = (SD/mean) ²				0.01
Minimum Sample Size required (efficiency)				3
tDistribution sample size adjustment		Iteration 1		9
		Iteration 2		4
		Iteration 3		6
		Iteration 4		5
		Iteration 5		5
		Iteration 6		5

		Madagascar		
Monitoring Parameter		$B_{y=1, new, L, survey}$		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023		
Sampling approach		Stratified random sampling across identified sampling frame		
Sample size determination				
Sampling frame	ICS population	Expected Value (Kg/person-meal/day)	Expected SD	Calculated Sample Size
Charcoal ICS	1183	0.15	0.02	5
$V_{mean} = (SD/mean)^2$				0.01
Minimum Sample Size required (efficiency)				3
tDistribution sample size adjustment		Iteration 1		9
		Iteration 2		4
		Iteration 3		6
		Iteration 4		5
		Iteration 5		5
		Iteration 6		5

Senegal				
Monitoring Parameter	$B_{y=1, new, i, survey}$			
Sampling frame(s)	Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023			
Sampling approach	Stratified random sampling across identified sampling frame			
Sample size determination				
Sampling frame	ICS population	Expected Value (Kg/person-meal/day)	Expected SD	Calculated Sample Size
Charcoal ICS	3461	0.15	0.02	5
$V_{mean} = (SD/mean)^2$				0.01
Minimum Sample Size required (efficiency)				3
tDistribution sample size adjustment	Iteration 1			9
	Iteration 2			4
	Iteration 3			6
	Iteration 4			5
	Iteration 5			5
	Iteration 6			5

Cote d'Ivoire				
Monitoring Parameter	$B_{y=1, new, i, survey}$			
Sampling frame(s)	Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023			
Sampling approach	Stratified random sampling across identified sampling frame			
Sample size determination				
Sampling frame	ICS population	Expected Value (Kg/person-meal/day)	Expected SD	Calculated Sample Size
Charcoal ICS	3494	0.15	0.02	5
$V_{mean} = (SD/mean)^2$				0.01
Minimum Sample Size required (efficiency)				3
tDistribution sample size adjustment	Iteration 1			9
	Iteration 2			4
	Iteration 3			6
	Iteration 4			5
	Iteration 5			5
	Iteration 6			5

DRC				
Monitoring Parameter		B _{y=1,new,i,survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023		
Sampling approach		Stratified random sampling across identified sampling frame		
Sample size determination				
Sampling frame	ICS population	Expected Value (Kg/person-meal/day)	Expected SD	Calculated Sample Size
Charcoal ICS	1503	0.15	0.02	5
V _{mean} = (SD/mean) ²				0.01
Minimum Sample Size required (efficiency)				3
tDistribution sample size adjustment		Iteration 1		9
		Iteration 2		4
		Iteration 3		6
		Iteration 4		5
		Iteration 5		5
		Iteration 6		5

Uganda				
Monitoring Parameter		B _{y=1, new, i, survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database from 01/06/2023 till		
Sampling approach		Stratified random sampling across identified sampling frame		
Sample size determination				
Sampling frame	ICS population	Expected Value (Kg/person-meal/day)	Expected SD	Calculated Sample Size
Charcoal ICS	3040	0.15	0.02	5
V _{mean} = (SD/mean) ²				0.01
Minimum Sample Size required (efficiency)				3
tDistribution sample size adjustment		Iteration 1		9
		Iteration 2		4
		Iteration 3		6
		Iteration 4		5
		Iteration 5		5
		Iteration 6		5

Sample Size Determination for parameter $N_{y,i,j}$ (MS2):

Rwanda				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,i,j}		
Sampling frame(s)		2 Frames 1. All charcoal ICS (JB) in Rwanda distributed till 31st May 2023 2. All charcoal ICS (JB) in Rwanda distributed from 1st June 2023 till 31st May 2024		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Year	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Bora Mama Yao	Batch-1	6960	0.900	7
Jiko Bora Mama Yao	Batch-2	25773	0.900	24
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{sof} = (SD/p) ²				0.11
Sample Size required (SOF)				30

Nigeria				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,i,j}		
Sampling frame(s)		3 Frames 1. Charcoal ICS (JF/JM) in Nigeria distributed till 31st May 2023 2. Charcoal ICS (JF/JM) in Nigeria distributed from 1st June 2023 till 31st May 2024 3. Charcoal ICS (JB) in Nigeria distributed from 1st June 2023 till 31st May 2024		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Year	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	1335	0.900	4
Jiko Fresh/ Jiko Malkia	Batch-2	8648	0.900	20
Jiko Bora Mama Yao	Batch-2	3270	0.900	8
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{sof} = (SD/p) ²				0.11
Sample Size required (SOF)				30

Mali				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,ij}		
Sampling frame(s)		2 Frames 1. All charcoal ICS (JF/JM) in Mali distributed till 31st May 2023 2. All charcoal ICS (JF/JM) in Mali distributed from 1st June 2023 till 31st May 2024		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Year	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	1536	0.900	15
Jiko Fresh/ Jiko Malkia	Batch-2	1556	0.900	16
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{sof} = (SD/p) ²				0.11
Sample Size required (SOF)				30

Madagascar				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,ij}		
Sampling frame(s)		2 Frames 1. All charcoal ICS (JF/JM) in Madagascar distributed till 31st May 2023 2. All charcoal ICS (JF/JM) in Madagascar distributed from 1st June 2023 till 31st May 2024		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Year	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	1183	0.900	11
Jiko Fresh/ Jiko Malkia	Batch-2	2069	0.900	20
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{SOF} = (SD/p) ²				0.11
Sample Size required (SOF)				30

Senegal				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,ij}		
Sampling frame(s)		2 Frames 1. All charcoal ICS (JF/JM) in Senegal distributed till 31st May 2023 2. All charcoal ICS (JF/JM) in Senegal distributed from 1st June 2023 till 31st May 2024		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Year	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	3461	0.900	15
Jiko Fresh/ Jiko Malkia	Batch-2	3652	0.900	16
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{sof} = (SD/p) ²				0.11
Sample Size required (SOF)				30

Cote d'Ivoire				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,i,j}		
Sampling frame(s)		2 Frames 1. All charcoal ICS (JF/JM) in Cote d'Ivoire distributed till 31st May 2023 2. All charcoal ICS (JF/JM) in Cote d'Ivoire distributed from 1st June 2023 till 31st May 2024		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Year	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	3494	0.900	12
Jiko Fresh/ Jiko Malkia	Batch-2	5302	0.900	19
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{sof} = (SD/p) ²				0.11
Sample Size required (SOF)				30

DRC				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,i,j}		
Sampling frame(s)		2 Frames 1. All charcoal ICS (JF/JM) in DRC distributed till 31st May 2023 2. All charcoal ICS (JF/JM) in DRC distributed from 1st June 2023 till 31st May 2024		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Year	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Fresh/ Jiko Malkia	Batch-1	1503	0.900	12
Jiko Fresh/ Jiko Malkia	Batch-2	2462	0.900	19
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{sof} = (SD/p) ²				0.11
Sample Size required (SOF)				30

Uganda				
Monitoring parameter(s)		Stove Operating Fraction for determination of N _{y,ij}		
Sampling frame(s)		1 Frame 1. All charcoal ICS (JM) in Uganda distributed from 1st June 2023 till 31st May 2024		
Sampling approach		Stratified random sampling		
Sample size determination				
ICS Model	Year	ICS population	Expected operational proportion (SoF)	Calculated Sample Size (n)
Jiko Malkia	Batch-2	3040	0.900	30
Estimated SOF (p)				0.90
Estimated Standard Deviation of SOF (SD)				0.30
V _{sof} = (SD/p) ²				0.11
Sample Size required (SOF)				30

e) Collected data:

The Usage rate Data was collected using a questionnaire survey form. This survey form included questions related to operational status of the sampled ICS as well as checking the extent of simultaneous usage of baseline stove, if any, as applicable. The fuel measurement campaigns were conducted using KPT Protocol v4.0. The fuel measurements were conducted by visiting the sampled households consecutively 4 days to record fuel consumption per day as well as number and type of meals served.

The (Surveys and fuel measurement campaigns) were conducted during 08-August-2023 - 26-November-2024. For detailed data collected refer to the ER calculation sheet.

f) Analysis of the collected data:

Analysis of the data monitored through sampling revealed the following result and precision:

Precision assessment for parameter $N_{y,i,j}$ (MS1):

Monitoring results_Rwanda				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operationaol}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	6960	47	95.74%
Reliability Check				
			Samples Monitored	47
			SoF Measured	0.9574
			Standard Error of SoF	0.24%
			Relative precision (Margin of error)	0.42%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.9535
			$N_{y,i,j}$	6663

Monitoring results_Nigeria				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operationaol}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	1335	50	98.00%
Reliability Check				
			Samples Monitored	50
			SoF Measured	0.9800
			Standard Error of SoF	0.38%
			Relative precision (Margin of error)	0.64%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.9737
			$N_{y,i,i}$	1308

Monitoring results_Mali				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operationaol}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	1536	50	96.00%
Reliability Check				
			Samples Monitored	50
			SoF Measured	0.9600
			Standard Error of SoF	0.50%
			Relative precision (Margin of error)	0.86%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.9518
			$N_{y,i,i}$	1474

Monitoring results_Madagascar				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operationaol}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	1183	50	96.00%
Reliability Check				
			Samples Monitored	50
			SoF Measured	0.9600
			Standard Error of SoF	0.57%
			Relative precision (Margin of error)	0.98%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.9506
			$N_{y,i,i}$	1135

Monitoring results_Senegal				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{y,i,j,total}$)	Monitored Operating Fraction ($n_{y,i,j,operationaol}/n_{y,i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	3461	47	93.62%
Reliability Check				
			Samples Monitored	47
			SoF Measured	0.9362
			Standard Error of SoF	0.42%
			Relative precision (Margin of error)	0.73%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.9293
			$N_{y,i,j}$	3240

Monitoring results_Cote d'Ivoire				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{y,i,j,total}$)	Monitored Operating Fraction ($n_{y,i,j,operationaol}/n_{y,i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	3494	50	96.00%
Reliability Check				
			Samples Monitored	50
			SoF Measured	0.9600
			Standard Error of SoF	0.33%
			Relative precision (Margin of error)	0.57%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.9545
			$N_{y,i,j}$	3354

Monitoring results_DRC				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{y,i,j,total}$)	Monitored Operating Fraction ($n_{y,i,j,operationaol}/n_{y,i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	1503	50	94.00%
Reliability Check				
			Samples Monitored	50
			SoF Measured	0.9400
			Standard Error of SoF	0.61%
			Relative precision (Margin of error)	1.07%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.9299
			$N_{y,i,j}$	1412

Precision assessment for parameter $B_{y=1,new,i,survey}$

Rwanda				
Monitoring Parameter		B _{y=1,new,i,survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023		
Sampling approach		Stratified random sampling across identified sampling frame		
Monitoring results				
Sampling frame	ICS population	Monitored Sample count	Monitored Value (Kg/person-meal/day)	Monitored SD
Charcoal ICS	6960	10	0.089	0.012
Reliability Check				
			Standard error of mean	0.39%
			Relative precision (Margin of error) (%)	8.06%
			Result	Ok, reliability level met
			Lower Bound confidence value	Not Applicable
			B _{y=1,new,i,survey} (Tonnes/ICS/Year)	0.299

Nigeria				
Monitoring Parameter		B _{y=1,new,i,survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023		
Sampling approach		Stratified random sampling across identified sampling frame		
Monitoring results				
Sampling frame	ICS population	Monitored Sample count	Monitored Value (Kg/person-meal/day)	Monitored SD
Charcoal ICS	1335	10	0.083	0.006
Reliability Check				
			Standard error of mean	0.20%
			Relative precision (Margin of error) (%)	4.44%
			Result	Ok, reliability level met
			Lower Bound confidence value	Not Applicable
			B _{y=1,new,i,survey} (Tonnes/ICS/Year)	0.353

Mali				
Monitoring Parameter		B _{y=1,new,i,survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023		
Sampling approach		Stratified random sampling across identified sampling frame		
Monitoring results				
Sampling frame	ICS population	Monitored Sample count	Monitored Value (Kg/person-meal/day)	Monitored SD
Charcoal ICS	1536	10	0.113	0.011
Reliability Check				
Standard error of mean			0.35%	
Relative precision (Margin of error) (%)			5.63%	
Result			Ok, reliability level met	
Lower Bound confidence value			Not Applicable	
B _{y=1,new,i,survey} (Tonnes/ICS/Year)			0.414	

Madagascar				
Monitoring Parameter		B _{y=1,new,i,survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023		
Sampling approach		Stratified random sampling across identified sampling frame		
Monitoring results				
Sampling frame	ICS population	Monitored Sample count	Monitored Value (Kg/person-meal/day)	Monitored SD
Charcoal ICS	1183	10	0.097	0.012
Reliability Check				
Standard error of mean				0.38%
Relative precision (Margin of error) (%)				7.17%
Result				Ok, reliability level met
Lower Bound confidence value				Not Applicable
B _{y=1,new,i,survey} (Tonnes/ICS/Year)			0.378	

Senegal				
Monitoring Parameter		B _{y=1,new,i,survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023		
Sampling approach		Stratified random sampling across identified sampling frame		
Monitoring results				
Sampling frame	ICS population	Monitored Sample count	Monitored Value (Kg/person-meal/day)	Monitored SD
Charcoal ICS	3461	10	0.109	0.009
Reliability Check				
Standard error of mean			0.28%	
Relative precision (Margin of error) (%)			4.74%	
Result			Ok, reliability level met	
Lower Bound confidence value			Not Applicable	
B _{y=1,new,i,survey} (Tonnes/ICS/Year)			0.375	

Cote d'Ivoire				
Monitoring Parameter		B _{y=1,new,i,survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023		
Sampling approach		Stratified random sampling across identified sampling frame		
Monitoring results				
Sampling frame	ICS population	Monitored Sample count	Monitored Value (Kg/person-meal/day)	Monitored SD
Charcoal ICS	3494	10	0.110	0.010
Reliability Check				
Standard error of mean				0.33%
Relative precision (Margin of error) (%)				5.44%
Result				Ok, reliability level met
Lower Bound confidence value				Not Applicable
B _{y=1,new,i,survey} (Tonnes/ICS/Year)				0.276

DRC				
Monitoring Parameter		B _{y=1,new,i,survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database, till 31/05/2023		
Sampling approach		Stratified random sampling across identified sampling frame		
Monitoring results				
Sampling frame	ICS population	Monitored Sample count	Monitored Value (Kg/person-meal/day)	Monitored SD
Charcoal ICS	1503	10	0.105	0.010
Reliability Check				
Standard error of mean				0.31%
Relative precision (Margin of error) (%)				5.52%
Result				Ok, reliability level met
Lower Bound confidence value				Not Applicable
B _{y=1,new,i,survey} (Tonnes/ICS/Year)				0.423

Uganda				
Monitoring Parameter		B _{y=1,new,i,survey}		
Sampling frame(s)		Aggregated (cumulative) number of ICS recorded in the Project ICS Database from 01/06/2023 till		
Sampling approach		Stratified random sampling across identified sampling frame		
Monitoring results				
Sampling frame	ICS population	Monitored Sample count	Monitored Value (Kg/person-meal/day)	Monitored SD
Charcoal ICS	3040	9	0.109	0.005
Reliability Check				
			Standard error of mean	0.18%
			Relative precision (Margin of error) (%)	3.04%
			Result	Ok, reliability level met
			Lower Bound confidence value	Not Applicable
			B _{y=1,new,i,survey} (Tonnes/ICS/Year)	0.409

Precision assessment for parameter $N_{y,i,j}$ (MS2):

Monitoring results_Rwanda				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operation}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	6960	11	81.82%
Jiko Fresh/ Jiko Malkia	Batch-2	25773	35	91.43%
Reliability Check				
Samples Monitored				46
SoF Measured				0.8939
Standard Error of SoF				2.27%
Relative precision (Margin of error)				4.18%
Result				Ok, reliability level met
Lower Bound confidence value				0.8565
$N_{y,i,j}$				29258

Monitoring results_Nigeria				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operation}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	1335	7	85.71%
Jiko Fresh/ Jiko Malkia	Batch-2	8648	26	96.15%
Jiko Bora Mama Yao	Batch-2	3270	17	88.24%
Reliability Check				
Samples Monitored				50
SoF Measured				0.9315
Standard Error of SoF				2.32%
Relative precision (Margin of error)				4.10%
Result				Ok, reliability level met
Lower Bound confidence value				0.8933
$N_{y,i,j}$				12344

Monitoring results_Mali				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operationao}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	1536	24	91.67%
Jiko Fresh/ Jiko Malkia	Batch-2	1556	26	92.31%
Reliability Check				
			Samples Monitored	50
			SoF Measured	0.9199
			Standard Error of SoF	3.64%
			Relative precision (Margin of error)	6.51%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.8600
			$N_{v,i,j}$	2844

Monitoring results_Madagascar				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operationao}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	1183	18	88.89%
Jiko Fresh/ Jiko Malkia	Batch-2	2069	31	96.77%
Reliability Check				
			Samples Monitored	49
			SoF Measured	0.9391
			Standard Error of SoF	3.13%
			Relative precision (Margin of error)	5.48%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.8876
			$N_{v,i,j}$	3053

Monitoring results_Senegal				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operationao}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	3461	23	91.30%
Jiko Fresh/ Jiko Malkia	Batch-2	3652	27	92.59%
Reliability Check				
			Samples Monitored	50
			SoF Measured	0.9197
			Standard Error of SoF	2.96%
			Relative precision (Margin of error)	5.29%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.8710
			$N_{v,i,j}$	6541

Monitoring results_Cote d'Ivoire				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operationaol}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	3494	18	94.44%
Jiko Fresh/ Jiko Malkia	Batch-2	5302	30	93.33%
Reliability Check				
			Samples Monitored	48
			SoF Measured	0.9377
			Standard Error of SoF	2.49%
			Relative precision (Margin of error)	4.38%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.8967
			$N_{y,ij}$	8248

Monitoring results_DRC				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operationaol}/n_{i,j,total}$)
Jiko Fresh/ Jiko Malkia	Batch-1	1503	18	94.44%
Jiko Fresh/ Jiko Malkia	Batch-2	2462	29	89.66%
Reliability Check				
			Samples Monitored	47
			SoF Measured	0.9147
			Standard Error of SoF	3.51%
			Relative precision (Margin of error)	6.31%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.8570
			$N_{y,ij}$	3626

Monitoring results_Uganda				
ICS Model	Batch#	Sampling frame size	Monitored Sample Count($n_{i,j,total}$)	Monitored Operating Fraction ($n_{i,j,operation}/n_{i,j,total}$)
Jiko Malkia	Batch-2	3040	47	87.23%
Reliability Check				
			Samples Monitored	47
			SoF Measured	0.8723
			Standard Error of SoF	0.61%
			Relative precision (Margin of error)	1.14%
			Result	Ok, reliability level met
			Lower Bound confidence value	0.8624
			$N_{y,ij}$	2651

g) Demonstration that the required confidence/precision level has been met:

The snapshots above demonstrate that required precision is met for both parameters of interest.

h) Demonstration of whether the samples were randomly selected and are representative of the population:

To ensure a random sample selection, random number generators were applied. Each ICS in the target population is uniquely identifiable by its Serial ID number. Each ICS was allocated a Sample Selection Number, starting at 1 and increasing up to the total number of ICS in the Database thus, giving equal chance to every unit for selection for monitoring. Applying the random number generators, desired number of random numbers were generated ranging from 1 to total number of ICS in the sampling frame. The ICS pertaining to the same random numbers as obtained by random number generator were then chosen from the defined stratum. Thus, the samples identified were purely random. Refer ER calculator for collected data on the samples monitored.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The methodology does not account for baseline emissions separately but instead quantifies net emission reductions achieved by the project. Please refer to Section 5.4. below.

5.2 Project Emissions

The methodology does not account for project emissions separately but instead quantifies net emission reductions achieved by the project. Please refer to Section 5.4. below.

5.3 Leakage Emissions

The value of Leakage has been considered as default of 0.95 in accordance with methodology.

5.4 GHG Emission Reductions and Carbon Dioxide Removals

The Grouped Project involves only GHG emission reductions and does not involve carbon dioxide removals. As per applicable methodology, formula to calculate emission reduction (ERs) is:

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

Where:

- i = Indices for the situation where more than one type/model of improved cook stove is introduced to replace the baseline stove
- j = Indices for the situation where there is more than one batch of improved cook stove of type i
- ER_y = Emission reductions during year y in t CO₂e
- $ER_{y,i,j}$ = Emission reductions by improved cook stove of type i and batch j during year y in t CO₂e

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

Where:

- $B_{y,savings,i,j}$ = Quantity of woody biomass that is saved in tonnes per improved cook stove of type i and batch j during year y
- $f_{NRB,y}$ = Fraction of woody biomass that can be established as non-renewable biomass (f_{NRB})
- $NCV_{wood\ fuel}$ = Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonne)
- EF_{wf,CO_2} = CO₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO₂/TJ)
- $EF_{wf,non\ CO_2}$ = Non-CO₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO₂/TJ)
- $N_{y,i,j}$ = Number of improved cook stoves of type i and batch j operating during year y
- 0.95 = Discount factor to account for leakage

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

Where:

- $B_{y=1,new,i,survey}$ = Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i and batch j , determined in the first year of the implementation of the project through a sample survey.
- η_{old} = Efficiency of baseline cookstove
- $\eta_{new,y,i,j}$ = Efficiency of the improved cook stove type i and batch j determined through water boiling test (WBT). efficiency may be determined using Equation 5.

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

Where:

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

For detailed actual / representative calculations, refer to "VCS 4151 MP1 ER Calculation Sheet v2.0 25112025"

The illustration of emission reductions achieved over the monitoring period is given below:

Country Name	PA#	MS1 Emission Reductions		MS2 Emission Reductions		Total Country Wise ERs
		01-Jun-2022 to 31-Dec-2022	01-Jan-2023 to 31-May-2023	01-Jun-2023 to 31-Dec-2023	01-Jan-2024 to 31-May-2024	
Rwanda	PA-1	6,614	11,484	35,140	53,135	106,373
Nigeria	PA-3	932	2,080	6,856	22,271	32,139
Mali	PA-4	188	1,603	3,905	3,889	9,585
Madagascar	PA-5	763	1,191	3,231	4,339	9,524
Senegal	PA-6	953	2,964	7,456	7,901	19,275
Cote d'Ivoire	PA-7	1,171	3,108	9,113	10,740	24,131
DRC	PA-8	430	2,055	5,314	6,702	14,500
Uganda	PA-10	0	0	848	4,238	5,086
Total Year Wise ERs		11,051	24,486	71,863	113,215	220,615

Vintage period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Reduction VCU (tCO ₂ e)	Removal VCU (tCO ₂ e)	Total VCUs (tCO ₂ e)
01-Jun-2022 to 31-Dec-2022	11,051	0	0	11,051	0	11,051
01-Jan-2023 to 31-Dec-2023	96,348	0	0	96,348	0	96,348
01-Jan-2024 to 31-May-2024	113,215	0	0	113,215	0	113,215
Total	220,615	0	0	220,615	0	220,615

The project is not required to assess permanence risk. The project does not have any buffer pool allocation.

The following table shows comparison of ex-ante ER estimates against actual ERs achieved for the monitoring period:

Vintage period	Ex-ante estimated reductions/removals	Achieved reductions/removals	Percent difference	Explanation for the difference
01-Jun-2022 to 31-Dec-2022	24,899	11,051	-55.62%	The primary reason for higher ex-post VCUs in the current monitoring period than the ex-ante estimates
01-Jan-2023 to 31-Dec-2023	115,649	96,348	-16.69%	

01-Jan-2024 to 31-May-2024	69,665	113,215	62.52%	presented in the registered VCS-PD is attributed to higher number of ICS distributed in the PAs, than that envisaged ex-ante in the registered VCS PD.
Total	210,212	220,615	4.95%	

The following table presents the comparison between adjusted Ex-ante estimates (based on actual number of stoves installed) and ex-post achieved emission reductions. For more details refer ER calculator.

Vintage period	Adjusted Ex-Ante emission reductions ²²	Ex-post Achieved emission reductions	Percent difference	Explanation for the difference
01-Jun-2022 to 31-Dec-2022	40,751	11,051	-72.88%	The negative percent difference indicates that the ex-post achieved values are lesser than the ex-ante estimates (for actual number of stoves installed).
01-Jan-2023 to 31-Dec-2023	190,678	96,348	-49.47%	
01-Jan-2024 to 31-May-2024	115,011	113,215	-1.56%	
Total	346,440	220,615	-36.32%	

²² Adjusted ex-ante emission reductions apportioned based on the actual ICS installed during the monitoring period against the corresponding ex-ante envisaged stove count in the registered VCS PD.

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

The information related to ICS beneficiary(ies) personal details (Name, Address and Phone number) has been redacted in the project documents (ICS distribution database and ER calculator) for personal data privacy and protection. Other than aforesaid, no commercially sensitive information has been excluded from the public version of the project documents.