



**Verified Carbon
Standard**

BIO-LITE AFRICA IMPROVED STOVE PROGRAM



Document Prepared by



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CONTENTS

1	PROJECT DETAILS	4
1.1	Summary Description of the Project	4
1.2	Sectoral Scope and Project Type	5
1.3	Project Eligibility	5
1.4	Project Design.....	7
1.5	Project Proponent	11
1.6	Other Entities Involved in the Project	12
1.7	Ownership	12
1.8	Project Start Date.....	12
1.9	Project Crediting Period	12
1.10	Project Scale and Estimated GHG Emission Reductions or Removals.....	12
1.11	Description of the Project Activity	17
1.12	Project Location	20
1.13	Conditions Prior to Project Initiation	27
1.14	Compliance with Laws, Statutes and Other Regulatory Frameworks.....	28
1.15	Participation under Other GHG Programs.....	31
1.16	Other Forms of Credit	31
1.17	Sustainable Development Contributions	31
1.18	Additional Information Relevant to the Project	33
2	SAFEGUARDS	34
2.1	No Net Harm	34
2.2	Local Stakeholder Consultation.....	42
2.3	Environmental Impact	75
2.4	Public Comments.....	75
2.5	AFOLU-Specific Safeguards.....	75
3	APPLICATION OF METHODOLOGY	75
3.1	Title and Reference of Methodology.....	75
3.2	Applicability of Methodology	75
3.3	Project Boundary	81
3.4	Baseline Scenario	82
3.5	Additionality.....	82

3.6	Methodology Deviations	84
4	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	84
4.1	Baseline Emissions.....	84
4.2	Project Emissions	85
4.3	Leakage	85
4.4	Net GHG Emission Reductions and Removals	85
5	MONITORING	89
5.1	Data and Parameters Available at Validation	89
5.2	Data and Parameters Monitored	93
5.3	Monitoring Plan	96
	Appendix 1: NPV Analysis	99
	Appendix 2: Baseline scenario / Scenario prior to the implementation of proposed project:.....	104
	Appendix 3: fNRB Calculation as per CDM Tool 30, V4.0	105

1 PROJECT DETAILS

1.1 Summary Description of the Project

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

Traditional cooking methods prevalent across Africa today, result in greenhouse gas (GHG) emissions attributed to inefficient combustion of unsustainably sourced, non-renewable biomass (NRB) fuel. Furthermore, the use of solid biomass fuels (e.g., wood) in inefficient traditional stoves and/or open fires releases large amounts of particulate matter (PM), creating hazardous levels of indoor air pollution (IAP).

Technologies/Measures

The grouped project includes dissemination of woody biomass ICS to project households using traditional modes of cooking in the baseline. The ICSs disseminated under the project are designed to improve fuel combustion and heat transfer. The ICS results in the reduction of fuel consumption and improvement in levels of Indoor air pollution for project users (reducing smoke, black soot, and particulate matter (PM) emissions). The reduction in consumption of cooking fuel also reduces equivalent greenhouse gas (GHG) emissions attributed to the use of non-renewable biomass. The project intends to access carbon finance to mitigate the main barrier (price) for end users towards adopting clean cookstoves.

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

Year	Rwanda	Malawi	Nigeria	Mali	Madagascar	Senegal	Ivory Coast	DRC	Zambia	Uganda
Year 1	3,000	0	1,500	1,500	1,500	1,500	1,500	1,500	0	0
Year 2	15,000	5,000	3,000	3,000	3,000	3,000	3,000	3,000	2,000	2,000
Year 3	25,000	10,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	3,000
Year 4	25,000	10,000	5,000	5,000	5,000	5,000	5,000	5,000	4,000	4,000
Year 5	25,000	10,000	5,000	5,000	5,000	5,000	5,000	5,000	4,000	4,000
Year 6	25,000	10,000	5,000	5,000	5,000	5,000	5,000	5,000	4,000	4,000
Year 7	25,000	10,000	5,000	5,000	5,000	5,000	5,000	5,000	4,000	4,000
Total	143,000	55,000	28,500	28,500	28,500	28,500	28,500	28,500	22,000	21,000

In the absence of this project, the project beneficiaries would cook primarily using traditional inefficient stoves for meeting their thermal energy needs (the scenario existing prior to the project activity), perpetuating environmental and health degradation.

The average annual GHG emission reduction from the grouped project is given below:

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

Project Activity #	Host Country	Duration of Crediting Period	Estimated Average Annual Emissions (tCO ₂ e)	Total Estimated Emissions over the Crediting Period (tCO ₂ e)
PA-1	Rwanda	01/06/2022 - 31/05/2029	265,156	1,856,093
PA-2	Malawi		79,649	557,545
PA-3	Nigeria		50,140	350,983
PA-4	Mali		39,767	278,366
PA-5	Madagascar		40,117	281,242
PA-6	Senegal		36,051	252,357
PA-7	Ivory Coast		49,953	349,670
PA-8	DRC		48,552	339,865
PA-9	Zambia		38,956	272,693
PA-10	Uganda		27,472	192,302

Audit History

Audit Type	Period	Program	VVB Name	Number of years
Validation	24-April-2023 - - 26-April- 2023	VCS	Carbon Check India Private Limited	-

1.2 Sectoral Scope and Project Type

Mandatory Sectoral Scope: 03 – Energy Demand

Conditional Sectoral Scope: Not Applicable

Project Type: Energy Efficiency Project

The project is a grouped project. All project activity(ies) under the grouped project shall have the aforesaid scope and project type.

1.3 Project Eligibility

- The Seven Kyoto Protocol greenhouse gases:** The grouped project is applicable to this scope, as the project involves emission reduction comes from Kyoto GHGs viz. CO₂, CH₄ and N₂O in the baseline.
- Ozone-depleting substances (ODS):** NA. The grouped project does not involve ODSs.
- Project activities supported by a methodology approved under the VCS program through the methodology development and review process:** The grouped project uses the methodology VMR0006 ver. 1.1 which is approved under the VCS program through the methodology development and review process. Each project activity under the grouped project shall, therefore, follow VMR0006.
- Project activities supported by a methodology approved under an approved GHG program, unless explicitly excluded:** NA. The grouped project does not use a methodology approved under other GHG programs.

5. Jurisdictional REDD+ programs and nested REDD+ projects as set out in the VCS Program document Jurisdictional and Nested REDD+ (JNR) Requirements: NA.
The grouped project does not involve REDD+.

Additionally, the grouped project is not listed in table 1, section 2.1.3 of the VCS standard version 4.4, given it involves installation of improved cooking stoves (ICS) in SSA (Sub Saharan Africa) with the host target countries as - Rwanda, Malawi, Nigeria, Mali, Madagascar, Senegal, Côte d'Ivoire, Democratic Republic of the Congo, Zambia and Uganda.

Compliance with other general requirements is as described below:

Reference to VCS Standard version 4.4	Requirement	Justification
3.1.1	Projects shall meet all applicable rules and requirements set out under the VCS Program, including this document. Projects shall be guided by the principles set out in Section 2.2.1.	The grouped project meets all applicable rules and requirements as set out under the VCS Program and is guided by the ISO 14064-2:2006 clause 3.
3.1.2	Projects shall apply methodologies eligible under the VCS Program. Methodologies shall be applied in full, including the full application of any tools or modules referred to by a methodology, noting the exception set out in Section 3.14.1.	The grouped project applies VCS approved methodology VMR0006, version 1.1 which is an approved VCS methodology along with tools or modules as applicable. Refer section 3 of the PD below for more details. This has been made an eligibility criterion for inclusion of project activity into the grouped project.
3.1.3	Projects shall apply the latest version of the applicable methodology in all cases unless a grace period applies to the project as set out in 3.21. Projects must update to the latest version of the methodology when reassessing the baseline and renewing a crediting period.	The grouped project applies the latest version 1.1 of VCS approved methodology VMR0006. Refer to section 3 of the PD below for more details.
3.1.4	Projects and the implementation of project activities shall not lead to the violation of any applicable law, regardless of whether or not the law is enforced.	The grouped project shall remain in compliance with the applicable local laws. This has been made an eligibility criterion for inclusion of project activity into the grouped project.
3.1.5	Where projects apply methodologies that permit the project proponent its own choice of model, such model shall meet with the requirements set out in the VCS Program document VCS Methodology Requirements and it shall be demonstrated at validation that the model is appropriate to the project circumstances (i.e., use of the model	Not applicable. The applied methodology VMR0006 version 1.1. does not provide any such option.

	will lead to an appropriate quantification of GHG emission reductions or removals).	
3.1.6	Where projects apply methodologies that permit the project proponent to choose a third-party default factor or standard to ascertain GHG emission data and any supporting data for establishing baseline scenarios and demonstrating additionality, such default factor or standard shall meet with the requirements set out in the VCS Program document VCS Methodology Requirements.	Not applicable. The applied methodology VMR0006 version 1.1. does not provide any such choice.
3.1.7	Where the rules and requirements under an approved GHG program conflict with the rules and requirements of the VCS Program, the rules and requirements of the VCS Program shall take precedence.	The project activity applies only VCS methodology and so this is not applicable.
3.1.8	Where projects apply methodologies from approved GHG programs, they shall conform with any specified capacity limits and any other relevant requirements set out with respect to the application of the methodology and/or tools referenced by the methodology under those programs.	The project activity only applies VCS methodology i.e., VMR0006 version 1.1 and so this is not applicable.
3.1.9	Where Verra issues new VCS Program rules, the effective dates of these requirements are set out in Appendix 3 of VCS standard ver. 4.4 and Effective Dates or equivalent for other program documents and are listed in a companion Summary of Effective Dates document which corresponds with each update.	The grouped project will adhere to the new VCS Program rules, and the effective dates of these requirements set out in Appendix 3 of VCS standard ver. 4.4.

1.4 Project Design

The proposed project is a grouped project. The grouped project involves distribution of ICS in Rwanda, Malawi, Nigeria, Mali, Madagascar, Senegal, Côte d'Ivoire, Democratic Republic of the Congo, Zambia and Uganda. All PA shall remain limited to the geographical the countries specified above.

Eligibility Criteria

The project is a grouped project and following are the eligibility criteria for inclusion of new project activity instances into a project activity under the grouped project activity under the grouped project as per para 3.6.16 and 3.6.17 of VCS standard version 4.4:

No.	Eligibility Criterion	Description/ condition	Required	Means of Verification / Supporting evidence for inclusion
1	Applicability Conditions	The project activity shall meet applicability conditions for methodology (VMR0006 version 1.1) as defined in section 3.2.		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.
2	Geographical Area	The project activity instance shall be located within the physical / geographical boundary of countries covered under the grouped project as specified in 1.1 and 1.4 above.		All ICS implemented / distributed in a PAI shall be within the Geographic boundary of Grouped Project. MoV: ICS installation database showing ICS location to be limited in the corresponding host country.
3	Baseline Scenario	The project activity shall have the baseline as usage of non-renewable fuel (wood/charcoal) to meet equivalent thermal energy needs.		PA shall capture the baseline fuel of project ICS beneficiaries to show that the baseline scenario is the use of non-renewable biomass. MoV: ICS installation database / user registration records showing baseline fuel for ICS distributed.
4	Technology type	The project activity shall involve distribution of ICS devices with more than 25% rated efficiency		Only ICS having more than 25% rated thermal efficiency shall be allowed to register in the project activity. MoV: Manufacturer specifications / Manufacturer Certificate / laboratory testing WBT certificates for ICS
5	Additionality	The project activity shall demonstrate additionality as per the following: Step 1: Regulatory Surplus and either of Step 2: Positive list Or Step 3: Project Method		The PA shall be demonstrated as additional via the following: 1. Demonstrate that the PA 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. PA installs or distributes 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 ICS 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.
6	Start Date	The project activity shall start on or after the start date of the Grouped Project.	The start date of grouped project is considered as 01/06/2022 which is also the start date of PA-1. 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 first ICS under PA.
7	Crediting Period	The project activity shall have a renewable crediting period.	Refer PA PD / Joint PD and MR section 1.9
8	Double Counting	The project activity shall confirm that: 1. It is not registered as a project activity in any other mechanism. 2. The project activity is not leaving any other program to join the Grouped Project.	MoV: Declaration by the Project Owner / Project Developer
9	Project Ownership	The ownership of the PA shall be clearly demonstrated by virtue of the following: • End user agreements transferring the ownership of credits from the use of project ICS to the CME/PP. Or • Disclaimer on the product packaging / warranty card assigning the rights of ownership of credits to the PP directly	MoV: End user agreement for ICS under the PA Or Product packaging/ warranty card template

The following table demonstrates how the PA-1 to PA-10 being included in the grouped project activity fulfills the above-mentioned eligibility conditions:

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.	The Initial Project activity (ies) PA-1 to PA-10 meet all applicability conditions for

		MoV: PD/ Joint PD MR section 3.2 justifying the applicability criteria of applied methodology.	methodology (VMR0006 version 1.1) as defined in section 3.2 below.
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	All ICS envisaged to be distributed under PA-1 to PA-10 will be in the respective host countries of the project activity and within the Geographic boundary of Grouped project. The ICS installation database shall be checked at the time of verification for all ICS to be within the boundary of the respective country to which the PA belongs.
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 installation database shall be checked at the time of verification for all the baseline fuel of the project ICS.
4	Technology type	Only ICS having more than 25% rated thermal efficiency shall be allowed to register in a PoA. MoV: Manufacturer specifications / Manufacturer Certificate / laboratory testing WBT certificates for ICS	The Project Activity (ies) involves distribution of ICS (Dura - wood fuel) with rated efficiency of 38.1 % and ICS (Jiko Fresh, Mama Yao and JikoMalkia - Charcoal) with rated efficiencies of 45.7%, 55.1% and 50.07% respectively. Manufacturer specifications / Manufacturer Certificate / laboratory testing WBT certificates for ICS distributed under PA-1 to PA-10. In case additional models are included under these PAs in future, they shall be evaluated at the time of verification to ensure that their design rated thermal efficiency is >25%.
5	Additionality	The PA shall be demonstrated as additional via the following: 1. Demonstrate that the PA is not mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law,	As per section 7 of VMR 0006 version 1.1: There are no laws and regulations governing the use of improved cookstoves in PA countries households. The project is a voluntary effort by the project proponent.

		statute or other regulatory framework. 2. PA installs or distributes 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 ICS 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.	Under the proposed grouped project, PA-1 to PA-10 will distribute ICSs at a subsidized price to the end users. Although some revenue will be 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 PA-1 to PA-10 are not financially viable without the support of carbon revenues from sale of VCUs, and are additional.
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 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 first ICS under the instance.	The PA-1 in Rwanda has started on 01/06/2022 (the date of distribution of first ICS). The Distribution record / user agreement for the first ICS under PA-1 substantiates the same.
7	Crediting Period	Refer PA PD / Joint PD and MR section 1.9	The crediting period for the PA-1 to 10 is renewable (7 years, renewable twice). Refer section 1.9 below.
8	Double Counting	MoV: Declaration by the Project Owner / Project Developer	The Declaration by the Project Owner / Project Developer is submitted to the validation team
9	Project Ownership	MoV: End user agreement for ICS under the PA Or Product packaging/ warranty card template	Refer end user agreement template / warranty card template / product packaging for condition/statement that transfers the rights to ownership of credits to Biolite.

1.5 Project Proponent

Organization name

BioLite

Contact person	Erik Wurster
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1.6 Other Entities Involved in the Project

Organization name	Climate Secure
Role in the project	Entity Completing the Project Description
Contact person	Rohit Lohia
Title	Director
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1.7 Ownership

For each PAI, the ownership of the instance shall be clearly demonstrated by virtue of the following:

Declaration / agreement with end user transferring the ownership rights of the carbon credits generated from the project ICS to the project proponent.

Thus, all VCUs generated from the grouped project instances shall be owned by **BioLite**, unless otherwise stated.

1.8 Project Start Date

01 June 2022 (Date for installation of 1st ICS under the Grouped project as well as the first PA i.e., in Rwanda)

1.9 Project Crediting Period

First Crediting Period start date: 01 June 2022

First Crediting Period end date: 31 May 2029

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

The date of first ICS distribution under the first project activity (PA-1) shall mark the start date of crediting period for the grouped project.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale
Project

Large project	X
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The estimated annual GHG emission reductions/removals for the grouped project, considering all initial project activities (PA-1 to PA-10) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	42,467
01/06/2023 – 31/05/2024	192,107
01/06/2024 – 31/05/2025	423,195
01/06/2025 – 31/05/2026	669,101
01/06/2026 – 31/05/2027	907,099
01/06/2027 – 31/05/2028	1,137,306
01/06/2028 – 31/05/2029	1,359,840
Total estimated ERs	4,731,116
Total number of crediting years	7
Average annual ERs	675,873

Further for each project activity the estimated annual GHG emission reductions/removals for the are summarized below:

Project Activity 1 (Rwanda):

The estimated annual GHG emission reductions/removals for the project activity (PA-1) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	12,274
01/06/2023 – 31/05/2024	72,504
01/06/2024 – 31/05/2025	170,505
01/06/2025 – 31/05/2026	265,411
01/06/2026 – 31/05/2027	357,266
01/06/2027 – 31/05/2028	446,118
01/06/2028 – 31/05/2029	532,012
Total estimated ERs	1,856,093
Total number of crediting years	7
Average annual ERs	265,156

Project Activity 2 (Malawi):

The estimated annual GHG emission reductions/removals for the project activity (PA-2) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	0
01/06/2023 – 31/05/2024	16,361

01/06/2024 – 31/05/2025	48,318
01/06/2025 – 31/05/2026	79,264
01/06/2026 – 31/05/2027	109,216
01/06/2027 – 31/05/2028	138,189
01/06/2028 – 31/05/2029	166,196
Total estimated ERs	557,545
Total number of crediting years	7
Average annual ERs	79,649

Project Activity 3 (Nigeria):

The estimated annual GHG emission reductions/removals for the project activity (PA-3) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	5,719
01/06/2023 – 31/05/2024	16,893
01/06/2024 – 31/05/2025	31,412
01/06/2025 – 31/05/2026	49,107
01/06/2026 – 31/05/2027	66,234
01/06/2027 – 31/05/2028	82,801
01/06/2028 – 31/05/2029	98,816
Total estimated ERs	350,983
Total number of crediting years	7
Average annual ERs	50,140

Project Activity 4 (Mali):

The estimated annual GHG emission reductions/removals for the project activity (PA-4) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	4,538
01/06/2023 – 31/05/2024	13,401
01/06/2024 – 31/05/2025	24,917
01/06/2025 – 31/05/2026	38,951
01/06/2026 – 31/05/2027	52,532
01/06/2027 – 31/05/2028	65,666
01/06/2028 – 31/05/2029	78,361
Total estimated ERs	278,366
Total number of crediting years	7
Average annual ERs	39,767

Project Activity 5 (Madagascar):

The estimated annual GHG emission reductions/removals for the project activity (PA-5) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	4,584
01/06/2023 – 31/05/2024	13,539
01/06/2024 – 31/05/2025	25,174
01/06/2025 – 31/05/2026	39,353
01/06/2026 – 31/05/2027	53,075
01/06/2027 – 31/05/2028	66,345
01/06/2028 – 31/05/2029	79,171
Total estimated ERs	281,242
Total number of crediting years	7
Average annual ERs	40,177

Project Activity 6 (Senegal):

The estimated annual GHG emission reductions/removals for the project activity (PAI-6) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	4,114
01/06/2023 – 31/05/2024	12,150
01/06/2024 – 31/05/2025	22,591
01/06/2025 – 31/05/2026	35,314
01/06/2026 – 31/05/2027	47,624
01/06/2027 – 31/05/2028	59,529
01/06/2028 – 31/05/2029	71,034
Total estimated ERs	252,357
Total number of crediting years	7
Average annual ERs	36,051

Project Activity 7 (Ivory Coast):

The estimated annual GHG emission reductions/removals for the project activity (PA-7) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	5,699
01/06/2023 – 31/05/2024	16,830
01/06/2024 – 31/05/2025	31,296
01/06/2025 – 31/05/2026	48,925
01/06/2026 – 31/05/2027	65,987

01/06/2027 – 31/05/2028	82,490
01/06/2028 – 31/05/2029	98,443
Total estimated ERs	349,670
Total number of crediting years	7
Average annual ERs	49,953

Project Activity 8 (DRC)

The estimated annual GHG emission reductions/removals for the project activity (PA-8) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	5,539
01/06/2023 – 31/05/2024	16,359
01/06/2024 – 31/05/2025	30,418
01/06/2025 – 31/05/2026	47,553
01/06/2026 – 31/05/2027	64,137
01/06/2027 – 31/05/2028	80,177
01/06/2028 – 31/05/2029	95,683
Total estimated ERs	339,865
Total number of crediting years	7
Average annual ERs	48,552

Project Activity 9 (Zambia):

The estimated annual GHG emission reductions/removals for the project activity (PA-9) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	0
01/06/2023 – 31/05/2024	8,001
01/06/2024 – 31/05/2025	23,630
01/06/2025 – 31/05/2026	38,767
01/06/2026 – 31/05/2027	53,417
01/06/2027 – 31/05/2028	67,589
01/06/2028 – 31/05/2029	81,289
Total estimated ERs	272,693
Total number of crediting years	7
Average annual ERs	38,956

Project Activity 10 (Uganda):

The estimated annual GHG emission reductions/removals for the project activity (PA-10) are summarized in the following table:

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	0
01/06/2023 – 31/05/2024	6,067
01/06/2024 – 31/05/2025	14,932
01/06/2025 – 31/05/2026	26,456
01/06/2026 – 31/05/2027	37,610
01/06/2027 – 31/05/2028	48,402
01/06/2028 – 31/05/2029	58,835
Total estimated ERs	192,302
Total number of crediting years	7
Average annual ERs	27,472

1.11 Description of the Project Activity

The purpose of this Grouped project is to disseminate energy-efficient improved cookstoves (ICS) to replace existing traditional Cookstoves in domestic households and communities in Rwanda, Malawi, Nigeria, Mali, Madagascar, Senegal, Côte d'Ivoire, Democratic Republic of the Congo, Zambia.

At present, following project activity (ies) are in the grouped project as follows:

Project Activity 1: Dissemination of energy-efficient improved cookstoves (ICS) in domestic households and communities of Rwanda.

Project Activity 2: Dissemination of energy-efficient improved cookstoves (ICS) in domestic households and communities of Malawi.

Project Activity 3: Dissemination of energy-efficient improved cookstoves (ICS) in domestic households and communities of Nigeria.

Project Activity 4: Dissemination of energy-efficient improved cookstoves (ICS) in domestic households and communities of Mali.

Project Activity 5: Dissemination of energy-efficient improved cookstoves (ICS) in domestic households and communities of Madagascar.

Project Activity 6: Dissemination of energy-efficient improved cookstoves (ICS) in domestic households and communities of Senegal.

Project Activity 7: Dissemination of energy-efficient improved cookstoves (ICS) in domestic households and communities of Côte d'Ivoire.

Project Activity 8: Dissemination of energy-efficient improved cookstoves (ICS) in domestic households and communities of Democratic Republic of the Congo.

Project Activity 9: Dissemination of energy-efficient improved cookstoves (ICS) in domestic households and communities of the Republic of Zambia.

Project Activity 10: Dissemination of energy-efficient improved cookstoves (ICS) in domestic households and communities of Uganda.

Despite efforts to increase global access to clean cooking, the Tracking SDG 7: Energy Progress Report 2023, Chapter-2² points to 2.3 billion people still without access to clean cooking as of 2021. Further, as per the same report, by 2050, 2.3 billion people in 91 low- and middle-income countries will still lack access to clean cooking. Among the 91 are 45 out of the 47 countries of Sub-Saharan Africa. If current trends continue, around 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 Sub-Saharan Africa, there has been a clear upward trend in the deficit, as access to clean cooking has failed to keep pace with growing populations. In fact, the number of people without access in Sub-Saharan Africa is growing at a rate of almost 20 million people per year as gains in the share of people with access fail to keep pace with population growth, to the detriment of the almost 1 billion people already suffering the negative effects of polluting cooking in the region. The growing access deficit in Sub-Saharan Africa, if not reversed, could dampen or undermine current increasing trends in global access.

Further, as per the same report, In 41 countries, predominantly in Sub-Saharan Africa, additional increases of 8–11 percentage points per year above the current trends are needed to reach 100 percent access from 2021 to 2030. Furthermore, without an additional 1–3 percentage point increase in access per year, 82 countries will not reach universal access to clean cooking by 2050, with 45 of these countries in Sub-Saharan Africa. Thus, traditional cooking methods are prevalent across the host countries. 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.

Additionally, the use of solid biomass fuels (e.g., wood) 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 age. Exposure is high among women and children, who spend the most time near the domestic hearth. Reliance on polluting fuels and technologies also requires significant time for cooking on an inefficient device and gathering and preparing fuel. In developing countries with high mortality rates overall, indoor air pollution ranks fourth in terms of the risk factors that contribute to disease and death (World Health Organization)³.

The ICS disseminated under the project are designed to improve fuel combustion and heat transfer. It results in the reduction of fuel consumption and improvement in levels of Indoor air pollution for project users (reducing smoke, black soot and particulate matter (PM)). The reduction in consumption of cooking fuel also reduces greenhouse gas (GHG) emissions attributed to the use of non-renewable biomass. For more information on the baseline scenario prevalent in the targeted countries prior to the project implementation, please refer to Appendix 2 of this document.

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

The project intends to access carbon finance to mitigate one of the main barriers (price) for end users towards adopting clean cookstoves.

Technology/Measure

² https://trackingsdg7.esmap.org/data/files/download-documents/sdg7-report2023-full_report.pdf

³ <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>

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

The PA-1 to PA-10 includes dissemination of following woody biomass ICS⁴, besides others. Specification of these example ICS is given below:

Stove Model	Dura (Firewood ICS)	Jiko Fresh (Charcoal ICS)	Mama Yao (Charcoal ICS)	Jiko Malkia (Charcoal ICS)
Photo				
Thermal Efficiency	38.1%	45.7%	55.1%	50.07%
Estimated Life ⁵	7 Years	7 Years	7 Years	7 Years
Weight	6.5 kg	6 kg	5.8 kg	5.3 kg
Dimensions	27.5x27.5x30cm	27.5x27.5x22.5cm	29x29x26.5cm	40x21x8.8cm
Fixed/Portable	Portable	Portable	Portable	Portable
Grate/Chimney	Grate	Grate	Grate	Grate

In the absence of this project activity, households would cook primarily using traditional inefficient stoves/ 3 stone fires perpetuating environmental and health degradation. The project intends to access carbon finance to mitigate one of the main barriers (price) for end users towards adopting clean cookstoves.

Management Plan and Operational Framework: The project will be implemented according to the following plan:

1. The PP is responsible for general management of the project, including appointing all personnel / groups of personnel involved in the grouped project development and implementation.
2. PP will coordinate with different manufacturers to produce ICSs. PP will provide guidelines for manufacturing including material and other specifications, serial identification, and quality standards of the cookstoves.
3. The distribution of the ICS will be managed via PP's own distribution network or with local distribution partners.

⁴ The ICS listed are non-exhaustive. The ICS distributions are subject to potential customer demands and preferences. Other ICS models may be included in the Project subsequently, provided they meet the methodological requirement. This shall not be construed as a deviation or change from project description.

⁵ In case of estimated life of project devices is less than the crediting period (7 years renewable twice), then either these devices will be replaced after the end of their expected lifetime span or otherwise, emission reductions will be claimed only till the end-of-life span of the project devices.

4. The PP will communicate to the project beneficiaries during distribution that PP retains exclusive and unconditional rights to the carbon credit generated by use of project ICS.
5. The PP will maintain and update the ICS distribution database continuously. The required data collection includes, but is not limited to, the following:
 - (a) Date of distribution
 - (b) Geographic area of distribution
 - (c) Model/type of project ICS distributed
 - (d) Quantity of project ICS distributed
 - (e) Name of the beneficiary, address, and telephone number (if available)
 - (f) Unique serial number of project ICS
 - (g) Primary Baseline fuel / technology being used
6. The information collected will be stored in a database which will serve as the project database for ex-post project sampling and monitoring purposes. Also, this shall serve to avoid any double counting and duplicity of data.
7. The PP will coordinate ex-post monitoring activities as follows:
 - a) Implement the monitoring plan,
 - b) Determine the sample size as per sampling plan and identify the samples to be monitored (the sampling plan is detailed below)
 - c) Ex-post monitoring - the data will be collected using survey questionnaires designed by experts. The surveys will be carried out by external parties or by project implementer teams experience / trained to conduct such surveys. PP will be responsible for ensuring that staff responsible for monitoring and reporting have received adequate training, as applicable.
 - d) Ensure the quality of monitoring data (QA/QC) as per section 5.2 below. The monitoring results and statistical robustness will be reviewed internally and approved by competent staff.
 - e) Use the data collected for emissions reduction calculations.

The aforesaid plan shall ensure that the project is managed and operated in a standard manner.

1.12 Project Location

The proposed group project is going to be implemented in Rwanda, Malawi, Nigeria, Mali, Madagascar, Senegal, Côte d'Ivoire, Democratic Republic of the Congo, Zambia and Uganda⁶.

All PA shall remain limited to the geographical boundary of countries specified above.

PA-1:

Host Country: Rwanda

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

⁶ The KML file for the countries included in this grouped project can be accessed at:

<https://www.dropbox.com/scl/fo/trnunge6dq2a2rhagstzt/AMD2NUUz-VrEhb7ET89UGqM?rlkey=cqz028cr08qa4i0c9v5k64kdf&dl=0>

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

Physical/Geographical location:

Project Location ⁷	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 1: Map of Rwanda

PA-2:

Host Country: Malawi

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

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

Physical/Geographical location:

Project Location	Geodetic Coordinates (Northernmost Point)	Geodetic Coordinates (Southernmost Point)	Geodetic Coordinates (Easternmost Point)	Geodetic Coordinates (Westernmost Point)
Malawi	09°22' S	17°07' S	35°55' E	32°40' E

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

⁷ <https://worldpopulationreview.com/>



Figure 2: Map of Malawi

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:



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 (Northernmost Point)	Geodetic Coordinates (Southernmost Point)	Geodetic Coordinates (Easternmost Point)	Geodetic Coordinates (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)
Democratic Republic of Congo	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:

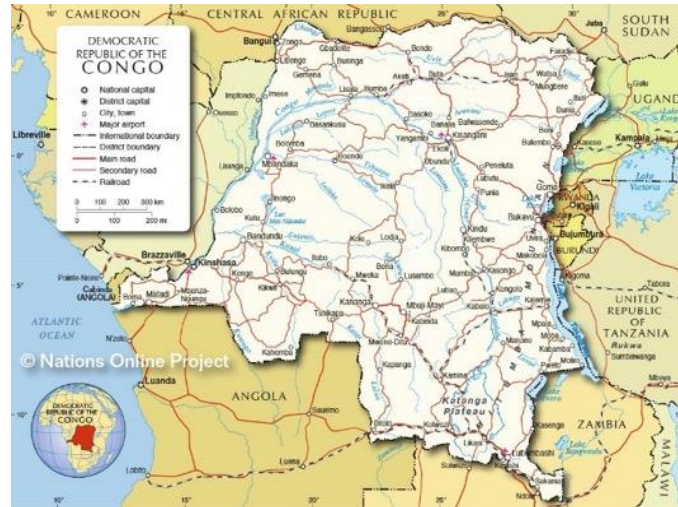


Figure 8: Map of Democratic Republic of Congo

PA-9:

Host Country: Zambia

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

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

Physical/Geographical location:

Project Location	Geodetic Coordinates (Northernmost Point)	Geodetic Coordinates (Southernmost Point)	Geodetic Coordinates (Easternmost Point)	Geodetic Coordinates (Westernmost Point)
Zambia	08°14' S	18°05' S	32°50' E	22°00' E

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



Figure 9: Map of Zambia

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 10: Map of Uganda

1.13 Conditions Prior to Project Initiation

The conditions prior to project initiation are the continued use of non-renewable biomass in traditional/inefficient baseline stoves by the target population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity. As specified in Section 1.11 above, the use of traditional means of cooking is prevalent in Sub Saharan Africa, since long and hence project has not been implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction.

The users who report having primary baseline technology as fossil fuel shall not be included in the project as per page 4 of the methodology. As already specified in Section 1.11 of the PD, the PP shall collect information on the primary baseline fuel / technology in project beneficiary households to ensure that baseline pertains to non-renewable biomass based traditional cooking.

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

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

Grouped Project-

There are no laws and regulations governing the use of improved cookstoves in the households of host countries involved under the Grouped project.

PA-1 to PA-10: The following table summarizes the review of various laws and regulations governing the use of improved cookstoves in host countries of each project activity.

Country	Justification for the Regulatory surplus
Rwanda	The Project Activity does not violate any of the Host Country's relevant local, regional, and national laws, statutes, and regulatory frameworks. There are no laws and regulations governing the use of improved cookstoves in Rwanda for households. The project is a voluntary effort by the project proponent. The following Rwanda environmental laws and regulations were reviewed: • Rwanda's Energy Sector Strategy Plan • Rwanda Energy Policy • Rwanda's Biomass Energy Strategy • 7-Years Government Programme: National Strategy for Transformation (NST1) 2017 – 2024 • Law No. 04/2005: Organic Law determining the modalities of protection, conservation, and promotion of environment in Rwanda: Article 71 from Organic Law: Any activity aiming at controlling soil erosion and drought, one that aims at afforestation and forestry, using renewable energy in a sustainable manner, using modern cooking stoves and any other means that can be used to protect forestry, may receive support from the National Fund for Environment.
Malawi	There are no laws and regulations governing the use of improved cookstoves in Malawi households. The project is a voluntary effort by the project proponent. A review is made on Malawi environmental laws and regulations as below: a) Environmental Management Act (1996) b) Guidelines for Environmental Impact Assessment (1997) c) Environment Management Act (2017) d) The National Environmental Policy (2004) There is no specific concern made on improved cookstoves project from the above laws and regulations.
Nigeria	There are no mandatory laws or regulations in the host country for the use of improved cookstoves in Nigeria households. The project is a voluntary effort by the project proponent. A review is made on Nigeria environmental laws and regulations as below: 1) National Environmental Standards and Regulation Enforcement Agency (NESREA) Act 2007 2) Environmental Impact Assessment (EIA) Act. Cap E12, LFN2004 3) The Nigerian Urban and Regional Planning Act Cap N138, LFN 2004
Mali	There is no mandatory law or requirement in Mali to foster the dissemination of improved cook stoves. In accordance with Mali regulations, an EIA is not required for the proposed project.
Madagascar	There is no mandatory law or requirement in Madagascar to foster the dissemination of improved cook stoves.

	Further to mention that in terms of local laws, statutes and regulatory frameworks etc. specific to the project type, there are no specific laws/policies available for cook stove projects or any domestic household energy related projects. However, the current set of existing policies, law, frameworks etc. are pertaining to the Electricity Access and Poverty Reduction Strategy under an action plan (MAP). The same can be referred in the link below https://energypedia.info/wiki/Madagascar_Energy_Situation#Energy_Demand_and_Supply%20in_the_Household_Sector Here, some sections of the “Poverty Reduction Strategy” under “Policy Framework” section can be interpreted to have correlation with the goals/objectives of project type similar to cook stove program. For example: Madagascar Action Plan 2007-2011 (MAP)¹ includes eight commitments under the policy framework. The commitment #4, #6 & #7 can be referenced to demonstrate correlation with the project activity. A brief description is included below: (a) Under commitment 7, challenge 2 “Reduce the natural resource degradation process” highlights that wood consumption is still a challenge and the goal is to conserve forest resources. Also, as a part of strategies, it is encouraged to promote reforestation and restore degraded habitats, to promote private sector financing to assist in environmental management etc. The project activity will help conserving forest resources, reduce the rate of deforestation and has facilitated private sector finance to assist the overall environmental management, hence these goals and strategies are aligned. (b) Under commitment 6 & 7, the various challenges are oriented towards income generation and improvement job and vocational training etc. Since the project activity has created local jobs and business avenues through promotion of local cook stove manufacturing unit, local employment in distribution and monitoring etc., hence the project is aligned with the overall objectives and goals of such commitments. Additionally, this is to further confirm that other local/national level laws and policy requirement pertaining to environmental & social impacts etc. are also not applicable for cook stove projects. It can be verified from the decree on the “Compatibility of Investments and Environment” (Decree 99.954 dated 15 December 1999) amended by Decree No 2004-167 of 03 February 2004 on the compatibility of investments with the environment (MECIE)” released by Ministry of Environment, Madagascar. It determines which type of projects must execute an EIA and the necessary procedures. According to this decree the cook stove project does not fall into the category mandated for conducting Environmental Impact Assessment. Thus, it can be concluded that there is no applicable local or regional law and regulatory framework in the host country with relation to cook stove projects. However, some national level goals and strategies are common which will be anyhow promoted through the cook stove program across the operational lifetime. Therefore, identification & demonstration of compliance of the project with any such law, statute, regulations etc. is not anticipated.
Senegal	There is no mandatory law or requirement in Senegal to foster the dissemination of improved cook stoves. As per the Senegal Presidential

	Decree Number 2001-282 ⁸ , which list all the activities that require an Environmental Impact Assessment, in the case of the type of project developed, the host party does not require environmental impact assessment to be undertaken.
Cote D Ivoire	In the country there are no mandatory laws, policies or regulations which would oblige households to use energy efficient cookstoves. In the National Environment Action Plan (1995), a program of diffusion of improved cookstoves and a promotion of the charcoal sector are included, but those issues are not subject to binding targets. The literature review on this field includes: • National Environment Action Plan: Future Directions for Sub-Saharan Africa (World Bank, 1995) • Nama study for a Sustainable charcoal value chain (UNDP, 2015); • Plan Actions National des Energies Renouvelables (MPE Ivory Coast, 2016); • National Action Planning Document for the reduction of short-lived climate pollutants (SLCP, 2019).
DRC	There is no mandatory law or requirement in DRC to foster the dissemination of improved cook stoves. DRC does not require an Environmental Impact Assessment for the installation of efficient cook stoves. As per Act of the Ministry of environment, nature protection, and tourism Nr. 11/009 of 09/07/2009 on basic principles relating to the protection of the environment, infrastructure projects that may have an impact on the environment are subject to an environmental and social impact pre-study. Projects implementing improved cook stoves are not considered as infrastructure projects with environmental impacts. No negative impacts can be identified.
Zambia	There is no mandatory law or requirement in Zambia to foster the dissemination of improved cook stoves. In accordance with Zambian regulations, an EIA is not required for the proposed project. There is no specific concern made on improved cookstoves project from the above laws and regulations.
Uganda	There are no laws and regulations governing the use of improved cookstoves in Uganda households. The project is a voluntary effort by the project proponent. A review is made on Uganda environmental laws and regulations as below: a) The National Environment Act, 2019 b) The National Environmental (Audit) Regulations, 2020 c) The National Environment (Environmental and Social Assessment) Regulations, 2020. Uganda's Renewable Energy Policy was adopted in 2007 whose targets were to increase the rate of adoption of efficient charcoal stoves from 20,000 in 2007, to 2,500,000 by 2017 in urban areas and efficient fuel wood stoves from 170,000 in 2007, to 500,000 by 2012 and 4,000,000 by 2017. In addition, the policy was to offer training opportunities for artisans at the village level for the manufacture, installation, and maintenance of efficient cooking stoves. The policy doesn't mandate the households to purchase the improved cookstoves and does not enforce the implementers too.

⁸ <https://www.fao.org/faolex/results/details/es/c/LEX-FAOC037192/>

	A review of the national energy policies of the country shows that there are no mandatory laws, policies or requirements mandating the use and distribution of Improved and Efficient Cookstoves. There is no negative concern shown on improved cookstoves project from the above laws and regulations.
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1.15 Participation under Other GHG Programs

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

Grouped Project

Every additional project activity to be added to this Grouped Project is required to demonstrate whether the project has been registered, or is seeking registration, under any other greenhouse gas programme. Where the project activity instance has been registered under any other greenhouse gas programme, the registration number and details will be provided.

PA-1 to PA-10: The project activity 1 to 10 have not been registered, nor seeking registration under any other GHG program.

1.15.2 Projects Rejected by Other GHG Programs

The grouped project and project activity(ies) have not been rejected by any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The grouped project activity is a voluntary initiative and is not being implemented to meet any local laws or regulatory compliances. The project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading.

1.16.2 Other Forms of Environmental Credit

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

Supply Chain (Scope 3) Emissions

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

1.17 Sustainable Development Contributions

Each country under grouped project is one of the United Nations member states that have committed to achieve Sustainable Development Goals. The project contributes to social,

environmental, and economic benefits which contribute to sustainable development of the local environment and the country.

The project contributions to the relevant SDGs are discussed below:

SDG	Project Contributions - Justification	Relevant SDG Target	SDG Impact Indicator
1 - No Poverty	Economic Sustainability: Household expenditures on purchased cooking fuel will get reduced with usage of project ICS owing to its increased efficiency. Thus, project ICS shall result in money savings in beneficiary households. The project will distribute ICS and will lead to reduction of poverty in the beneficiary households.	1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	Project Specific Indicator / Monitoring Parameter: Average monthly household savings due to decrease in expenditure on purchased fuel after shifting to project technology.
3 - Good Health and Well Being	Social Sustainability: The indoor pollutants emissions attributed to inefficient burning of solid biomass fuels in the beneficiary households will be reduced. The project ICS shall aid improved combustion of solid biomass fuel thereby reducing smoke and Particulate matter (PM) emissions. The project will free the beneficiary households from exposure to smoke / PM associated with traditional cooking.	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	Project Specific Indicator / Monitoring Parameter: % users reporting reduction in smoke/PM after shifting to ICS in project.
5 - Gender Equality	Social Sustainability: The project ICS shall save time in cooking activities (by faster cooking) as well as save time in fuel procurement (reduced collection time or reduced fuel purchase trips to market) due to reduced fuel consumption. This shall save time spent by the women involved in these activities (unpaid work) to be utilized in the same in more productive and income generating tasks. The project will lead to helping beneficiary households in saving time in cooking activities (by faster	5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate.	SDG Indicator 5.4.1: Proportion of time spent on unpaid domestic and care work, by sex, age and location. Monitoring Parameter: The average time saving associated with cooking and fuel collection time due to adoption of project technology / measures.

	cooking) as well as fuel procurement (reduced collection time or reduced fuel purchase trips to market).		
7 - Affordable and Clean Energy	Social, Economic Sustainability: The project activity by distributing ICS will provide access to clean cooking with primary reliance on clean fuels and technology. The project ICS will be made available free of cost to beneficiary households. The project will lead to project households getting access to clean cookstoves (ICS) by the end of its lifetime.	7.1 By 2030, ensure universal access to affordable, reliable, and modern energy services.	SDG Indicator 7.1.2: Proportion of population with primary reliance on clean fuels and technology. Monitoring Parameter: 1. Number of Beneficiaries under the project i.e., Number of ICS distributed under the project. 2. % Users reporting operational project stove.
8 - Decent Work and Economic Growth	Economic Sustainability: The project will create local employment opportunities in operational and management roles, as well as in manufacturing, distribution and logistics.	8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.	SDG Indicator 8.5.1: Average hourly earnings of employees, by sex, age, occupation and persons with disabilities Monitoring Parameter: Number of male / female employment created by project.
13 - Climate Action	Environmental Sustainability: The project by replacing the inefficient traditional stove with the energy-efficient ICS will reduce GHG emissions.	13.2 Integrate climate change measures into national policies, strategies, and planning.	SDG Indicator 13.2.2: Total greenhouse gas emissions per year Monitoring Parameter: Amount of CO ₂ e emissions avoided or sequestered.
15 - Life on Land	Environmental Sustainability: The project will help reduce the use of non-renewable biomass from forests, thus assist in conserving existing forest stock and the protection of natural forest eco-systems and wildlife habitats.	15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.	SDG Indicator 15.2.1: Progress towards sustainable forest management. Monitoring Parameter: Total non-renewable wood fuel saved after shifting to project device.

1.18 Additional Information Relevant to the Project

Leakage Management

Not applicable, as the grouped project adopts a net gross adjustment factor of 95% to account for leakage.

Commercially Sensitive Information

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

Further Information

Not applicable

2 SAFEGUARDS

2.1 No Net Harm

No potential negative socio-economic impacts are generated by the grouped project. The table below outlines various aspects of the project, to assess if any negative impacts exist and its mitigation measures, if required.

Requirement Description	Relevance (Yes/Potentially/No)	How the Project will Achieve Requirements	Mitigation Measures (if required)
1. Human Rights			
1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights	Yes	The Grouped Project/PA and PP both respect human rights and are not complicit in violence or human rights abuses.	No negative impacts, hence, mitigation measures are not applicable
2. The Project shall not discriminate with regards to participation and inclusion	Yes	The Grouped Project/PA does not discriminate with regards to participation and inclusion	No negative impacts, hence, mitigation measures are not applicable
2. Gender Equity			
1. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women a. Sexual harassment and/or any forms of violence against women – address the multiple risks of gender-based	Yes	1. The primary beneficiaries of the Grouped project/PA, include domestic households, where women usually serve as primary cook. Thus, ICSs shall contribute towards Gender equality by freeing the women from the drudgery of	No negative impacts, hence, mitigation measures are not applicable

violence, including sexual exploitation or human trafficking. b. Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls. c. Restriction of women's rights or access to resources (natural or economic). d. Recognise women's ownership rights regardless of marital status – adopt project measures where possible to support to women's access to inherit and own land, homes, and other assets or natural resources. 2. Projects shall apply the principles of non-discrimination, equal treatment, and equal pay for equal work a. Where appropriate for the implementation of the grouped project/PA, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities. b. Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status. c. Ensure that these conditions do not limit the access of women or men, as the case may be, to Grouped		fuel collection and cooking. The time saved in these activities would also help them to conduct other more productive /income generation activities. This would further contribute towards Gender Equality. 2. PP does not discriminate on the basis on gender and promotes equal work for equal pay. PP (BioLite) further confirms that the average wages / remunerations paid to the employees working with BioLite is at / above par with the industry standards and in compliance with the minimum wage rate prescribed by the state / local government regulations. 3. The project complies with National Women Development & Gender Policy and does not limit women access to or control of resources, entitlements, and benefits. On the contrary, the PA ameliorates the living condition of women by freeing them from the burden of biomass fuel collection, decreasing smoke levels and incidence of respiratory illness relative to cooking on traditional biomass stoves using solid biomass fuel.	
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Project/PA participation and benefits. 3. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks 4. (Where required) Summary of opinions and recommendations of an Expert Stakeholder(s)		4. Not Required	
3. Community Health, Safety and Working Conditions			
1. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community	Yes	The Grouped Project/PA reduces exposure to indoor air pollutants and smoke levels, further reducing incidence of respiratory illness compared to cooking on traditional biomass stoves using solid biomass fuel.	
4.1 Sites of Cultural and Historical Heritage			
1. Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional, or religious values or intangible forms of culture?	No, the ICSs are installed in the kitchen of beneficiary households. The ICSs do not interfere with any sites, structures, or objects with historical, cultural, artistic, traditional, or religious values or intangible forms of culture	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
4.2 Forced Eviction and Displacement			
1. Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?	No, the project ICS are installed in the kitchens of the household and hence any possibilities of forced eviction/physical relocation of people due to the project is not applicable. The PP collaborates with the local entrepreneurs for fabrication as well as installation of project	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable

	ICS thereby empowering them economically rather than relocation / threat.		
4.3 Land Tenure and Other Rights			
1. Does the Project require any change, or have any uncertainties related to land tenure arrangements and/or access rights, usage rights or land ownership? 2. For Projects involving land use tenure, are there any uncertainties with regards to land tenure, access rights, usage rights or land ownership?	No, refer justification for 4.1,4.2 above.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
4.4 Native People			
1. Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?	No, the project does not involve any land/territory claim. The ICS are installed in the project beneficiary households at their discretion.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
5. Corruption			
1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects	Yes	The PP does not promote / or is complicit in direct or indirect corruption.	No negative impacts, hence, mitigation measures are not applicable
6.1 Labour Rights			
1. The Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles and standards embodied in the ILO fundamental conventions 2. Workers shall be able to establish and join labour organisations 3. Working agreements with all individual workers shall be documented and implemented and include: a. Working hours (must not exceed 48 hours		1. The Grouped Project/PA does not involve any forced labour and the PP ensures that all employment is in compliance with local labour regulations and laws. 2. The PP puts no constraints / limitations on employees to form a union. 3. The CME/PI's policies and employment contracts are compliant with the requirement.	

per week on a regular basis), AND b. Duties and tasks, AND c. Remuneration (must include provision for payment of overtime), AND d. Modalities on health insurance, AND e. Modalities on termination of the contract with provision for voluntary resignation by employee, AND f. Provision for annual leave of not less than 10 days per year, not including sick and casual leave. 4. No child labour is allowed (Exceptions for children working on their families' property requires an Expert Stakeholder opinion) 5. The Project Developer shall ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures		4. The PP does not promote / or is complicit in child labour 5. No, Major occupational hazards are envisaged during the operation of the project activity.	
6.2 Negative Economic Outcomes			
1. Does the project cause negative economic consequences during and after project implementation?	No, the project will rather contribute to money and time saving because of the reduced fuel consumption. Therefore, the economic outcomes are expected to be positive.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
7.1 Emissions			
1. Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No, the project shall reduce GHG emission by virtue of the increased efficiency of the ICS.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
7.2 Energy Resource			
1. Will the Project use energy from a local grid or	No, the project does not use or intervene	Requirements do not apply	No negative impacts, hence,

power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	with the fuel type used in baseline scenario. In fact, the project minimizes the consumption and thereby reduces the emission by virtue of the increased efficiency of the ICS.		mitigation measures are not applicable
8.1 Impact on Natural Water Patterns/Flows			
1. Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No, the by-products (ash and smoke) of the project cookstoves operation are same as baseline scenario since there is no fuel change. This rule out any additional potential impact on natural or pre-existing pattern of watercourses, groundwater and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
8.2 Erosion and/or Water Body Instability			
1. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? 2. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?	No, The Grouped Project/PA shall result in reduction in demand of biomass fuel in the region putting less pressure on forests for deforestation and will hence indirectly avoid erosion associated with tree cutting/ felling.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
9.1 Landscape Modification and Soil			
1. Does the Project involve the use of land and soil for production of crops or other products?	No, project ICSs shall be installed in the kitchen/cooking area of the beneficiary.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
9.2 Vulnerability to Natural Disaster			
1. Will the Project be susceptible to or lead to increased vulnerability to	No such consequences are envisaged.	Requirements do not apply	No negative impacts, hence, mitigation

wind, earthquakes, subsidence, landslides, erosion, flooding, drought, or other extreme climatic conditions?			measures are not applicable
9.3 Genetic Resources			
1. Could the Project be negatively impacted by or involve genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development, or take place in facilities or farms that include GMOs in their processes and production)?	No, the project intervention includes replacement of baseline stoves with improved project ICS. It does not carry out any change in baseline fuel or that may add additional pollutant to in the air.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
9.4 Release of pollutants			
1. Could the Project potentially result in the release of pollutants to the environment?	No, the project intervention includes replacement of baseline stoves with improved project ICS. It does not carry out any change in baseline fuel or that may add additional pollutant to in the air.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
9.5 Hazardous and Non-hazardous Waste			
1. Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No, the Project does not involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
9.6 Pesticides & Fertilisers			
1. Will the Project involve the application of pesticides and/or fertilisers?	No, the Project does not involve the application of pesticides and/or fertilisers	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
9.7 Harvesting of Forests			
1. Will the Project involve the harvesting of forests?	No, The Grouped Project/PA does not involve harvesting of forests. The Project shall result in reduction in demand of biomass fuel in the region putting less pressure on forests for	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable

	deforestation and will hence indirectly avoid erosion associated with tree cutting/ felling.		
9.8 Food			
1. Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No, the project does not intervene with the baseline food or other edible items.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
9.9 Animal Raising			
1. Will the Project involve animal husbandry?	No, the project will not involve animal husbandry	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
9.10 High Conservation Value Areas and Critical Habitation			
1. Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No, the ICS are going to decrease the GHG emission levels solely due to improved performance and design of the project ICSs. It does not involve change in baseline fuel or any other major interventions that may add additional pollutant to in the air. Thus, the project does not affect or alter the largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified.	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable
Requirement 9.11 Threatened Species			
Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)? and/or	No, the ICS are going to decrease the GHG emission levels solely due to improved performance and design of the project ICSs. It does not involve change in	Requirements do not apply	No negative impacts, hence, mitigation measures are not applicable

Does the Project potentially impact other areas where endangered species may be present through transboundary effects?	baseline fuel or does any other major interventions that may add additional pollutant to in the air. Therefore, the project implementation does not pose any threat to the endangered species prevalent in that area.		
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2.2 Local Stakeholder Consultation

The local stakeholder consultation (LSC) for PA-1 to PA-10 were conducted batchwise from 22/08/2022 to 10/11/2022 as follows:

S. No.	E mail Invitations sent Date	Date on which LSC was concluded	Batch	Country (ies)
1	08/08/2022	22/08/2022	Batch 1	Uganda, Rwanda, Malawi, and Zambia
2	24/08/2022	05/09/2022	Batch 2	Nigeria
3	25/08/2022	06/09/2022	Batch 3	Democratic Republic of Congo
4	09/10/2022	21/10/2022	Batch 4	Madagascar
5	09/10/2022	10/11/2022	Batch 5	Senegal, Mali, Côte d'Ivoire

The stakeholders (both direct and indirect) were invited through various means such as email invitations, newspaper advertisement, posters advertisement at public places, etc. to maximize the stakeholder's participation and to collect their feedback on the project.

Mapping of Relevant Stakeholders Groups: Stakeholders groups likely to be impacted (direct / indirect) by the project, based on experience and professional judgement of PP, were identified as follows:

- A** - Local people, communities and or representatives who are directly or indirectly affected (adversely affected or beneficiaries) by the project or may have an interest in the project.
- B** - Stakeholders with land-tenure rights for any area directly affected by the implementation of the project (i.e., within the project boundary).
- C** - Local policy makers and representatives of local authorities
- D** - National government officials or National Focal bodies responsible for the project in the host country, for example, Designated National Authority (DNA)
- E** - Local non-governmental organisations (NGOs), Women Groups working on topics relevant to the project or working with communities who are likely to be affected by the project.
- F** - Relevant international Non-Governmental Organizations (NGOs) supporters, with a representation in the region of the project.
- G** - Representatives from Verra.

Stakeholder Representation: Based on PP's experience and professional judgement, representative individuals / institutions, as applicable from each stakeholder group were invited (via email, phone calls, in person etc.) to ensure comprehensive representation. Throughout the stakeholder identification process, careful consideration was given to

include individuals and groups who might be directly or indirectly affected by project activities.

The list of identified stakeholders is as illustrated below. The contact details (phone/email) have been removed for data privacy considerations.

Group	Country	Name of invitee / type of invitee	Designation, Organisation (if relevant)	Means of invitation	Invitation Sent on
A	Cote d'Ivoire	Ange-Lewis N'Dri	Baobab+ country sales director	Email	09-10-2022
A	Cote d'Ivoire	Mr. Dickson Ahing Kouame Bahfi	Director, Ivoire Consommation	Email	09-10-2022
A	Cote d'Ivoire	KOFFI Christophe	Baobab+ country Business Development	Email	09-10-2022
A	Cote d'Ivoire	Nguessan Donald Konan	Baobab+ country training supervisor	Email	09-10-2022
A	Cote d'Ivoire	Elisabeth Jacqueline De Billong Edima	Baobab+ country marketing manager	Email	09-10-2022
A	Cote d'Ivoire	Mr. Ermann Zannou	Founder and Manager, Green Ker	Email	09-10-2022
A	Cote d'Ivoire	Kouakou Kan Herve Kouadio	Baobab+ country sales manager	Email	09-10-2022
A	Cote d'Ivoire	Bomo Maraman Drobo	Baobab+ country marketing assistant	Email	09-10-2022
A	Cote d'Ivoire	Pauline Salançon	Baobab+ country CEO	Email	09-10-2022
A	Cote d'Ivoire	Pacôme Goule Tali	Baobab+ country technician supervisor	Email	09-10-2022
A	Cote d'Ivoire	Atta Yatté Mathieu	End User-Solar	Phone	09-10-2022
A	Cote d'Ivoire	Kabore Pascal	End User-Solar	Phone	09-10-2022
A	Cote d'Ivoire	Kobenon Koffi Henock	End User-Solar	Phone	09-10-2022
A	Cote d'Ivoire	Méa kanga Christophe	End User-Solar	Phone	09-10-2022
A	Cote d'Ivoire	Zouzou kouassi	End User-Solar	Phone	09-10-2022
A	Cote d'Ivoire	Mr. Ermann Zannou	Founder and Manager - Green Ker	Email	09-10-2022
A	Cote d'Ivoire	Mr. Dickson Ahing Kouame Bahfi	Director - Ivoire Consommation	Email	09-10-2022
A	Cote d'Ivoire	Mr. Avou AHONZO	President – Hydrovie	Email	09-10-2022
A	Cote d'Ivoire	Mr. INES AHOUE	JVE Côte d'Ivoire	Email	09-10-2022
A	Cote d'Ivoire	Nick Marshall	Envirofit	Email	09-10-2022
A	DRC	Blandine	Cookstove End user - 1st stove CRF - CCA01008631	Phone	25-08-2022
A	DRC	Edmond RAMAZANI	Baobab+ DRC Accountant	Email	25-08-2022
A	DRC	Mr. Elois MATHERANYA	Directeur Gerant, GOMA STOVE	Email	25-08-2022
A	DRC	Aimerance RIBA RIBA	Potentiel Client (utilise le FA artisanale)	Email	25-08-2022
A	DRC	Patrick coco TOMBE MUKABA	Baobab+ country commercial director	Email	25-08-2022
A	DRC	Sandra NDAYA MUTEMBA	End user – stoves	Email	25-08-2022
A	DRC	Mr. Malango Washikala	Co-Founder & Co-CEO, Alternative Energy Technologies Group (Altech Group)	Email	25-08-2022
A	DRC	BAvon KIYOYO KIANZA	Client – Solar	Phone	25-08-2022
A	DRC	Suzane MUDISI	Client – Solar	Phone	25-08-2022
A	DRC	Mr. longwa Washikala	Co-Founder, Alternative Energy Technologies Group (Altech Group)	Email	25-08-2022

Group	Country	Name of invitee / type of invitee	Designation, Organisation (if relevant)	Means of invitation	Invitation Sent on
A	DRC	Mr. Emmanuel Nzola Meso M	Manging Director - CONGO GREEN ENERGY&TECHNOLOGIES LTD	Email	25-08-2022
A	DRC	Mr. Morya Nzola Meso	Director - CONGO GREEN ENERGY&TECHNOLOGIES LTD	Email	25-08-2022
A	DRC	Mr. Elois MATHERANYA	Director - Goma Stove	Email	25-08-2022
A	DRC	Mr. Joseph BAUMA	Finance Director - Goma Stove	Email	25-08-2022
A	DRC	Mr. Phidias Mufan	MD – Tufaidike	Email	25-08-2022
A	DRC	Ms. Mamy Shweka	Chairperson – Tufaidike	Email	25-08-2022
A	DRC	Mr. ANDRE MOLIRO	Coordinator - Hope Land Congo	Email	25-08-2022
A	DRC	GUILLAUME MAMBU	Secretary General - Hope Land Congo	Email	25-08-2022
A	DRC	Mrs. FRANCINE Mwafima	President- Kudiva	Email	25-08-2022
A	DRC	Mrs. Liliane Pemba	Coordinator-Kudiva	Email	25-08-2022
A	Madagascar	Joel Ranarijesy	Baobab+ country sales director	Email	09-10-2022
A	Madagascar	Nirivotra Randrianarivelo	Baobab+ country marketing & biz dev director	Email	09-10-2022
A	Madagascar	VELONIRINA Dieu Donné Norbertino	End User Stoves: 12051403	Email	09-10-2022
A	Madagascar	ANDRIAMPARANY ANIC	Client Cookstoves	Phone	09-10-2022
A	Madagascar	LAZA JULIEN	End User-cookstoves	Phone	09-10-2022
A	Madagascar	MAMIZARA ROMIALD BERNARD	End User-cookstoves	Phone	09-10-2022
A	Madagascar	Manguithre Geneviève dit Mme Geneviève ou Maman 'i Brayan	End User-solar	Phone	09-10-2022
A	Madagascar	NILAINA BETOMIAS PHILEMON	End User-cookstoves	Phone	09-10-2022
A	Madagascar	RAHARISOA Marie Nathalie	End User-solar	Phone	09-10-2022
A	Madagascar	RAKOTOMALALA FANJAHARISOA	Client Cookstoves	Phone	09-10-2022
A	Madagascar	RANDRIAMORIA SITRAKINIAINA ANNICK	End User-cookstoves	Phone	09-10-2022
A	Madagascar	RASOAHANITRINIAINA VOLOLONIRINA VALISOA ANDRY LALAINA	End User-cookstoves	Phone	09-10-2022
A	Madagascar	RASOANIRIANA MARIE ANGELE	End User-solar	Phone	09-10-2022
A	Madagascar	RASOAVELOMANANA YANNA ROGETTE	Client Cookstoves	Phone	09-10-2022
A	Madagascar	RAZANAKOLONA NIRISOA ODON	Client Cookstoves	Phone	09-10-2022
A	Madagascar	ROGER BOTOMORA	Client Cookstoves	Phone	09-10-2022
A	Madagascar	TAHINIAYO GUILLAUMINE AGATTE CLAUDINE	Client Cookstoves	Phone	09-10-2022
A	Madagascar	Dr. Alessandro Berti	General Manager - Tozzi Green	Email	09-10-2022
A	Madagascar		Zahana organisation	Email	09-10-2022
A	Madagascar		Ades Organisation	Email	09-10-2022
A	Malawi	Ben Walwyn	Yellow	Email	08-08-2022

Group	Country	Name of invitee / type of invitee	Designation, Organisation (if relevant)	Means of invitation	Invitation Sent on
A	Malawi	Mr. Boniface Mbewe	Programs Coordinator, Chipembere Community Development Organization	Email	08-08-2022
A	Malawi	Caville Harris	Yellow	Email	08-08-2022
A	Malawi	Chawezi Moyo	Civil Society	Email	08-08-2022
A	Malawi	Mr. John Chimbata Munthali	Chief Executive officer, Preserve Malawi	Email	08-08-2022
A	Malawi	Henry Chinoko	Civil Society	Email	08-08-2022
A	Malawi	Elenimo Chembe	Civil Society	Email	08-08-2022
A	Malawi	Hope M'bobo	Civil Society	Email	08-08-2022
A	Malawi	Emma Pempho Malata	Civil Society	Email	08-08-2022
A	Malawi	Felicia Monjeza	Civil Society	Email	08-08-2022
A	Malawi	Noble Hara	Civil Society	Email	08-08-2022
A	Malawi	Jacqueline Singano	Civil Society	Email	08-08-2022
A	Malawi	Mr. Jordan Kowalke	CEO, Total LandCare Green	Email	08-08-2022
A	Malawi	Joyce Sikwese	GIT	Email	08-08-2022
A	Malawi	Kelvin Kalulu	Civil Society	Email	08-08-2022
A	Malawi	Kondwani Moyo	Civil Society	Email	08-08-2022
A	Malawi	Linda Kungota	Solar-works	Email	08-08-2022
A	Malawi	Mayamiko Chingoka	Civil Society	Email	08-08-2022
A	Malawi	Edgar Petros	Civil Society	Email	08-08-2022
A	Malawi	Janet Mwanjiwa	Civil Society	Email	08-08-2022
A	Malawi	Olive mpina	Civil Society	Email	08-08-2022
A	Malawi	Stuart Malongo	Solar Works	Email	08-08-2022
A	Malawi	Stella Chikombole	Civil Society	Email	08-08-2022
A	Malawi	Stuart McMaster	Yellow	Email	08-08-2022
A	Malawi	Wongani Nyondo	Civil Society	Email	08-08-2022
A	Malawi	Agnes Tankhulenji Mpangaja	End User-Solar	Phone	08-08-2022
A	Malawi	Alinafe Kalewa	End User-Solar	Phone	08-08-2022
A	Malawi	Anna Chibonzo	End User-Solar	Phone	08-08-2022
A	Malawi	Debrah Banda	End User-Solar	Phone	08-08-2022
A	Malawi	Dyna Bwanali	End User-Solar	Phone	08-08-2022
A	Malawi	Feria Chidzere Andriano	End User-Solar	Phone	08-08-2022
A	Malawi	Fred Chibwana	End User	Phone	08-08-2022
A	Malawi	Jacqline Binwell	End User-Solar	Phone	08-08-2022
A	Malawi	Ketrina Najere Newa	End User-Solar	Phone	08-08-2022
A	Malawi	Rose Banda Namadzunda	End User-Solar	Phone	08-08-2022
A	Malawi	Shyreen Sarah Chipazya	End User-Solar	Phone	08-08-2022
A	Mali	Djilomo SAMBOU	Client experience Manager Baobab+ Mali	Email	09-10-2022
A	Mali	Hamadou DIAKITE	Marketing Manager Baobab+ Mali	Email	09-10-2022
A	Mali	Kadiatou TRAORE	CBB Agence Baobab ACI 2000	Email	09-10-2022

Group	Country	Name of invitee / type of invitee	Designation, Organisation (if relevant)	Means of invitation	Invitation Sent on
A	Mali	Fanta KEITA	Communication, Gender & Inclusive Development Officer MADECC	Email	09-10-2022
A	Mali	Mame DIOR NDIAYE	CEO Baobab+ Mali	Email	09-10-2022
A	Mali	Moussa DIALLO	Agency Operations Manager Baobab + Mali	Email	09-10-2022
A	Mali	Mohamed SOUMAHORO	Administrative and Finance Manager Baobab+ Mali	Email	09-10-2022
A	Mali	Mr. Gamby Hamady	Africa Diamond Business	Email	09-10-2022
A	Mali	Dr. Ballo Abdoulaye	Africa Diamond Business	Email	09-10-2022
A	Mali	Ms. Salamata Fofana	President - Association des femmes ingénieurs du Mali	Email	09-10-2022
A	Mali	Ms. Sita Safe	Communication Director - Association des femmes ingénieurs du Mali	Email	09-10-2022
A	Mali	Mr. Amara DIAWARA	President - Association GreenCom	Email	09-10-2022
A	Mali	Mr. Aboubacar Sidiki KONE	Vice President - Association GreenCom	Email	09-10-2022
A	Mali	Mr. Modibo SIDIBE	Manager - BIFAC	Email	09-10-2022
A	Mali	Mr. Ouattara Ousmane	Exec director - Mali-Foklecenter Nyetaa (MFC)	Email	09-10-2022
A	Mali	Mr. Diarra Mahamadou Karamoko	Project Coordinator - Mali-Foklecenter Nyetaa (MFC)	Email	09-10-2022
A	Mali	Mr. Amadou Kassambara	Secretary General - Prema Mali	Email	09-10-2022
A	Mali	Ms. Maimouna Diawara	Finance Director - Prema Mali	Email	09-10-2022
A	Mali	Mali	Mr. Kassoum Coulibaly	Email	09-10-2022
A	Mali	Mali	Mr. Idrissa Coulibaly	Email	09-10-2022
A	Mali	Mali	Mr. Amzatou KONE	Email	09-10-2022
A	Mali	Mali	Mr. Oumar DIALLO	Email	09-10-2022
A	Mali	Valérie Konaté	Human Resource director Baobab+ Mali	Email	09-10-2022
A	Nigeria	Mr Agazue Ishmael	Commercial Cookstove Manufacturer, Mr Agazue Ishmael	Email	24-08-2022
A	Nigeria	Amos dupengus	Commercial Cookstove Manufacturer, Amos dupengus	Email	24-08-2022
A	Nigeria	Anas Adamu	Commercial Cookstove Manufacturer, Anas Adamu	Email	24-08-2022
A	Nigeria	Ayodele Joshua	Cookstove Technician, Ayodele Joshua	Email	24-08-2022
A	Nigeria	Oniyide Tobi	Cookstove Technician, Oniyide Tobi	Email	24-08-2022
A	Nigeria	Mr Selbol Lannap	Director, Bols N Sels Technologies Ltd	Email	24-08-2022
A	Nigeria	Mrs adeyemi	Proprietress, Captain of Host School	Email	24-08-2022
A	Nigeria		Managing Director, Child Health Advocacy Initiative	Email	24-08-2022
A	Nigeria	Anusi Chioma(Mrs)	Proprietor, Imagination Kindercare School	Email	24-08-2022
A	Nigeria	Christopher Wazhi	Baobab+ tech manager	Email	24-08-2022
A	Nigeria	Lawal Samusideen	Head of school, The Pillars Model School's Ota	Email	24-08-2022
A	Nigeria	Dare Kehinde	Cookstove Technician, Dare Kehinde	Email	24-08-2022
A	Nigeria	Mrs Victoria Anigioro	Head of school, De Guide Light Schools	Email	24-08-2022
A	Nigeria	Adeyeye Lawrence Ojo	Proprietor, Brilliant Heritage School	Email	24-08-2022

Group	Country	Name of invitee / type of invitee	Designation, Organisation (if relevant)	Means of invitation	Invitation Sent on
A	Nigeria	Binta yahaya	Commercial Cookstove Manufacuter, Binta yahaya	Email	24-08-2022
A	Nigeria	Iftar Mubarak	Commercial cookstove Distributor, Fati stoves	Email	24-08-2022
A	Nigeria	Grace Akinbami	Baobab+ finance manager	Email	24-08-2022
A	Nigeria	Happy AMOS	Manufaturer Cookstove , Roshan Global services	Email	24-08-2022
A	Nigeria	Okey Esse	Power Stove	Email	24-08-2022
A	Nigeria	Mrs ihmadu priscilla	Proprietress, Treasure Chest Nursery and Primary School	Email	24-08-2022
A	Nigeria		Lagos Medical Women Association Of Nigeria (MWAN)	Email	24-08-2022
A	Nigeria	Umar Farouk Adbulrasheed	Founder, Laafia Stoves	Email	24-08-2022
A	Nigeria	Mr. Taiwo Ibironke	Country Director, Wise Ecostove Nigeria Limited	Email	24-08-2022
A	Nigeria	Jessica Alderman	Director of commuication, Envirofit Nigeria CookStove LTD	Email	24-08-2022
A	Nigeria	Mrs Oghenejiru Bezi	Proprietress, Mariglom Nursery and Primary School	Email	24-08-2022
A	Nigeria	Joshua Obey	Cookstove Technician, Joshua Obey	Email	24-08-2022
A	Nigeria	Kemi Esho	Distributor Cookstove, Kemi Esho	Email	24-08-2022
A	Nigeria	Mr kenny	Head of school, Silverson Private Schools,Iyana Iyesi	Email	24-08-2022
A	Nigeria	Kolawole Oguntuase	Baobab+ training/biz dev manager	Email	24-08-2022
A	Nigeria	Kolawole Osinowo	Baobab+ CEO	Email	24-08-2022
A	Nigeria	Omotosho Lekan	Director, King's Bridge School	Email	24-08-2022
A	Nigeria	Ladidi Mingai	other manager	Email	24-08-2022
A	Nigeria	Leonard Odagbu	other manager	Email	24-08-2022
A	Nigeria	Maarufu Salahudeen	Cookstove Technician, Maarufu Salahudeen	Email	24-08-2022
A	Nigeria	Rev Fawole	Proprietor, Apples of Gold International School	Email	24-08-2022
A	Nigeria	Musa Galadima	Distributor Cookstove, Musa Galadima	Email	24-08-2022
A	Nigeria	Femi Akinwunmi	Proprietor, Multigrace School	Email	24-08-2022
A	Nigeria	Mr. Oriaku Kelechi	Commercial Cookstove Manufacuter, Mr. Oriaku Kelechi	Email	24-08-2022
A	Nigeria	Mathew Olatokunbo	Cookstove Technician, Mathew Olatokunbo	Email	24-08-2022
A	Nigeria	Christopher Obi	CEO, Nenu Stoves	Email	24-08-2022
A	Nigeria	Olabisi Adenusi	other manager	Email	24-08-2022
A	Nigeria	Esther Obialo	Distributor Cookstove, Esther Obialo	Email	24-08-2022
A	Nigeria	Mr Olujuwon	Proprietor, Olujuwon Heritage Model College	Email	24-08-2022
A	Nigeria	Hannah Akangbe	Distributor Cookstove, Hannah Akangbe	Email	24-08-2022
A	Nigeria	Esther Oyarinde	Distributor Cookstove, Esther Oyarinde	Email	24-08-2022
A	Nigeria	Ikechukwu Chinemerem	Director, Young water professionals Nigeria	Email	24-08-2022
A	Nigeria	Mrs lape fajuyitan	Proprietress, Sign and Wonders International School	Email	24-08-2022
A	Nigeria	Mr Ramoni Shittu	Commercial Cookstove Manufacuter, Mr Ramoni Shittu	Email	24-08-2022

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A	Nigeria	Sulaiman Usman	Commercial Cookstove Manufacuter, Sulaiman Usman	Email	24-08-2022
A	Nigeria	Sunday Ibrahim	Distributor Cookstove, Sunday Ibrahim	Email	24-08-2022
A	Nigeria	Osundairo Ayomide	Cookstove Technician, Osundairo Ayomide	Email	24-08-2022
A	Nigeria	Ahlhja Khadija	Commercial cookstove user, Ahlhja Khadija	Phone	24-08-2022
A	Nigeria	Akaasa Opkoama	Commercial cookstove user, Akaasa Opkoama	Phone	24-08-2022
A	Nigeria	Alhaji tea center and fast food	Commercial cookstove user, Alhaji tea center and fast food	Phone	24-08-2022
A	Nigeria	Aregbesola Sulaimon	Cookstove Technician, Aregbesola Sulaimon	Phone	24-08-2022
A	Nigeria	Austin Ogbonna	Commercial Cookstove Manufacuter, Austin Ogbonna	Phone	24-08-2022
A	Nigeria	Busari Sikiru	Cookstove Technician, Busari Sikiru	Phone	24-08-2022
A	Nigeria	Deborah Agbo	Commercial cookstove user, Deborah Agbo	Phone	24-08-2022
A	Nigeria	Eka Ejima	Commercial cookstove user, Eka Ejima	Phone	24-08-2022
A	Nigeria	FAAD	Commercial Cookstove Manufacuter, FAAD	Phone	24-08-2022
A	Nigeria	Florence Aniebonam	Commercial cookstove user, Florence Aniebonam	Phone	24-08-2022
A	Nigeria	Gloria David	Commercial cookstove user, Gloria David	Phone	24-08-2022
A	Nigeria	Glory Foods	Commercial cookstove user, Glory Foods	Phone	24-08-2022
A	Nigeria	Godiya Inusa	Commercial cookstove user, Godiya Inusa	Phone	24-08-2022
A	Nigeria	Timi Tope Ologunoye	Director, Green Energy bio fuels	Email	24-08-2022
A	Nigeria	Hannatu	Commercial cookstove user, Hannatu	Phone	24-08-2022
A	Nigeria	Hassan	Commercial cookstove user, Hassan	Phone	24-08-2022
A	Nigeria	Iya Samuel	Commercial cookstove user, Iya Samuel	Phone	24-08-2022
A	Nigeria	Joy Akaya	Commercial cookstove user, Joy Akaya	Phone	24-08-2022
A	Nigeria	Jumai Isaac	Commercial cookstove user, Jumai Isaac	Phone	24-08-2022
A	Nigeria	Kareem	Commercial cookstove user, Kareem	Phone	24-08-2022
A	Nigeria	Kehinde Ebenezer	Cookstove Technician, Kehinde Ebenezer	Phone	24-08-2022
A	Nigeria	Khadija	Commercial cookstove user, Khadija	Phone	24-08-2022
A	Nigeria	Mama Ruka	Commercial cookstove user, Mama Ruka	Phone	24-08-2022
A	Nigeria	Miss Deborah	Commercial cookstove user, Miss Deborah	Phone	24-08-2022
A	Nigeria	Mohammed	Commercial Cookstove Manufacuter, Mohammed	Phone	24-08-2022
A	Nigeria	Mr Femi	Commercial cookstove user, Mr Femi	Phone	24-08-2022
A	Nigeria	Mr Longenus Ofoewe8	Commercial Cookstove Manufacuter, Mr Longenus Ofoewe8	Phone	24-08-2022
A	Nigeria	Mr Ogunsina	Commercial Cookstove Manufacuter, Mr Ogunsina	Phone	24-08-2022
A	Nigeria	Mr. Abdulahi	Commercial Cookstove Manufacuter, Mr. Abdulahi	Phone	24-08-2022
A	Nigeria	Mr. Fatoki	Commercial Cookstove Manufacuter, Mr. Fatoki	Phone	24-08-2022
A	Nigeria	Mrs Aliu	Commercial cookstove user, Mrs Aliu	Phone	24-08-2022
A	Nigeria	Mrs Augustina Anyawui	Commercial cookstove user, Mrs Augustina Anyawui	Phone	24-08-2022

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A	Nigeria	Mrs Bose Isa	Commercial cookstove user, Mrs Bose Isa	Phone	24-08-2022
A	Nigeria	Mrs Chinyere	Commercial cookstove user, Mrs Chinyere	Phone	24-08-2022
A	Nigeria	Mrs Florence	Commercial cookstove user, Mrs Florence	Phone	24-08-2022
A	Nigeria	Mrs Goodness Agoha	Commercial cookstove user, Mrs Goodness Agoha	Phone	24-08-2022
A	Nigeria	Mrs Medina	Commercial cookstove user, Mrs Medina	Phone	24-08-2022
A	Nigeria	Mrs Opara Ogechi	Commercial cookstove user, Mrs Opara Ogechi	Phone	24-08-2022
A	Nigeria	Mrs Opeyemi Elizabeth	Commercial cookstove user, Mrs Opeyemi Elizabeth	Phone	24-08-2022
A	Nigeria	Mrs Perpetual Emerionyeekwe	Commercial cookstove user, Mrs Perpetual Emerionyeekwe	Phone	24-08-2022
A	Nigeria	Mrs. Glory Pius	Commercial cookstove user, Mrs. Glory Pius	Phone	24-08-2022
A	Nigeria	Mrs. Ogundipe	Commercial cookstove user, Mrs. Ogundipe	Phone	24-08-2022
A	Nigeria	Mrs.Ugo	Commercial cookstove user, Mrs.Ugo	Phone	24-08-2022
A	Nigeria	Mummy twins	Commercial cookstove user, Mummy twins	Phone	24-08-2022
A	Nigeria	Nwanyi Owerri Restaurant	Commercial cookstove user, Nwanyi Owerri Restaurant	Phone	24-08-2022
A	Nigeria	Orji.	Commercial cookstove user, Orji.	Phone	24-08-2022
A	Nigeria	Rebecca	Commercial cookstove user, Rebecca	Phone	24-08-2022
A	Nigeria	Saida mohammed	Commercial cookstove user, Saida mohammed	Phone	24-08-2022
A	Nigeria	Pedro Akposeye	Manager, SHELL (Community Relation Manager)	Phone	24-08-2022
A	Nigeria	Sonny Amos	Commercial Cookstove Manufacuter, Sonny Amos	Phone	24-08-2022
A	Nigeria	Sunny	Commercial cookstove user, Sunny	Phone	24-08-2022
A	Nigeria	Talatu Audu	Commercial cookstove user, Talatu Audu	Phone	24-08-2022
A	Nigeria	SEYE OMIYEFA	EXECUTIVE DIRECTOR, Youth Action on Tobacco Control And Health	Phone	24-08-2022
A	Nigeria	Yusuf	Commercial cookstove user, Yusuf	Phone	24-08-2022
A	Nigeria	Kuburat Oyekanmi	cookstove customer	Phone	24-08-2022
A	Rwanda	Alex Munyehirwe		Email	08-08-2022
A	Rwanda	AJDR COOPERATIVE	AJDR COOPERATIVE	Email	08-08-2022
A	Rwanda	Alain	Solektra Energy	Email	08-08-2022
A	Rwanda	Alain Harelimana	SOLEKTRA-ENERGY	Email	08-08-2022
A	Rwanda	Alexis Mbera		Email	08-08-2022
A	Rwanda	MAHIRWE Alexis		Email	08-08-2022
A	Rwanda	TWAHIRWA APPOLINAIRE		Email	08-08-2022
A	Rwanda	Biomasssters Energy	Biomasssters Energy	Email	08-08-2022
A	Rwanda	Buim	BUIM	Email	08-08-2022
A	Rwanda	Christian Burege	SP	Email	08-08-2022
A	Rwanda	Céline TAHANINKA		Email	08-08-2022
A	Rwanda	Chelang'at Surum	One Acre Fund	Email	08-08-2022

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A	Rwanda	Chris Kavanagh	BLUEFLAME	Email	08-08-2022
A	Rwanda	Alain RUZINDANA Christian	Product Scaling specialist, One Acre Fund	Email	08-08-2022
A	Rwanda	Clean cooking Sub-Sahara	Clean cooking Sub-Sahara	Email	08-08-2022
A	Rwanda	Gashumba Damas		Email	08-08-2022
A	Rwanda	Daniel Harunashe Matimba	Product Scaling lead, One Acre Fund	Email	08-08-2022
A	Rwanda	Pac International -Debora-	Pac International	Email	08-08-2022
A	Rwanda	Doreen Rwigamba	Dalberg	Email	08-08-2022
A	Rwanda	Marcel Dushimimana	One Acre Fund	Email	08-08-2022
A	Rwanda	Ed Agnew	Koko Networks	Email	08-08-2022
A	Rwanda	Eastaficamg group	Eastaficamg group	Email	08-08-2022
A	Rwanda	EFECO Ltd	EFECO Ltd	Email	08-08-2022
A	Rwanda	Emmanuel Kayiranga		Email	08-08-2022
A	Rwanda	Enedom		Email	08-08-2022
A	Rwanda	Entreprise Dassise		Email	08-08-2022
A	Rwanda	Envirogreen	Biomaster Energy	Email	08-08-2022
A	Rwanda	Eraste Mugemangango	One Acre Fund	Email	08-08-2022
A	Rwanda	Euan Mcdougall	Del-Agua	Email	08-08-2022
A	Rwanda	GAAP Ltd	GAAP Ltd	Email	08-08-2022
A	Rwanda	Geir	Blue Flame	Email	08-08-2022
A	Rwanda	Geni Green Solutions Ltd	Geni Green Solutions Ltd	Email	08-08-2022
A	Rwanda	Grace Ingabire	Ignite	Email	08-08-2022
A	Rwanda	GREEN SHELTER	GREEN SHELTER	Email	08-08-2022
A	Rwanda	Honore Nzayisenga		Email	08-08-2022
A	Rwanda	Idrissa Octave	Ignite	Email	08-08-2022
A	Rwanda	Innocent Nsekeyukunze	Biomasters Energy	Email	08-08-2022
A	Rwanda	Innotech Rwanda	Innotech Rwanda	Email	08-08-2022
A	Rwanda	Issam Rez	SP	Email	08-08-2022
A	Rwanda	John Kamali	Bboxx	Email	08-08-2022
A	Rwanda	Justus Mucyo	BBOX	Email	08-08-2022
A	Rwanda	Julie Roberts	Mesh Power	Email	08-08-2022
A	Rwanda	Josephine Mbabazi	EPDRWANDA	Email	08-08-2022
A	Rwanda	Kerryn Probert	PESITHO	Email	08-08-2022
A	Rwanda	Startimes	STARTIMES	Email	08-08-2022
A	Rwanda	Louis Rwagaju	Engie	Email	08-08-2022
A	Rwanda	MAHIRWE Cassien		Email	08-08-2022
A	Rwanda	Maria Velazquez	One Acre Fund	Email	08-08-2022
A	Rwanda	Monica Keza	Del-Agua	Email	08-08-2022
A	Rwanda	Mr. Oscar MUHIRE	Sales Manager, GLAS Ltd	Email	08-08-2022
A	Rwanda	Munyatina	Geco Ltd	Email	08-08-2022
A	Rwanda	Mutoni Christiane		Email	08-08-2022

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A	Rwanda	Mr. Jean Nepo MUTSINZI	Engineer, ASOFATE	Email	08-08-2022
A	Rwanda	Nancy Yu		Email	08-08-2022
A	Rwanda	Ndayishimiye Dieudonne		Email	08-08-2022
A	Rwanda	leon nduwayezu		Email	08-08-2022
A	Rwanda	Naya Mondo	ELERA	Email	08-08-2022
A	Rwanda	Mr. Aloys NTIHEMUKA	NESELTEC LTD	Email	08-08-2022
A	Rwanda	Aloys NTIHEMUKA		Email	08-08-2022
A	Rwanda	Nzarulinda		Email	08-08-2022
A	Rwanda	Mr. Placide Nzisabira	President, AJDR Cooperative	Email	08-08-2022
A	Rwanda	Oak Investments Ltd	Oak Investments Ltd	Email	08-08-2022
A	Rwanda	Philbert Dusenge	Development Bank of Rwanda-BRD	Email	08-08-2022
A	Rwanda	Patricia Mwanzia	Non-Ag-Supply chain, One Acre Fund	Email	08-08-2022
A	Rwanda	pius nyuykonge Lukong	Green Carbon	Email	08-08-2022
A	Rwanda	Mr. Paulin RUZIBIZA	Integrated Polytechnic Regional Centre (IPRC Kigali) Kicukiro Campus	Email	08-08-2022
A	Rwanda	Quality engineering company ltd	Quality engineering company ltd	Email	08-08-2022
A	Rwanda	Richard Mori	Mesh Power	Email	08-08-2022
A	Rwanda	Ruben	Africa Clean Energy	Email	08-08-2022
A	Rwanda	Bruno Rugero		Email	08-08-2022
A	Rwanda	Rutagarama F		Email	08-08-2022
A	Rwanda	Rutyomba Eustache		Email	08-08-2022
A	Rwanda	EcoGreen ltd	EcoGreen ltd	Email	08-08-2022
A	Rwanda	Saxena	Koko Networks	Email	08-08-2022
A	Rwanda	Salim Mbarushimana	Ignite Solar	Email	08-08-2022
A	Rwanda	Sam murenzi	Ignite	Email	08-08-2022
A	Rwanda	Samuel Mugisha	Zola Electric	Email	08-08-2022
A	Rwanda	Sam Murererehe	EMS	Email	08-08-2022
A	Rwanda	Sanday Kabarebe	EPDRWANDA	Email	08-08-2022
A	Rwanda	SAVE LIFE LTD	SAVE LIFE LTD	Email	08-08-2022
A	Rwanda	Steve zion	Axourse	Email	08-08-2022
A	Rwanda	Steve		Email	08-08-2022
A	Rwanda	Tim lee	Bboxx	Email	08-08-2022
A	Rwanda	Isdore NZEYIMANA		Email	08-08-2022
A	Rwanda	Solektra Energy	Solektra Energy	Email	08-08-2022
A	Rwanda	REPCAW		Email	08-08-2022
A	Rwanda	Phocas Twizeyimana		Email	08-08-2022
A	Rwanda	Uwiza Alice		Email	08-08-2022
A	Rwanda	Uwihanga	Intertech Ltd	Email	08-08-2022
A	Rwanda	MUHAMYANKAKA VENUSTE		Email	08-08-2022

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A	Rwanda	Yves Damour		Email	08-08-2022
A	Rwanda	Yves Rurangirwa	Yerbis	Email	08-08-2022
A	Rwanda	Claudine Mukamwiza	End User-Cookstoves	Phone	08-08-2022
A	Rwanda	Deliphine Uwase	End User-Cookstoves	Phone	08-08-2022
A	Rwanda	Esperence Umuhoza	End User-Cookstoves	Phone	08-08-2022
A	Rwanda	Francine Kasine	End User-Cookstoves	Phone	08-08-2022
A	Rwanda	Mukagakwaya Esperance	End User-Cookstoves	Phone	08-08-2022
A	Rwanda	Nambazimana Pauline	End User-Cookstoves	Phone	08-08-2022
A	Rwanda	Nsengiyumva Emmanuel	End User-Cookstoves	Phone	08-08-2022
A	Rwanda	Pascalie Kashima	End User-Cookstoves	Phone	08-08-2022
A	Rwanda	Sinigenga Theoneste	End User-Cookstoves	Phone	08-08-2022
A	Rwanda	Uwanyirigira Anosiatha	End User-Cookstoves	Phone	08-08-2022
A	Senegal	Awa Top	Baobab+ Agency Supervisor	Email	09-10-2022
A	Senegal	Aïssatou Yelly Diop	End User- First stove sale	Email	09-10-2022
A	Senegal	Mr. Arouna Diallo	Project Manager, GIE PADISEN	Email	09-10-2022
A	Senegal	Christophe Gondry	Baobab+ CEO Sénégal	Email	09-10-2022
A	Senegal	Dieynaba Ba	Baobab+ Marketing & Business Development manager	Email	09-10-2022
A	Senegal	Daniel Ndiaye	Baobab+ Logistics, Purchasing & General Resources Manager	Email	09-10-2022
A	Senegal	Jasmine Gackou	Baobab+ Marketing assistant	Email	09-10-2022
A	Senegal	Justine Diémé	Baobab+ Agency Supervisor	Email	09-10-2022
A	Senegal	Magloire Ahouanmenou	Baobab+ Commercial Director	Email	09-10-2022
A	Senegal	Saer Dial	Baobab+ Directeur Expérience Client	Email	09-10-2022
A	Senegal	Marie Téning Sarr	Business Development Manager Baobab+ Senegal	Email	09-10-2022
A	Senegal	Thiané Yaffa	Baobab+ Sales	Email	09-10-2022
A	Senegal	Hanane Zerouaoui	Baobab+ country Chief Finance Officer	Email	09-10-2022
A	Senegal	Ms. Nadia Mrabit	CEO - Africa Future Group	Email	09-10-2022
A	Senegal	Mr. Arouna Diallo	Project Manager - GIE PADISEN	Email	09-10-2022
A	Senegal	Mr. Moustapha Sarr	General Manager - Gie Padisen	Email	09-10-2022
A	Senegal	Ms. Diele Faye	Chief strategy Officer - SenCook	Email	09-10-2022
A	Senegal	Mr. Bocar SY	Institutional Expert - SenCook	Email	09-10-2022
A	Senegal	Mr. John Fay	MD - Shared Value Africa LLC	Email	09-10-2022
A	Senegal	Mr. Marc-André Ledoux	Director General - Société Sahélienne d'Energie Renouvelable (SOSER)	Email	09-10-2022
A	Uganda	Andreas Manhart		Email	08-08-2022
A	Uganda	Karungi Acheles	GIZ-Uganda	Email	08-08-2022
A	Uganda	Batteiger Alexander	GIZ-Uganda	Email	08-08-2022
A	Uganda	Kahunzire Amanda	Engie	Email	08-08-2022
A	Uganda	Abubaker Mayemba	IOM-Uganda	Email	08-08-2022

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A	Uganda	Andrew	Sologrid	Email	08-08-2022
A	Uganda	Antonia Stroeh	Master card	Email	08-08-2022
A	Uganda	Arnold Ruyonga		Email	08-08-2022
A	Uganda	Beatrice Nabbanja	Engie	Email	08-08-2022
A	Uganda	Ben Good	Energy 4 Impact	Email	08-08-2022
A	Uganda	Baesch Ssemwaka Bettina	GIZ-Uganda	Email	08-08-2022
A	Uganda	Bisasso	Bodawerk	Email	08-08-2022
A	Uganda	Bruce Muhame	FINCA Brightlife	Email	08-08-2022
A	Uganda	Mugeya Cosmas	Inventory & Logistics Manager, FINCA Brightlife	Email	08-08-2022
A	Uganda	Ragazzi	Mercy corps	Email	08-08-2022
A	Uganda	Daniel Umariah Ojok	GREEN LIGHT PLANET-Uganda	Email	08-08-2022
A	Uganda	Tashobya Dean		Email	08-08-2022
A	Uganda	Nicholson	Mercy corps	Email	08-08-2022
A	Uganda	Yazdani	Mercy corps	Email	08-08-2022
A	Uganda	Aziebor	Mercy corps	Email	08-08-2022
A	Uganda	Emmanuel Onangu	Engie	Email	08-08-2022
A	Uganda	Frank Obua	GIZ-Uganda	Email	08-08-2022
A	Uganda	Fred Tuhairwe	Global Green Growth Institute	Email	08-08-2022
A	Uganda	Arthurson Gemma	IOM-Uganda	Email	08-08-2022
A	Uganda	Gladys Nambi		Email	08-08-2022
A	Uganda	Kyomugisha Helen	GIZ-Uganda	Email	08-08-2022
A	Uganda	Hugo	ENGIE-Uganda	Email	08-08-2022
A	Uganda	Taremwa Ivan Bwengye	GIZ-Uganda	Email	08-08-2022
A	Uganda	Jacinta Mueni Mutevu	CFO, FINCA BrightLife	Email	08-08-2022
A	Uganda	Mandel Jana	GIZ-Uganda	Email	08-08-2022
A	Uganda	Jebiwot Sumbeiywo	Rescue.org	Email	08-08-2022
A	Uganda	Jeus Ainomujuni	FINCA Brightlife	Email	08-08-2022
A	Uganda	Joe Attwood	Energy 4 Impact	Email	08-08-2022
A	Uganda	John Kiogora	Rescue.org	Email	08-08-2022
A	Uganda	Julius Mubiru	CERC	Email	08-08-2022
A	Uganda	Kajal Patel	Rescue.org	Email	08-08-2022
A	Uganda	Kato Sekubunga Kibuka	Engie	Email	08-08-2022
A	Uganda	Kenneth Wanasobo	DLIGHT-Uganda	Email	08-08-2022
A	Uganda	Laurynas Vaiciulis	FINCA Brightlife	Email	08-08-2022
A	Uganda	Lister Byamugisha	Managing Director, EzyLife	Email	08-08-2022
A	Uganda	Lilian Kasina	Rescue.org	Email	08-08-2022
A	Uganda	Loy Kyozaire	Send E.A	Email	08-08-2022
A	Uganda	Lona	Power Africa	Email	08-08-2022
A	Uganda	Kuerten Lucas	GIZ-Uganda	Email	08-08-2022
A	Uganda	Maria Knodt	Energy 4 Impact	Email	08-08-2022

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A	Uganda	Mark	Sologrid	Email	08-08-2022
A	Uganda	Mathieu Brun	Grant Manager, Engie	Email	08-08-2022
A	Uganda	Mercy Rose	Energy 4 Impact	Email	08-08-2022
A	Uganda	Mugga	KONSERVE.CO-Uganda	Email	08-08-2022
A	Uganda	Mohamed Hussein Elmontassir	Rescue.org	Email	08-08-2022
A	Uganda	Yirga	Mercy corps	Email	08-08-2022
A	Uganda	Rashid		Email	08-08-2022
A	Uganda	Miriam Natabo	UNHCR-Uganda	Email	08-08-2022
A	Uganda	Ochima Noah	GIZ-Uganda	Email	08-08-2022
A	Uganda	Harriet Nongoola	SUNNYMONEY-Uganda	Email	08-08-2022
A	Uganda	Oscar Oankunda	USAID -Uganda	Email	08-08-2022
A	Uganda	Okello	VILLAGE-POWER-Uganda	Email	08-08-2022
A	Uganda	Patrick Tusingwire	GREEN LIGHT PLANET-Uganda	Email	08-08-2022
A	Uganda	Peter.O	Sologrid	Email	08-08-2022
A	Uganda	Hopfenwieser Pia	GIZ-Uganda	Email	08-08-2022
A	Uganda	Das Rabin	Solar Now-Uganda	Email	08-08-2022
A	Uganda	Rafael Diezmos	Energy 4 Impact	Email	08-08-2022
A	Uganda	Rakan Kwasa	IOM-Uganda	Email	08-08-2022
A	Uganda	Ronald	Solar Now-Uganda	Email	08-08-2022
A	Uganda	Woerden	Mercy corps	Email	08-08-2022
A	Uganda	Ndyaba		Email	08-08-2022
A	Uganda	Sandra Kitimbo	VILLAGE-POWER-Uganda	Email	08-08-2022
A	Uganda	Sarah Mijabi	GREEN LIGHT PLANET-Uganda	Email	08-08-2022
A	Uganda	Sasha Kapadia	Master card	Email	08-08-2022
A	Uganda	Segujja Muhammed		Email	08-08-2022
A	Uganda	Shimul Chaudhuri	GREEN LIGHT PLANET-Uganda	Email	08-08-2022
A	Uganda	Murray	Mercy corps	Email	08-08-2022
A	Uganda	Timothy Ssuna	DLIGHT-Uganda	Email	08-08-2022
A	Uganda	Freisleben Udyakisya	GIZ-Uganda	Email	08-08-2022
A	Uganda	Winter Burhoe	Rescue.org	Email	08-08-2022
A	Uganda	Zakalia Amanyia	FINCA Brightlife	Email	08-08-2022
A	Uganda	Kukiriza Juliet	End User-Cookstoves	Phone	08-08-2022
A	Uganda	Kyasimire Judith	End User-Cookstoves	Phone	08-08-2022
A	Uganda	Maya Kaijesh	End User-Cookstoves	Phone	08-08-2022
A	Uganda	Nabasa Tomson	End User-Cookstoves	Phone	08-08-2022
A	Uganda	Nakidde Betty	End User-Cookstoves	Phone	08-08-2022
A	Uganda	Nalongo Namugera	End User-Cookstoves	Phone	08-08-2022
A	Uganda	Nanyonjo Maria	End User-Cookstoves	Phone	08-08-2022
A	Uganda	Nyangoma Samali	End User-Cookstoves	Phone	08-08-2022
A	Uganda	Sarah Kemigisha	End User-Cookstoves	Phone	08-08-2022

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A	Uganda	Twebaze Melon	End User-Cookstoves	Phone	08-08-2022
A	Zambia	Lubosi Chilambe	Vitalite	Email	08-08-2022
A	Zambia	William Makubalo	Vitalite, New Proposition dev manager	Email	08-08-2022
A	Zambia	Casco Mubanga	CEO - Bettter World Innovations	Email	08-08-2022
A	Zambia	Ms. Shula Kizita Mwamba	National coordinator - Climate Focus Network	Email	08-08-2022
A	Zambia	Mr. Joshua Lungu	Project Coordinator - Conservation Agri Business	Email	08-08-2022
A	Zambia	Mr. Mattias Ohlson	CEO- Emerging Cooking Solutions	Email	08-08-2022
A	Zambia	Ms. Judy Ngumbi	Director - Gobl Renewables Energy Limited	Email	08-08-2022
A	Zambia	Mr. James Mkandawire	Director of Operations - Green Innfordev	Email	08-08-2022
A	Zambia	Mr. Arnold Shawa	Director of Production - Green Innfordev	Email	08-08-2022
A	Zambia	Mr. Nick O'Connor	Managing Director - Home Energy Limited	Email	08-08-2022
A	Zambia	Ms. ELMA SIAMUZWE	Jacobs Court Yard Enterprise	Email	08-08-2022
A	Zambia	Mr. Blessing Gondwe	COO - Kainos Green Energy	Email	08-08-2022
A	Zambia	Mr. Roy Jere	CEO - Kainos Green Energy	Email	08-08-2022
A	Zambia	Mr. Francis Mbewe	CEO - Micro Energy Supply Company	Email	08-08-2022
A	Zambia	Mrs. Lynda Banda	Founder - Lynch Farms and General Supplies	Email	08-08-2022
A	Zambia	Dr. George Mulomboi	CEO - Royal International Development Agency Ltd	Email	08-08-2022
A	Zambia	Mrs. Sarah Bwalya Mwalusi	Chairman - Royal International Development Agency Ltd	Email	08-08-2022
A	Zambia	Dr. Samuel Bell	CEO - Vitalite	Email	08-08-2022
A	Zambia	Dr. John Fay	Director - Vitalite	Email	08-08-2022
A	Zambia	Ernest Sinkala	Cookstove End User- 1st Stove CRF-12073633	Phone	08-08-2022
C	Cote d'Ivoire	General	Ministry of National Education, Technical Education and Vocational Training (MENETFP - Cote d'Ivoire)	Email	09-10-2022
C	Cote d'Ivoire	COULIBALY Serge	President of the Association of Renewable Energies Professionals of Côte d'Ivoire (APERCI)	Email	09-10-2022
C	Cote d'Ivoire	Dagnogo dotchan	Village Chief	Phone	09-10-2022
C	Cote d'Ivoire	Guiropo Paul	Village Chief	Phone	09-10-2022
C	Cote d'Ivoire	Konaté nanourgo	Village Chief	Phone	09-10-2022
C	Cote d'Ivoire	N'Guessan Kocola	Village Chief	Phone	09-10-2022
C	Cote d'Ivoire	General	Africa Development Bank - Energy, Environment and Climate Change Department (ONEC)	Email	09-10-2022
C	Cote d'Ivoire	General	Ministry of Environment and Sustainable Development (MINEDD)	Email	09-10-2022
C	Cote d'Ivoire	General	General Directorate of Hydrocarbons (DGH)	Email	09-10-2022
C	Cote d'Ivoire	General	Petroci	Email	09-10-2022
C	DRC	General	MINISTRY OF ENVIRONMENT AND SUSTAINABLE DEVELOPMENT	Email	25-08-2022
C	DRC	Mr. Charles Mananga	Director general - Agriculture Et Elevage pour le Social au Congo	Email	25-08-2022

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C	DRC	Ms. CHARLENE NGOMA	Accountant - Agriculture Et Elevage pour le Social au Congo	Email	25-08-2022
C	DRC	Aimé MBUYI	Head of Division, . Ministry of Environment and Sustainable Development, Climate Change Division	Phone	25-08-2022
C	DRC	Alfred LOBOKO BIN GELE	Director of Renewable Energies, Ministry of Energy	Email	25-08-2022
C	DRC	Martin MPUNI	Mayor of Lukolela commune, Kikwit	Phone	25-08-2022
C	DRC	Massamba Nzuni Evariste	Head of natural gas office, Ministry of Hydrocarbons	Email	25-08-2022
C	DRC	Mrs. Laetitia Bonsange	Alliance Congolaise pour les Foyers et Combustibles Améliorés (ACFCA-ASBL	Email	25-08-2022
C	DRC	Mr. Jean Luc Alliez	Alliance Congolaise pour les Foyers et Combustibles Améliorés (ACFCA-ASBL	Email	25-08-2022
C	DRC	Mr. Kazongo Kambombo	President - Association Communautaire pour le bien etre et la protection environnementale	Email	25-08-2022
C	DRC	Mr. Kingombe Aime	coordinator - Association Communautaire pour le bien etre et la protection environnementale	Email	25-08-2022
C	Madagascar	General	Madagascar Standards Office	Email	09-10-2022
C	Madagascar	Ms. Lovakanto Ravelomanana	Director of the National Office for Climate Change Coordination - Ministry of Environment, Ecology, Sea and Forests	Email	09-10-2022
C	Madagascar	Dorothy McIntosh	Mercy Corps UK	Email	09-10-2022
C	Madagascar	Steve Sawyer	Greenpeace international	Email	09-10-2022
C	Madagascar	Amanda Luxande	REEEP, Regional Secretariat Southern African	Email	09-10-2022
C	Madagascar	Fenosoa Andriamahanina	Tany Meva (Fondation malgacheen environnement)	Email	09-10-2022
C	Madagascar	Voahirana Randriambola	WWF Madagascar	Email	09-10-2022
C	Madagascar	Naritiana RAKOTONIAINA RANAIVOSON	Executive Director - Environmental Management Support Service (SAGE)	Email	09-10-2022
C	Madagascar	Rosmarie Metz	Country Director - GIZ-Madagascar	Email	09-10-2022
C	Madagascar	Andrew Tanswell	CarboCo	Email	09-10-2022
C	Madagascar	Ms. RAKOTONDRAZAFY EP. ANDRIATAHINA	Representative - UNIDO Madagascar	Email	09-10-2022
C	Madagascar	Mrs Rita Bachmann	ADES Association pour le Développement de l'Energie Solaire Suisse - Madagascar	Email	09-10-2022
C	Malawi	General	Environmental Affairs Department Malawi	Email	08-08-2022
C	Malawi	General	Malawi - Ministry of Gender, Children, Disability and Social Welfare	Email	08-08-2022
C	Malawi	Mr. Davies Luhanga	Research fellow - Centre for Agricultural Research Development (CARD)	Email	08-08-2022
C	Malawi	Dr. Charles Jumbe	Director of Research and Outreach - Centre for Agricultural Research Development (CARD)	Email	08-08-2022
C	Malawi	Mr. Kondwani Singini	Scientific Officer - Engineering and Materials - Malawi Bureau of Standards	Email	08-08-2022
C	Malawi	Mr. Davlin Chokazinga	Director General - Malawi Bureau of Standards	Email	08-08-2022
C	Malawi	Mr. John Tauro	Malawi Industrial Research and Technology Development Centre	Email	08-08-2022
C	Malawi	Mr. CAPS Msukwa	Development Technical Assistance Service	Email	08-08-2022

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C	Malawi	Mr. Boniface Mbewe	Programs Coordinator - Chipembere Community Development Organization	Email	08-08-2022
C	Malawi	Mr. Martin Mwanangwa Munkhondya	Director - Centre for Climate Change and Environment Management	Email	08-08-2022
C	Malawi	Mr. Sangwani Nyirenda	Operations Director - Centre for Climate Change and Environment Management	Email	08-08-2022
C	Malawi	Mrs. Mbumba Chigalu	Movement for Bioenergy Advocacy, Utilization, Learning and Action	Email	08-08-2022
C	Malawi	Ms. Alice Priestland	Movement for Bioenergy Advocacy, Utilization, Learning and Action	Email	08-08-2022
C	Mali	Abdrahamane KONE	Mayor of the rural commune of GONGASSO (Sikasso Region)	Phone	09-10-2022
C	Mali	Dramane KONATE	Chief of the village of SANANFARA (Yanfolila circle)	Phone	09-10-2022
C	Mali	Mr Boureima Camara	Director General of the Environment and Sustainable Development Agency - The Environment and Sustainable Development Agency	Email	09-10-2022
C	Mali	General	SNV - Mali	Email	09-10-2022
C	Mali	Dembele Toumany	STP /Ministere de L'Environnement	Email	09-10-2022
C	Mali	Laurent Coche	Coordonnateur Programme Regional Energie-Pauvreté/PTF - UNDP Regional Programme	Email	09-10-2022
C	Mali	Haïdara Moussa Doudou	World Bank Private Sector Liaison Officer - Chambre de Commerce et d'Industrie du Mali (World Bank Private Sector Liaison Officer)	Email	09-10-2022
C	Mali	Diarra Moussa	Communications officer - World Bank Mali	Email	09-10-2022
C	Mali	Byll-Cataria Joseph	Resident Representative - UNDP Mali	Email	09-10-2022
C	Mali	Oualy Aboubacar	Responsable Micro-Entreprises et AGRs Programme Régional Energie-Pauvreté/PTF	Email	09-10-2022
C	Mali	Ms. SOW TRAORE Haby	Representative - UNIDO Mali	Email	09-10-2022
C	Nigeria	Adeniji Francis	Chairman, Agege Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Francis Ndubisi	Chairman, Ajeromi-Ifelelodon Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Oriola Oriola	Chairperson, Alimosho Chairperson	Phone	24-08-2022
C	Nigeria	Adesina O.	Chairman, Badagry Local Government Chairperson	Phone	24-08-2022
C	Nigeria	General	ECREEE Secretariat, Ecogas centre for Renewable Energy & Energy Efficiency (ECREEE)	Email	24-08-2022
C	Nigeria	Alimi Abraham	Chairman, Epe Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Adesoke Babatunde	Chairman, Eti-Osa Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Ogunsanya Ogunsanya	Chairperson, Ibeju/Lekki Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Orolu Orolu	Chairperson, Ifako-Ijaiye Local Government Chairperson	Email	24-08-2022
C	Nigeria	Anjorin O. A.	Chairman, Ikeja Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Kasumu S.O	Chairman, Ikorodu Chairperson	Phone	24-08-2022
C	Nigeria	Shotunde OLUOLAPO	Doctor, Ikorodu PHC	Phone	24-08-2022

Group	Country	Name of invitee / type of invitee	Designation, Organisation (if relevant)	Means of invitation	Invitation Sent on
C	Nigeria	Robert Asiedu	Director, Research for Development, International Institute of Tropic Agriculture (IITA)	Email	24-08-2022
C	Nigeria	Adesola Olajide	Chairperson, Kosofe Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Lady Scholastica Nwanze	Chairperson, Lagos Island Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Muhammad Makusidi,	Commissioner of Health, Minisrty of Health, Niger state	Phone	24-08-2022
C	Nigeria	Dr Gana Musa	Permanent SEC, Minisrty of Health, Niger state	Phone	24-08-2022
C	Nigeria	Samuel Babatunde Adejare	Honourable Commissioner, Ministry of Environment	Email	24-08-2022
C	Nigeria		MOE Public Affiars, Ministry of Environment - Lagos State	Email	24-08-2022
C	Nigeria	Zakaria Musa	Commissioner of Environment, Ministry of Environment - Niger state	Phone	24-08-2022
C	Nigeria	Lucky Barau	Permanent SEC, Ministry of Environment - Niger state	Phone	24-08-2022
C	Nigeria	Rt. Hon. Olatunji Kehinde Ayoola	Honourable commissioner, Ministry of Environment and Natural Resources	Email	24-08-2022
C	Nigeria	Wale Wahab	Chairman, Mushin Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Ewah Eleri	Representative, Nigerian Alliance for Clean Cookstoves (NACC)	Email	24-08-2022
C	Nigeria	Moses Otayokhe	Chairman, Ojo Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Jonathan Abiola	Chairman, Oshodi-Isolo Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Oguntolu	Chairman, Somolu Local Government Chairperson	Phone	24-08-2022
C	Nigeria	Oyenuga Oyenuga	Chairman, Surulere Local Government Chairperson	Phone	24-08-2022
C	Nigeria	sa'ad Bashir	Director, The director Nigerian meteorological agency	Phone	24-08-2022
C	Nigeria		Abuja Environmental Protection Board (AEPB)	Email	24-08-2022
C	Nigeria	General	Federal Ministry of Education (FMEEnv)	Email	24-08-2022
C	Nigeria	General	Federal Ministry of Environment (FMEEnv)	Email	24-08-2022
C	Nigeria		Forest Research institute of Nigeria	Email	24-08-2022
C	Nigeria		Lagos State Ministry Of Commerce, Industry & Cooperatives	Email	24-08-2022
C	Nigeria		National Biosafety management agency	Email	24-08-2022
C	Nigeria		Nigerian Biological safety association	Phone	24-08-2022
C	Nigeria		United Purpose Nigeria	Phone	24-08-2022
C	Nigeria	Adewale Rasheed Sijuade	local representative/chief/employee of local authority	Phone	24-08-2022
C	Nigeria	Alhaja Tawakalitu Olaleye (Iya Oloja of Ifo)	local representative/chief/employee of local authority	Phone	24-08-2022
C	Nigeria	Ihemebiri Ezinme	local representative/chief/employee of local authority	Phone	24-08-2022
C	Nigeria	Leramo Bunmi	local representative/chief/employee of local authority	Phone	24-08-2022
C	Nigeria	Oluwaseyi Ogunnami (Amazing Grace Coop)	local representative/chief/employee of local authority	Phone	24-08-2022

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C	Rwanda	General	ministry of Education Rwanda (MININFRA)	Email	08-08-2022
C	Rwanda	General	ministry of environment Rwanda	Email	08-08-2022
C	Rwanda	General	Ministry of Gender and Family Promotion (MIGEPROF)	Email	08-08-2022
C	Rwanda	General	ministry of Infrastructure Rwanda (MININFRA)	Email	08-08-2022
C	Rwanda	General	Rwanda Energy Group	Email	08-08-2022
C	Rwanda		Rwanda Development Board	Email	08-08-2022
C	Rwanda		Rwanda Energy Group	Email	08-08-2022
C	Rwanda	Mr. Albert Butare	CEO - Africa Energy Services Group	Email	08-08-2022
C	Rwanda	Mr. Antoine Rugari Joyeux	Senior consultant - Africa Energy Services Group	Email	08-08-2022
C	Rwanda	Mr. Paulin RUZIBIZA	Integrated Polytechnic Regional Centre (IPRC Kigali)	Email	08-08-2022
C	Senegal	General	Initiative for the development of Africa	Email	09-10-2022
C	Senegal	General	MINISTRY OF ENVIRONMENT AND SUSTAINABLE DEVELOPMENT	Email	09-10-2022
C	Senegal	General	National Education Ministry, Ministry of Senegal	Email	09-10-2022
C	Senegal	Mr. Issakha Youm	Centre d'Études et de Recherches sur les Énergies Renouvelables (CERER)	Email	09-10-2022
C	Senegal	Ms. Valerie G. Traore	Executive Director - Niyel	Email	09-10-2022
C	Senegal	Mr. Deograttius Odie	Senior Campaigner - Niyel	Email	09-10-2022
C	Senegal	Mr. Sire Diallo	Executive Director - Senegal Ecovillage Microfinance Fund	Email	09-10-2022
C	Senegal	General	Senegalese Association for Standardization	Email	09-10-2022
C	Senegal	General	Energy4Impact	Email	09-10-2022
C	Senegal	Ms. Madeleine Diouf Sarr	Head of Climate Change Division - Ministry of Environment and Sustainable Development	Email	09-10-2022
C	Uganda	Richard Mwesigwa	Uganda Solar Energy Association	Email	08-08-2022
C	Uganda	Mr. Karsten Bechtel	Centre for Research in Energy and Energy Conservation (CREEC)	Email	08-08-2022
C	Uganda	Mr. Kabagambe- Kaliisa Fred	Permanent Secretary - Ministry of Energy and Mineral Development, Uganda	Email	08-08-2022
C	Uganda	Mr. Godfrey Ndawula	Assistant Commissioner - Ministry of Energy and Mineral Development, Uganda	Email	08-08-2022
C	Uganda	Dr. Bruce Kirenga	Director - Makerere University Lung Institute	Email	08-08-2022
C	Uganda	Mr. Richard Ebong	Senior Standards Officer / Head Engineering Standards Division - Uganda National Bureau of Standards	Email	08-08-2022
C	Uganda	Mrs. Rehema Nakyazze	CEO - Uganda Stove Manufacturers Ltd (UGASTOVE)	Email	08-08-2022
C	Uganda	Mr. Moses Mafabi	Managing Partner - ResearchINdepth International	Email	08-08-2022
C	Uganda	Mr. Emmanuel Odong	Senior research Manager - ResearchINdepth International	Email	08-08-2022
C	Uganda	Mr. Nelson Tashobya	CEO - AOT Consulting (U) Ltd	Email	08-08-2022
C	Uganda	Mr. Alexander Komakech	CTO - AOT Consulting (U) Ltd	Email	08-08-2022
C	Zambia	Mrs. Elizabeth Ngoma Musonda	Project Manager - Zambia Energy and Environmental Organization (ZENGO)ZN	Email	08-08-2022
C	Zambia	KASHIBA ZEBRON	Chairman - PARTICIPATORY RURAL DEVELOPMENT CENTRE	Email	08-08-2022

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C	Zambia	Rhema Chiboboka	Technical Officer - Zambia Energy and Environmental Organization (ZENGO)ZN	Email	08-08-2022
C	Zambia	CHANDA KABWE	TREASURER - PARTICIPATORY RURAL DEVELOPMENT CENTRE	Email	08-08-2022
C	Zambia	Mr. Edward Chanda	CEO - SWEEM Timber and Wood Products Ltd	Email	08-08-2022
C	Zambia	Mrs. Mercy Kabika	MD - SWEEM Timber and Wood Products Ltd	Email	08-08-2022
C	Zambia	Mr. Steward Makanse	Executive Director - Act to Save	Email	08-08-2022
C	Zambia	Ms. Febby Ngoma	Programmews director - Act to Save	Phone	08-08-2022
C	Zambia	Ms. Alice Mafuleka	Country Manager - Action Africa Help	Email	08-08-2022
C	Zambia	Mr. Dixon Daka	Finance manager - Action Africa Help	Email	08-08-2022
D	Rwanda	Juliet KABERA	Director General, Rwanda Environment Management Authority (REMA)	Email	08-08-2022
D	Uganda	Mr. Bob Natifu	UNFCCC National Focal Point for Uganda, Ministry of Water and Environment	Email	08-08-2022
D	Uganda	Mr. Alfred Okot Okidi	Alternate UNFCCC Focal Point for Uganda, Ministry of Water and Environment	Email	08-08-2022
D	Malawi	Mrs. Shamiso Nandi Najira	Chief Environmental Officer, Environmental Affairs Department	Email	08-08-2022
D	Cote d'Ivoire	Ms. Rachel Boti-Douayoua	CDM-DNA Coordinator, National Agency for Environment (ANDE)	Email	09-10-2022
D	Senegal	Madeleine Diouf SARR	Direction de l'Environnement	Email	09-10-2022
D	Mali	Mr. Sékou Kone	Directeur Général Adjoint, Agence de l'Environnement et du Développement Durable (AEDD)	Email	09-10-2022
D	Madagascar	Ms Lantonirina Ratovonjanahary	President, Ministère de l'Environnement, de l'Ecologie et des Forêts	Email	09-10-2022
D	Nigeria	Dr. Yerima Peter Tarfa	UNFCCC Focal Point, Nigeria & Director, Department of Climate Change, Federal Ministry of Environment	Email	24-08-2022
D	DRC	Mr. Hans Andre Lohayo Djamba	National Coordinator, Ministry of Environment , Wildlife Conservation, and Sustainable Development	Email	25-08-2022
D	Zambia	Mr. Ephraim Mwepya Shitima	Acting Director & UNFCCC National Focal Point, Climate Change and Natural Resources Management Department	Email	08-08-2022
E	Cote d'Ivoire	Christophe Kouamé	Country Director and Convenor, Humid West Africa	Email	09-10-2022
E	Cote d'Ivoire		Fondation Dr. Javad Nurbakhsh	Email	09-10-2022
E	Cote d'Ivoire		Innovations for Poverty Action (IPA)	Email	09-10-2022
E	Cote d'Ivoire		Organization of Active Women in Ivory Coast (OFACI)	Email	09-10-2022
E	Cote d'Ivoire	Mr. Avou AHONZO	President, Hydrovie	Email	09-10-2022
E	DRC		Hanns Seidel	Email	25-08-2022
E	DRC		BBOXX	Email	25-08-2022
E	DRC		Concern Worldwide	Email	25-08-2022

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E	DRC	Mrs. Anny Mbombo	Coordonnatrice, Environnement, Ressources Naturelles et Développement Institute	Email	25-08-2022
E	DRC	Andreas Kalk	Directeur, Bureau de la GIZ en République démocratique du Congo	Email	25-08-2022
E	DRC		ERAIFT	Email	25-08-2022
E	DRC	James Curtis	Executive Director East Africa & Great Lakes, DRC	Email	25-08-2022
E	DRC	Mr. Bayubasire Djanda	Founder & CEO, Youth Entrepreneurship and Sustainability (YES) DR Congo	Email	25-08-2022
E	DRC		Greenpeace Africa Head Office	Email	25-08-2022
E	DRC		IMA WORLD HEALTH	Email	25-08-2022
E	DRC		Institute for the Conservation of Nature (ICCN)	Email	25-08-2022
E	DRC	Mr. Freddy BISETSA MUZANEZA	Mr. Freddy BISETSA MUZANEZA, WOMEN CONCERN	Email	25-08-2022
E	DRC	Solange Lwashiga	National Spokesperson, Rien Sans Les Femmes (RSLF)	Email	25-08-2022
E	DRC	Mr. Kazongo Kambombo	President , Association Communautaire pour le bien etre et la protection environnementale	Email	25-08-2022
E	DRC		Rainforest Foundation Norway	Email	25-08-2022
E	DRC	Philippe Serge Degernier	Resident Representative, Enabel DR CONGO	Email	25-08-2022
E	DRC	Paolo Cerutti	Senior Scientist, DRC Unit Head, World Agroforestry	Email	25-08-2022
E	DRC		Tropenbos DRC	Email	25-08-2022
E	DRC		Wonder foundation	Email	25-08-2022
E	Madagascar		ADES	Email	09-10-2022
E	Madagascar		ADM	Email	09-10-2022
E	Madagascar		ATIA	Email	09-10-2022
E	Madagascar		C for C	Email	09-10-2022
E	Madagascar		Conservation Through Poverty Alleviation, International	Email	09-10-2022
E	Madagascar		EDUCATION FOR MADAGASCAR	Email	09-10-2022
E	Madagascar	Eugénie Raharisoa	Feedback Madagascar	Email	09-10-2022
E	Madagascar		Friends of Madagascar Mission (FOMM)	Email	09-10-2022
E	Madagascar		Madagasikara Voakajy	Email	09-10-2022
E	Madagascar		Pact	Email	09-10-2022
E	Madagascar		SAF / FJKM	Email	09-10-2022
E	Madagascar		SKYLINE	Email	09-10-2022
E	Madagascar		WWF Madagascar	Email	09-10-2022
E	Malawi		AGE Africa	Email	08-08-2022
E	Malawi	Mr. Marshall Dyton	C/O Muslim Association of Malawi	Email	08-08-2022
E	Malawi		Centre For Alternatives For Victimised Women And Children(CAVWOC)	Email	08-08-2022

Group	Country	Name of invitee / type of invitee	Designation, Organisation (if relevant)	Means of invitation	Invitation Sent on
E	Malawi		Centre For Environmental Policy & Advocacy (CEPA)	Email	08-08-2022
E	Malawi	Mr. BONIFACE VINCENT MBEWE	Chipembere Community Development Organisation	Email	08-08-2022
E	Malawi	Betserai Isaac Nyoka	Country Coordinator and Southern Africa Convenor, SADC-ICRAF Agroforestry Programme	Email	08-08-2022
E	Malawi		Country Director, Disabled Women In Africa	Email	08-08-2022
E	Malawi	Mr. Kondwani Khonje	Director, Foundation for Building Resilient Communities (FOBRECO)	Email	08-08-2022
E	Malawi	Mr. Daniel Mwakameka	Executive Director, Action for Environmental Sustainability (AFES)	Email	08-08-2022
E	Malawi	Mr. Simplex Chithyola	Executive Director, Chinansi Foundation	Email	08-08-2022
E	Malawi	Mr. Clement Chiwala	Executive Director, Positive Steps	Email	08-08-2022
E	Malawi	Linnah Matanya	Executive Director, Women for Fair Development	Email	08-08-2022
E	Malawi	Mr. Muzza Thole	Head of Environmental Management, Timange Society Based Organization	Email	08-08-2022
E	Malawi		Lilongwe Wildlife Trust	Email	08-08-2022
E	Malawi	Mrs. Maya Stewart	Managing Director, Maeve Project	Email	08-08-2022
E	Malawi	Mr. Stanley Chitukwi	OSSEDI Malawi	Email	08-08-2022
E	Malawi	January Watchman Mvula	Sustainable Rural Community Development Organisation	Email	08-08-2022
E	Malawi		The Chesney Trust	Email	08-08-2022
E	Malawi		Wildlife and Environmental Society Of Malawi	Email	08-08-2022
E	Malawi		Young Womens Christian Association, Malawi	Email	08-08-2022
E	Mali	Ibrahim Toure	Mali country representative, Sahel, CIFOR	Email	09-10-2022
E	Mali		ASSOCIATION FOR ACTIVE AND PARTICIPATORY DEVELOPMENT (ADAP)	Email	09-10-2022
E	Mali		FAIDA MALI	Email	09-10-2022
E	Mali		FRONT LINE DEFENDERS	Email	09-10-2022
E	Mali		Ouelessebougou-Utah Alliance	Email	09-10-2022
E	Mali		Tostan Dignity for All	Email	09-10-2022
E	Mali		UNFPA	Phone	09-10-2022
E	Nigeria		Initiative for Community Development (ICD)	Email	24-08-2022
E	Nigeria	Emmanuel Buba	Admin Officer, Damnaish Human Capacity Building Initiative (DHCBI)	Email	24-08-2022
E	Nigeria		African Foundation for Human Advancement	Email	24-08-2022
E	Nigeria		Aid Foundation	Email	24-08-2022

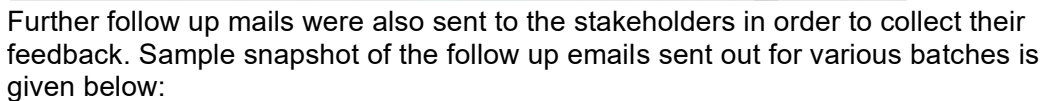
Group	Country	Name of invitee / type of invitee	Designation, Organisation (if relevant)	Means of invitation	Invitation Sent on
E	Nigeria		CENTER FOR CLIMATE CHANGE AND ENVIRONMENTAL STUDIES	Email	24-08-2022
E	Nigeria		Centre for Environment, Human Rights and Development (CEHRD)	Email	24-08-2022
E	Nigeria	Kelechi Emeh	Country Representative, CAFOD	Email	24-08-2022
E	Nigeria		CRUDAN	Email	24-08-2022
E	Nigeria	Lucy Coley	Director, ACTED	Email	24-08-2022
E	Nigeria		Girl Child Concerns (GCC)	Email	24-08-2022
E	Nigeria		Health Actions Concerning the Environment and You (HACEY)	Email	24-08-2022
E	Nigeria		NNNGO	Email	24-08-2022
E	Nigeria		PARTNERS FOR DEVELOPMENT	Phone	24-08-2022
E	Nigeria	Mr Adediran Adetunji	Programs coordinator, FOUNDATION FOR INTEGRATED RURAL AND URBAN DEVELOPMENT (FIRUD)	Email	24-08-2022
E	Nigeria	Adeyemo Micheal	VICE PRESIDENTS AFED	Email	24-08-2022
E	Nigeria		Women Environmental Programme	Email	24-08-2022
E	Rwanda	Mr. Jean de Dieu BIZIMANA	Chief Executive Officer, Go Africa for Sustainable Development	Email	08-08-2022
E	Rwanda		Culture Conservation Act	Email	08-08-2022
E	Rwanda		Empower Rwanda	Email	08-08-2022
E	Rwanda	Mr. Mwanafunzi Willy	Executive Director, Faith Victory Association (FVA)	Email	08-08-2022
E	Rwanda	Emma Marie Bugingo	Executive Director, Pro Femmes / Twese Hamwe	Email	08-08-2022
E	Rwanda	Mr. Damasce Gashumba	Executive Director, Rural Environmental and Development organization	Email	08-08-2022
E	Rwanda	Mr. Ntarindwa Viateur	Executive Secretary, Rural Development Interdiocesan Service	Email	08-08-2022
E	Rwanda	Mr. Canut Dufitumukiza	Legal Representative, Global Initiative for Humanitarian Action (GIHA)	Email	08-08-2022
E	Rwanda	Mr. Kabera Godfrey	Manager, Watoto Vision on Africa	Email	08-08-2022
E	Rwanda		Paper Crown Rwanda	Email	08-08-2022
E	Rwanda	Jean Baptiste Nsabimana	President, Fondation Artisans de la Paix et du Développement au Rwanda	Email	08-08-2022
E	Rwanda	Bayingana Emmanuel	President, RIDI-Gira Ubumenyi	Email	08-08-2022
E	Rwanda		RWAMREC	Email	08-08-2022
E	Rwanda		Rwanda Environment Awareness Organization	Email	08-08-2022
E	Rwanda		Rwanda of Peace and Progress (RPP)	Email	08-08-2022
E	Rwanda		Rwanda Village Community Promoters	Email	08-08-2022
E	Rwanda		Rwanda Women's Network	Email	08-08-2022
E	Rwanda		RwandOpp	Email	08-08-2022

Group	Country	Name of invitee / type of invitee	Designation, Organisation (if relevant)	Means of invitation	Invitation Sent on
E	Rwanda		Safer Rwanda	Email	08-08-2022
E	Rwanda		Strive Foundation Rwanda (SFR)	Email	08-08-2022
E	Rwanda		We Do GREEN Organization (WDGO)	Email	08-08-2022
E	Rwanda		Young Women's Christian Association of Rwanda (YWCA)	Email	08-08-2022
E	Senegal		African Avenir Foundation	Email	09-10-2022
E	Senegal		ALPHADEV	Email	09-10-2022
E	Senegal		APTE-SENEGAL	Email	09-10-2022
E	Senegal		Baobab Senegal Education Initiative	Email	09-10-2022
E	Senegal		Cause Premiere	Email	09-10-2022
E	Senegal		Développement-Citoyenneté-Leadership Intégré & Communautaire (DECLIC)	Email	09-10-2022
E	Senegal		Enda Graf Sahel	Email	09-10-2022
E	Senegal		ENERGY 4 IMPACT	Email	09-10-2022
E	Senegal		Mozdahir International Institute (IMI)	Email	09-10-2022
E	Senegal		PLAN INTERNATIONAL	Email	09-10-2022
E	Senegal		REPAOC	Email	09-10-2022
E	Senegal		Speak Up Africa	Email	09-10-2022
E	Senegal		TOSTAN	Email	09-10-2022
E	Uganda	Adam Rajab	ACRE	Email	08-08-2022
E	Uganda		Action for Rural Women's Empowerment	Email	08-08-2022
E	Uganda		African Evangelistic Enterprise	Email	08-08-2022
E	Uganda		Agency for Accelerated Regional Development	Email	08-08-2022
E	Uganda	Federico Gallo	Believe Green LLC	Email	08-08-2022
E	Uganda	Erik Wurster	Biolite Inc	Email	08-08-2022
E	Uganda	Hasina Haque	BRAC Uganda	Email	08-08-2022
E	Uganda	Lucas Emmerson	CO2balance UK Ltd	Email	08-08-2022
E	Uganda	Jean Christophe Saint Esteben	Country Director, Danish Refugee Council	Email	08-08-2022
E	Uganda	Mbekeani Kennedy	Country Manager, Africa Development Bank	Email	08-08-2022
E	Uganda	Edson Ngirabakunzi	Executive Director, National Union of Disabled Persons of Uganda	Email	08-08-2022
E	Uganda	Vincent Kienzler	Fenix International	Email	08-08-2022
E	Uganda		Finance Trust Bank	Email	08-08-2022
E	Uganda	Victoria Butegwa	GIZ	Email	08-08-2022
E	Uganda	Representative of Global-wood AG	Global-woods AG	Email	08-08-2022
E	Uganda	Evan Haigler	Impact Carbon	Email	08-08-2022
E	Uganda		IRC Uganda	Email	08-08-2022
E	Uganda		Joint Effort To Save The Environment	Email	08-08-2022
E	Uganda		Katosi Women Development Trust	Email	08-08-2022
E	Uganda		Little Light Uganda	Email	08-08-2022

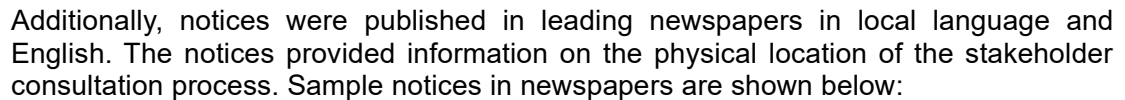
Group	Country	Name of invitee / type of invitee	Designation, Organisation (if relevant)	Means of invitation	Invitation Sent on
E	Uganda	Caritas MADDO	Masaka Diocesan Development Organisation	Email	08-08-2022
E	Uganda		National Union of Disabled Persons of Uganda	Email	08-08-2022
E	Uganda	Arjun Patney	Natural Capital Partners	Email	08-08-2022
E	Uganda	Deusdedit	Nucafe	Email	08-08-2022
E	Uganda	Jessica De Clerck	Potential Energy	Email	08-08-2022
E	Uganda		Private Sector Foundation Uganda	Email	08-08-2022
E	Uganda	Virginia Echavarria	Simoshi Limited	Email	08-08-2022
E	Uganda	Georg Zenk	Uganda Carbon Bureau	Email	08-08-2022
E	Uganda		Uganda Muslim Rural Development Association	Email	08-08-2022
E	Uganda		UNICEF	Email	08-08-2022
E	Uganda	Thomas Huth	Village Power	Email	08-08-2022
E	Zambia		Africare/Zambia	Email	08-08-2022
E	Zambia		Chaslife Foundation	Email	08-08-2022
E	Zambia	Mr. Walubita Sifuniso	Director, Community Relief and Development Foundation– CRDF	Email	08-08-2022
E	Zambia	Ezra Brian Banda	Keepers Zambia Foundation (KZF)	Email	08-08-2022
E	Zambia		KUBUKA	Email	08-08-2022
E	Zambia		New Hope Waves	Email	08-08-2022
E	Zambia		The Wildlife and Environmental Conservation Society of Zambia	Email	08-08-2022
E	Zambia		Voluntary Service Overseas	Email	08-08-2022
E	Zambia		Women for Change	Email	08-08-2022
E	Zambia		Youth Alive Zambia	Email	08-08-2022
E	Zambia		Zambia Alliance of Women	Phone	08-08-2022
E	Zambia		Zambia Council For Social Development	Email	08-08-2022
E	Mali	Mr. Kassoum Coulibaly	CEO - Global Institute for Women's Empowerment Group (GIWE GROUP)	Email	09-10-2022
E	Mali	Mr. Idrissa Coulibaly	Chief Operating Officer - Global Institute for Women's Empowerment Group (GIWE GROUP)	Email	09-10-2022
E	Mali	Mr. Amzatou KONE	Deputy Director General - GROUPE YIRIMEX-SA	Email	09-10-2022
E	Mali	Mr. Oumar DIALLO	CEO - GROUPE YIRIMEX-SA	Email	09-10-2022
F		Maxwell Musoka	Representative, GIZ EnDev	Email	08-08-2022
F		Jolene Mae Mullins	Country Director, International Medical Corps (IMC)	Email	08-08-2022
F		Modou Diaw	Field Director, International Rescue Committee	Email	08-08-2022
F		Dr. Muhtari Aminu-Kano	Director General, Nigerian Conservation Foundation	Email	08-08-2022
F		Eric Batonon	Country Director, Norwegian Refugee Council (NRC)	Email	08-08-2022
F		Hussaini Abdul	Country Director, Plan International	Email	08-08-2022

Email invitations were sent to various stakeholders (Local Communities, Government officials, NGOs, local association leaders etc.) during 08/08/2022-09/10/2022 along with the non-technical summary of the project and stakeholder feedback form. People were allowed to submit their feedback within 30 days from the date of receipt of the email through the feedback form provided. Sample snapshot of email invitations sent out for different batches are given below:



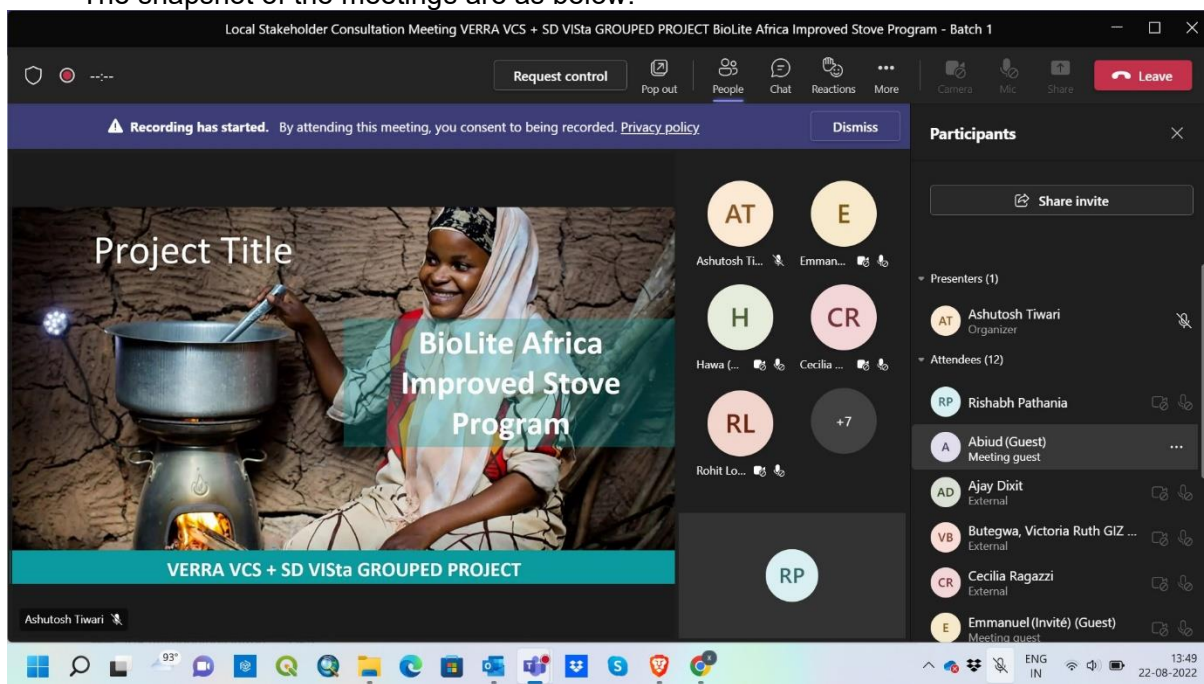








The snapshot of the meetings are as below:



Local Stakeholder Consultation Meeting VERRA VCS + SD VISTA GROUPED PROJECT BioLite Africa Improved Stove Program - Batch 2 (Nigeria)

40:48

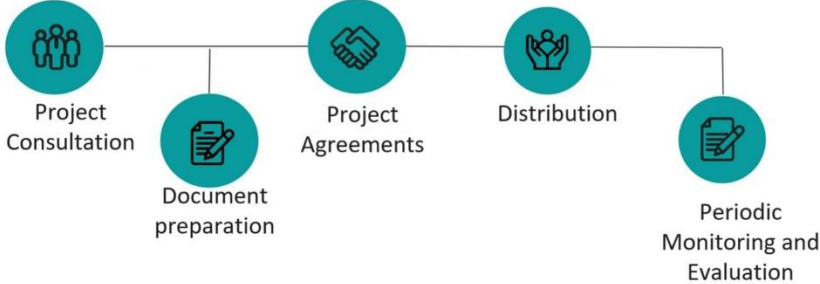
Request control

Pop out People Chat Reactions More

Camera Mic Share

Leave

Project Implementation



Project Consultation

Document preparation

Project Agreements

Distribution

Periodic Monitoring and Evaluation

AT HN

Ashutosh Tiwari Hesbon ...

BY M

BINTA Y... Margar...

H BY

Hawa (... BINTA Y...

RP

VERRA VCS + SD VISTA Stakeholder Consultation Event

VCS

September 05, 2022

Implementation Framework



Biolite:

Coordinating/managing entity & Project Implementer

- Overall programme execution and management
- Technological promotion and awareness raising
- Quality control, general monitoring and reporting
- Communication with stakeholders
- Grievances Address
- Managing the implementation of project instances.
- Ensure no double counting.
- Training/guidance/instructions to local sales and distribution partners (SDP)
- Coordinate and Manage Field measurements and data collection
- Ensure transfer of ownership of credits from beneficiary to CME.

JS HN

Artem Schen Hesbon Npang...

RP H

Bishab Pichana Kema Cuent

CB RP

Clara Brück (G... Bishab Pichana

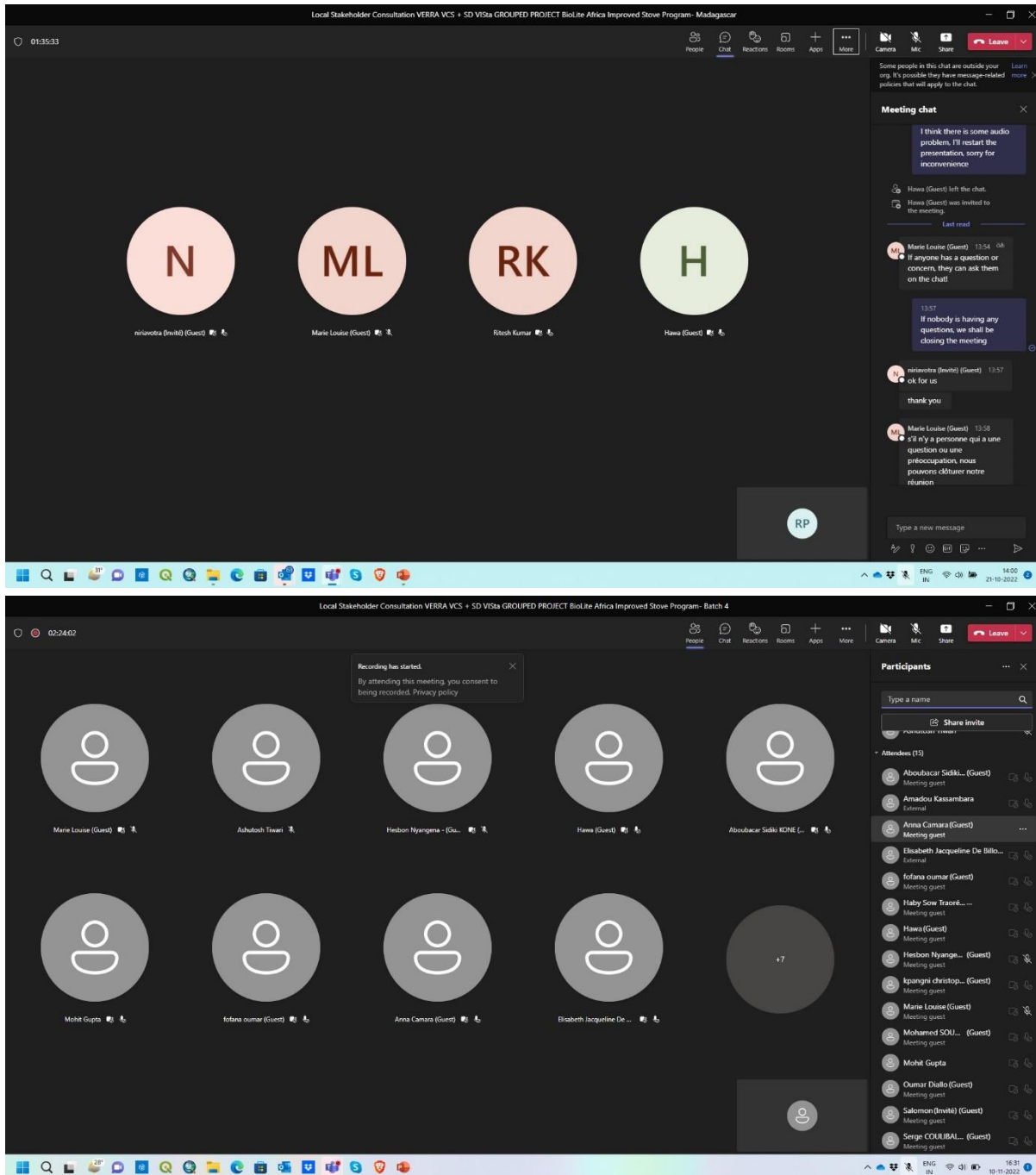
LM AT

Lungu Kulemba... Ashutosh Tiwari

VERRA VCS + SD VISTA Stakeholder Consultation Event

VCS

September 06, 2022



The meeting had the presence of all categories of stakeholders targeted, with the consultation sessions being quite productive and engaging. Stakeholders present during meeting were provided with a non-technical summary of the project and a brief about the project and its components (including costs, risks, and benefits). The representatives of BioLite and Climate Secure were also present to address any questions/queries from the participating stakeholders. The language of the consultation was both English and local language. The non-technical summary was prepared in a culturally appropriate, gender sensitive and stakeholder category agnostic manner to ensure it is well comprehended by all.

During the meeting, important aspects of the proposed project activity(ies) were discussed including technology/measure, local baseline, grievance mechanism, SDG benefits, transfer of ownership of credits etc. The prevailing practices for cooking were also discussed to set the local context and explain the importance of efficient cooking to the participants.

Special attention has been paid to the directly affected parties under the project and they have been encouraged to use ICS by describing to them the benefits of ICS technology as compared to traditional stoves. The project does not involve any negative effects on the marginalized and vulnerable groups. Rather, the project by offering subsidized clean cooking devices shall contribute towards inclusion of marginalized and vulnerable groups into mainstream by reducing their health burden associated with traditional cooking, improve their economic situation by reduced expenditure on fuel, save time from fuel collection and cooking to be utilized for more productive tasks etc.

Stakeholder feedback was collected via question and answer session during the consultation as well as a feedback form designed specifically to collect stakeholder opinion and rating on various aspects of the grouped project and respective PA.

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

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

Question/ Concern Raised	Response Provided
What is the timeline for the distribution in your target markets?	Biolite has already initiated the distribution process in several countries and is actively working towards starting the distribution in remaining countries.
How do you ensure that there is no double counting between two different project developers?	Each project technology under the project activity has a unique serial number enabling easy identification of products across different projects.
Does the project involve or plan to involve different government agencies or the agencies working with the same products for stoves distribution?	Biolite is always open to engage and collaborate with agencies/ partners for the development of distribution network. Biolite is certainly open if there are opportunities to partner with policy drivers/ government/ policy advocacy group etc. in whatever scale with these organizations.
Can you please discuss about how usage will be monitored?	Biolite will be conducting regular monitoring to check the usage of project technologies.
What are the areas where distribution partners can expect the support from Biolite?	BioLite is ready to provide support to its distribution partners in various areas, such as marketing assistance and specialized product training. Moreover, the BioLite will be providing trainings on monitoring activities, end-user data collection, and data archiving.

Summary of feedback received via “stakeholder feedback form” virtually from invited stakeholders are given below:

1. Stakeholder Feedback- General

S. No.	Questions	Summary of Feedback received
--------	-----------	------------------------------

1	What are your views on system of waiver of ownership of carbon credits by end users?	The stakeholders believed that the ownership of carbon credits is not a concern for households. Instead, carbon credits can benefit the population by reducing the prices of fuel or stoves
2	Kindly express your views on the Continuous feedback mechanism explained above?	The stakeholders expressed that transparency in continuous feedback mechanism is most important and should be promoted. This will be helpful in raw data collection and enhance the ownership and sustainability of project activities.
3	What recommendations do you have for monitoring procedures discussed above regarding the SDG indicators?	The stakeholders have made recommendations regarding the involvement of local authorities and communities in the project. Additionally, they recommended creating awareness on project stoves. Furthermore, the stakeholders expressed the need to monitor fuel consumption both with and without the improved cookstoves.
4	What recommendations do you have for betterment of the project (improvement in implementation framework, interaction with other initiatives in region etc.)?	The stakeholders have recommended that the project should engage with other initiatives to create a positive impact and collaborate with local stakeholders to support mass production and raise public awareness. Furthermore, the stakeholders expressed the importance of distributing the stove to low-income households
5	Any other comment (technology, geographical spread/location etc.)	The stakeholders expressed their desire for the project to implement a system or software for recording daily data. They also emphasized the importance of extending the project to interior regions, as there is a need for additional equipment in West Africa to reduce cooking pollution.

2. Local Stakeholder Consultation – Overall Evaluation

Question: What is your impression of the Stakeholder Consultation?	The consultation meeting was widely regarded as a positive and well-placed initiative, serving as an important platform for connecting with other stakeholders involved in the improved stove valorization sector.
Question: What do you like about the project?	The stakeholders encouraged that the project would significantly enhance the livelihood of local people while also promoting environmental well-being. The stakeholders acknowledged and appreciated the project's salient features like including raising awareness about clean cooking, addressing health hazards, positively impacting climate change, etc..
Question: What do you not like about the project?	No significant concerns were raised.

In general, the participating stakeholders were appreciative of the initiative taken by Biolite and welcomed the project. Stakeholders acknowledged the features of project i.e., the

reduction in Indoor air pollution / GHG and employment generation features of the project. No negative comments were raised during the Question session and feedback round. Thus, no change in project design is deemed required.

2.3 Environmental Impact

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

2.4 Public Comments

The project was opened for public consultation from 10/04/2023-10/05/2023. No feedback was received during the public comment period.

2.5 AFOLU-Specific Safeguards

This section is not applicable as the project is a non-AFOLU project.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Grouped Project and Project Activity (ies)

VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, Version 1.1 dated 22 July 2021,

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

Project Activity 1 to 10-

For calculation of fraction of non-renewable biomass, the below tool is used "TOOL30: Calculation of the fraction of non-renewable biomass" Version 4.0- and third-party reports on assessment of fraction of non-renewable biomass has been used.

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

For demonstration of Additionality- "Tool 1: Tool for demonstration and assessment of additionality", Version-7.0.0":

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

Tool 27: Investment analysis, Version- 11.0.

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

3.2 Applicability of Methodology

The applicability of VMR006 methodology is justified as below:

Applicability criterion	Project Activity Applicability
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Project activities shall be implemented in domestic premises, or in community-based kitchens	The proposed grouped project involves deployment of ICS in domestic households and communities of Sub-Saharan Africa, with the target host countries being Rwanda, Malawi, Nigeria, Mali, Madagascar, Senegal, Côte d'Ivoire, Democratic Republic of the Congo, Zambia and Uganda. The PA-1 to PA-10 comprises distribution of ICS in domestic households and communities of the respective host countries of the project activity and within the <i>Geographic boundary of Grouped project</i>.
The project stove shall have specified high-power thermal efficiency of at least 25% per the manufacturer's specifications and shall exclusively use woody biomass and can be single pot or multi-pot;	The rated efficiencies of ICS planned to be distributed under the grouped project are more than 25%. The same has been developed as an eligibility criterion (#4) for inclusion of project activity instances in the grouped project.
Both 'Projects' and 'Large Projects' can use this methodology	The proposed grouped project is a large-scale project as the annual emission reduction is more than 300,000 tonnes of CO ₂ e per year which is in line with the section 3.10.1 of VCS standard ver 4.4.
Non-renewable biomass has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports, or statistics	Non-renewable biomass has been used since 31-December 1989 in the targeted countries. Same is demonstrated below on page 77-79.
For the specific case of biomass residues processed as a fuel (e.g., briquettes, wood chips), it shall be demonstrated that: 1. It is produced using exclusively renewable biomass (more than one type of biomass may be used). 2. The consumption of the fuel should be monitored during the crediting period and 3. Energy use for renewable biomass processing (e.g., shredding and compacting in the case of briquetting) may be considered as equivalent to the upstream emissions associated with the processing of the displaced fossil fuel and hence disregarded	The project does not envisage use of processed biomass. In case, processed biomass residues are used in the grouped project, the following will be ensured: 1. It is renewable biomass 2. Its consumption will be monitored 3. If renewable biomass processing (e.g., shredding and compacting in the case of briquetting) occurs in project case, the energy consumption for manufacturing and transportation of renewable biomass fuel (briquettes) will be monitored to calculate project emissions.
The VCS PD shall explain the proposed method for distribution of project devices including the method to avoid double counting of emission reductions such as unique identifications of product and end-user locations (e.g., programme logo).	The ICS installation database will have the following provisions to ensure complete avoidance of double counting: 1. Unique serial number of ICS distributed 2. End users' details (End username, address, and/or telephone number (if available))

The VCS PD shall also explain how the proposed procedures prevent double counting of emission reductions, for example to avoid that project stove manufacturers, wholesale providers or others claim credit for emission reductions from the project devices.	At the time of ICS distribution, each ICS beneficiary transfers the rights of credit ownership to PP via an agreement or disclaimed via clear statement on the product packing or warranty card thereby avoiding any subsequent double claim on ownership of credits by other entities
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Evidence that the non-renewable biomass has been in use since 1989- Non-renewable biomass has been in use since 31 December 1989 as evidenced by various FAO statistical data given below:

PA-1: *Rwanda*

The Global Forest Resources Assessment 2020 (FRA) indicates that forest areas declined yearly between 1990 to 2020.

FRA categories ⁹	2020	Area (1000 hectares)			
		1990	2000	2010	2020
Forest		317.00	287.00	265.00	276.00
Other wooded land		261.00	261.00	261.00	261.00
Other land		1,889.00	1,919.00	1,941.00	1,930.00
Total Land		2,467.00	2,467.00	2,467.00	2,467.00

Rwanda lost an average of 1,366 hectares of forest per year with average annual deforestation rate of 0.43% between 1990 and 2020. In total, Rwanda lost 12.93% of its forest or 41,000 hectares.

PA-2: *Malawi*

The Global Forest Resources Assessment 2020 (FRA) indicates that forest areas declined yearly between 1990 to 2020.

FRA categories ¹⁰	2020	Area (1000 hectares)			
		1990	2000	2010	2020
Forest		3,501.70	3,081.70	2,661.70	2,241.70
Other wooded land		0.00	0.00	0.00	0.00
Other land		5,926.30	6,346.30	6,766.30	7,186.30
Total Land		9,428.00	9,428.00	9,428.00	9,428.00

According to latest data, the forest annual forest loss in Malawi is estimated at 1.20%, which correspond to approximately 42,000 hectares.

PA-3: *Nigeria*

The Global Forest Resources Assessment 2020 (FRA) indicates that forest areas declined yearly between 1990 to 2020.

FRA categories ¹¹	2020	Area (1000 hectares)			
		1990	2000	2010	2020
Forest		26,526.09	24,893.04	23,259.98	21,626.95
Other wooded land		0.00	0.00	0.00	0.00

⁹ <https://www.fao.org/3/ca9878fr/ca9878fr.pdf>

¹⁰ <https://www.fao.org/3/cb0032en/cb0032en.pdf>

¹¹ <https://www.fao.org/3/cb0037en/cb0037en.pdf>

Other land	64,550.91	66,183.96	67,817.02	69,450.05
Total Land	91,077.00	91,077.00	91,077.00	91,077.00

Nigeria lost an average of 163,304 hectares of forest per year with average annual deforestation rate of 0.61% between 1990 and 2020. In total, Nigeria lost 18.46% of its forest or 4,899,140 hectares.

PA-4: Mali

As per Global Forest Watch (database by World Resources Institute), From 2001 to 2021, Mali lost 3.79kha of relative tree cover, equivalent to a 15% decrease since 2000 and < 0.1% of the global total¹².

PA-5: Madagascar

The Global Forest Resources Assessment 2020 (FRA) indicates that forest areas declined yearly between 1990 to 2020.

FRA categories ¹³	2020	Area (1000 hectares)			
		1990	2000	2010	2020
Forest		13,693.45	13,030.67	12,561.98	12,429.81
Other wooded land		21,148.00	18,453.00	15,688.00	13,244.00
Other land		23,338.55	26,696.33	23,930.02	32,506.19
Total Land		58,180.00	58,180.00	58,180.00	58,180.00

Madagascar lost an average of 42,122 hectares of forest per year with average annual deforestation rate of 0.30% between 1990 and 2020. In total, Madagascar lost 9.22% of its forest or 1,263,640 hectares.

PA-6: Senegal

The Global Forest Resources Assessment 2020 (FRA) indicates that forest areas declined yearly between 1990 to 2020.

FRA categories ¹⁴	2020	Area (1000 hectares)			
		1990	2000	2010	2020
Forest		9,303.16	8,853.16	8,468.16	8,068.16
Other wooded land		5,531.83	5,531.83	5,232.06	5,072.06
Other land		4,418.01	5,048.01	5,552.78	6,112.78
Total Land		19,253.00	19,253.00	19,253.00	19,253.00

From 1990 to 2020, Senegal lost 41,666 ha of forests annually, which corresponds to annual loss of 0.43% in the forest area. In total, Senegal lost 1,235,000 hectares between 1990 to 2020.

PA-7: Côte d'Ivoire

The Global Forest Resources Assessment 2020 (FRA) indicates that forest areas declined yearly between 1990 to 2020.

FRA categories ¹⁵	2020	Area (1000 hectares)			
		1990	2000	2010	2020

¹² <https://www.globalforestwatch.org/dashboards/country/MLI/?category=biodiversity>

¹³ <https://www.fao.org/3/cb0139fr/cb0139fr.pdf>

¹⁴ <https://www.fao.org/3/cb0152fr/cb0152fr.pdf>

¹⁵ <https://www.fao.org/3/cb0126fr/cb0126fr.pdf>

Forest	7,850.86	5,094.45	3,955.58	2,836.71
Other wooded land	2,675.00	2,662.00	2,590.00	2,518.00
Other land	21,274.14	2,4043.55	2,5244.42	2,6445.29
Total Land	31,800.00	31,800.00	31,800.00	31,800.00

From 1990 to 2020, Côte d'Ivoire lost 167.13 kha of forests annually, which corresponds to annual loss of 2.12% in the forest area.

PA-8: Democratic Republic of the Congo

The Global Forest Resources Assessment 2020 (FRA) indicates that forest areas declined yearly between 1990 to 2020.

FRA categories ¹⁶	2020	Area (1000 hectares)			
		1990	2000	2010	2020
Forest		150,629.00	143,899.00	137,169.00	126,155.24
Other wooded land		11,512.00	11,512.00	11,512.00	11,512.00
Other land		64,564.00	71,294.00	78,024.00	89,037.76
Total Land		226,705.00	226,705.00	226,705.00	226,705.00

Democratic Republic of the Congo lost an average of 815,792 hectares of forest per year with average annual deforestation rate of 0.54% between 1990 and 2020. In total, Democratic Republic of the Congo lost 16.24% of its forest or 24,473,760 hectares.

PA-9: Zambia

The Global Forest Resources Assessment 2020 (FRA) indicates that forest areas declined yearly between 1990 to 2020.

FRA categories ¹⁷	2020	Area (1000 hectares)			
		1990	2000	2010	2020
Forest		47,412.00	47,054.00	46,696.00	44,814.03
Other wooded land		13,219.00	13,219.00	13,219.00	13,219.00
Other land		13,708.00	14,066.00	14,424.00	16,305.97
Total Land		74,339.00	74,339.00	74,339.00	74,339.00

Zambia lost an average of 86,599 hectares of forest per year with average annual deforestation rate of 0.18% between 1990 and 2020. In total, Zambia lost 5.48% of its forest or 2,597,970 hectares.

PA-10: Uganda

The Global Forest Resources Assessment 2020 (FRA) indicates that forest areas declined yearly between 1990 to 2020.

FRA categories ¹⁸	2020	Area (1000 hectares)			
		1990	2000	2010	2020
Forest		3,575.47	3,162.95	2,750.42	2,337.90
Other wooded land		3,393.88	3,400.82	3,719.91	3,234.32
Other land		13,082.65	13,488.23	13,581.67	14,479.78
Total Land		20,052.00	20,052.00	20,052.00	20,052.00

¹⁶ <https://www.fao.org/3/cb0125fr/cb0125fr.pdf>

¹⁷ <https://www.fao.org/3/cb0092en/cb0092en.pdf>

¹⁸ <https://www.fao.org/3/cb0084en/cb0084en.pdf>

Uganda lost an average of 41,252 hectares of forest per year with average annual deforestation rate of 1.154% between 1990 and 2020. In total, Uganda lost 34.61% of its forest or 1,237,470 hectares.

This substantiates that non- renewable biomass has been in use in **targeted countries since 1989**.

The applicability of tool 01 is justified as below:

Applicability criterion	Project Activity Applicability
Condition para 9: The use of the “Tool for the demonstration and assessment of additionality” is not mandatory for project participants when proposing new methodologies. Project participants may propose alternative methods to demonstrate additionality for consideration by the Executive Board. They may also submit revisions to approved methodologies using the additionality tool.	Not applicable, an approved methodology is being applied in the project.
Condition para 10: Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	Step-3 in Section 7 of the applied methodology VMR 0006, version 1.1 states the following: <i>“For any project activity where stoves are not provided at zero cost to the end-user or has any other source of revenues other than the sale of GHG credits, then the project activity shall apply investment analysis method set out in the CDM Tool for the Demonstration and Assessment of Additionality to determine that the proposed project activity is either: 1) not the most economically or financially attractive, or 2) not economically or financially feasible.”</i> Since the proposed project does not distribute ICS at zero cost, hence the Tool 1 is applicable to the project.

The applicability of tool 27 is justified as below:

Applicability criterion	Project Activity Applicability
Condition para 2: This methodological tool is applicable to project activities that apply the methodological tool “Tool for the demonstration and assessment of additionality”, the methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality”, the guidelines “Non-binding best practice examples to demonstrate additionality for SSC project activities”, or baseline and monitoring methodologies that use the investment analysis	As project applies “Tool for the demonstration and assessment of additionality”. Thus, TOOL 27 can be applied to the project. Please refer to section B.5 of PD for details.

for the demonstration of additionality and/or the identification of the baseline scenario.	
Condition para 3: In case the applied approved baseline and monitoring methodology contains requirements for the investment analysis that are different from those described in this methodological tool, the requirements contained in the methodology shall prevail.	The applied methodology does not define any investment analysis requirements.

The applicability of tool 30 is justified as below:

Applicability criterion	Project Activity Applicability
This tool may be used by: a) DNAs to submit region/country-specific default f_{NRB} values, following the procedures for development, revision, clarification, and update of standardized baselines (SB procedures); or b) project participants to calculate project or PoA-specific f_{NRB} values.	This tool is used by the project participants to calculate a project specific value for f_{NRB} under option (b) of applicability condition 1.
For project or PoA specific f_{NRB} values, project participants shall assess the area where biomass is sourced for end-users included in the project activity and justify the selection of the area in project design documents.	The area for the calculated value is selected within the geographical boundary of Grouped Project.

3.3 Project Boundary

Grouped Project and Project Activity (ies)

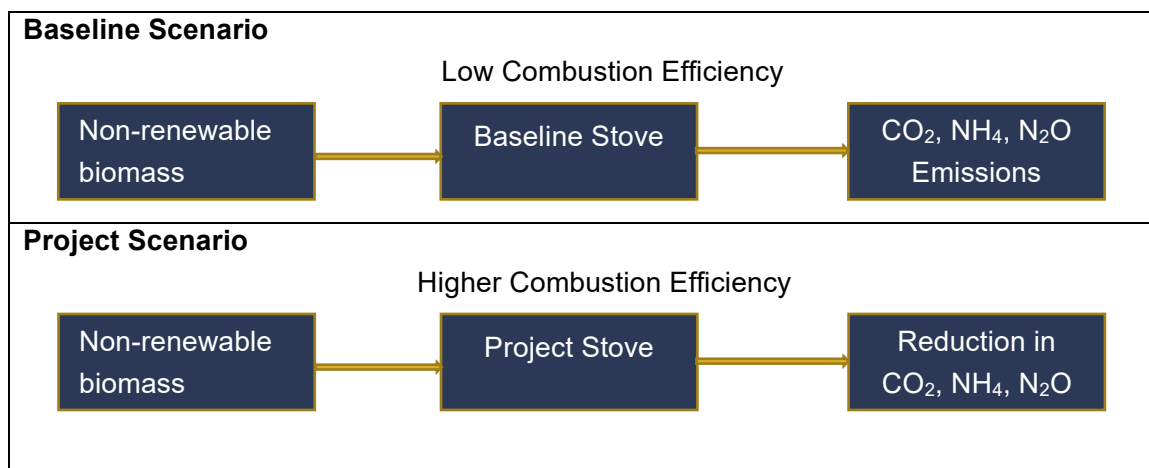
As per the applied methodology, the project boundary is the physical, geographical location of all equipment and systems affected by the project activity. As the activity involves distribution of ICS (Improved Cookstove), the project boundary is the physical, geographical location of each household where the ICS (Improved Cookstove) is distributed to replace the traditional stove.

Each Project Activity (ies) will define the boundary of emission sources. The emissions sources for PA-1 to PA-10 are outlined in the following table.

Source		Gas	Included?	Justification/Explanation
Baseline	Emission from use of non-renewable biomass/Fossil fuel	CO ₂	Yes	Major Source
		CH ₄	Yes	Major Source
		N ₂ O	Yes	Major Source
		Other	No	No other source identified
Project	Emission from use of non-renewable	CO ₂	Yes	Major Source
		CH ₄	Yes	Major Source
		N ₂ O	Yes	Major Source
		Other	No	No other source identified

Source	Gas	Included?	Justification/Explanation
biomass/Fossil fuel			

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



3.4 Baseline Scenario

Grouped Project and Project Activity (ies)

As per section 6 of the methodology VMR0006 Ver 1.1, “The baseline scenario is the continued use of non-renewable wood fuel (firewood/charcoal) by the target population to meet similar thermal energy needs as provided by project cook stoves in absence of project activity.”

Refer section 1.11 above, wherein the prevailing practices in targeted countries have been substantiated as use of non-renewable wood fuel (such as firewood or charcoal) for traditional cooking methods using national government literature / publications.

3.5 Additionality

Grouped Project and Project Activity(ies)

Step 1: Regulatory Surplus

The proposed grouped project is a voluntary coordinated action by BioLite, and there is no mandated government programme or policy in the host countries of this project ensuring the distribution of domestic fuel-efficient cookstoves. The project is not mandated by any law, statute, or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute, or other regulatory framework (refer section 1.14 above).

Step 2: Positive List

Under the proposed project, project ICS are not being distributed at zero costs but shall be distributed at a subsidized price to end users. Hence step 2 is not applicable for demonstration of project’s additionality.

Step 3: Project Method

Investment analysis method as set out in the “Tool 1: Tool for demonstration and assessment of additionality”, Version-7.0.0 and “Tool 27: Investment Analysis, version 11.0, has been applied to demonstrate the additionality as follows:

Step 0: Demonstration whether the proposed project activity is the first-of its-kind

The proposed project involves the distribution of high efficiency ICSs and is not the first of its kind initiative in the targeted countries.

Sub-step 1a: Define alternatives to the project activity

The alternatives to the proposed project are either proposed project been undertaken without being registered as a VCS project activity or continuation of the current situation/ scenario without proposed project been undertaken.

Sub-step 1b: Consistency with mandatory laws and regulations

Please refer to section 1.14 above, wherein the compliance with the mandatory laws and regulations present in the targeted countries has been demonstrated for the proposed project and it has been concluded that the proposed project is a voluntary initiative by PP and consistent with laws and regulations of targeted countries.

Step 2. Investment analysis of the “Tool for demonstration and assessment of additionality” Version-7.0.0”

The consultancy services agreement for the development of Verra VCS grouped project was signed between Biolite and Climate Secure on April 01, 2022. This specific date has been considered as the official investment decision date as this marks first point of no return from the project and PP’s commitment to investment in the project.

Sub-step 2a: Determine appropriate analysis method

Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis (Sub-step 2b). If the CDM project activity and the alternatives identified in Step 1 generate no financial or economic benefits other than CDM related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III).

The project will distribute ICS at a subsidized price (i.e. at a price lower than the purchase cost of ICS). There is no financial or economic benefit other than VER income, given all sale revenues are less than the cost to PP per unit of ICS¹⁹. Although simple cost analysis can be applied, a better presentation might be achieved via Investment Comparison Analysis.

Sub-step 2b: Option II. Apply Investment Comparison Analysis

Identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service (e.g. levelized cost of electricity production in \$/kWh or levelized cost of delivered heat in \$/GJ) most suitable for the project type and decision-making context.

The project applies NPV analysis. The project’s NPV is negative without VER revenue and hence substantiates that the project activity is not financially viable / economically attractive without the sale of VER revenues.

The calculated value of the NPV²⁰ of the grouped project and each project activity is negative without VCUs revenue. Thus, project activity is not financially viable without the support of carbon revenues from sale of VCUs and deemed additional.

¹⁹ The revenue from distribution of sale is not deemed to generate any economic or financial benefit, as the price at which stove is being provided to the beneficiary is less than the cost of stove procurement and distribution by PP.

²⁰ Refer to the Appendix 1 of this PD.

Despite considering a very conservative ICS cost above (with several costs considered as zero), the calculated value of the NPV is negative without VCUs revenue. This confirms that the project activity is not financially viable without the support of carbon revenues and is fully additional.

The alternative to the project activity is deemed as continuation of current practice by the potential beneficiaries i.e., use of traditional / inefficient means of cooking. For this alternative, the PP does not need to make any investment neither shall earn any revenue associated with the continuation of current practice. Thus, the NPV for the alternative is deemed as 0.

Sensitivity Analysis:

The project activity's financial performance is dependent on several crucial parameters. This section does a sensitivity analysis to ensure that the financial performance is resilient to moderately favourable fluctuations in the essential assumptions. As per para 27 of Tool 27 Ver. 11 "Variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation".

The following set of conditions are expected to materially affect the NPV of the proposed project:

1. Increase in project revenue / increase in sale price of ICS
2. Decrease in purchase cost of ICS
3. Decrease in other costs

Thus, the project is not sensitive²¹ to significant variations to the input parameters and scenarios in which the project activity might become financially more favourable than the alternative does not exist. As per para 42a) of Tool1, v 7.0.0, since the NPV of alternative (continuation of current practice) is higher than the NPV of the proposed project without considering carbon revenues. Hence, the project is substantiated as fully additional.

3.6 Methodology Deviations

The project does not involve any methodological deviations.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The methodology does not account for baseline emissions separately, but instead quantifies net emission reductions achieved by the project. Please refer to Section 4.4.

²¹ For the detailed sensitivity analysis, refer to the Appendix 1 of this PD and the Investment Analysis spreadsheets.

4.2 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 4.4.

4.3 Leakage

Leakage shall be considered as default 0.95 in accordance with methodology.

4.4 Net GHG Emission Reductions and Removals

As per applicable methodology,

Formula to calculate emission reduction (ERs) is:

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

Where:

i Indices for the situation where more than one type/model of improved cook stove is introduced to replace three-stone fire

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

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

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

Where:

$B_{y=1,new,i,survey}$ Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i and batch j , determined in the first year of the implementation of the project through a sample survey.

η_{old} Efficiency of baseline cookstove

$\eta_{new,i,y}$ Efficiency of the improved cook stove type i and batch j determined through water boiling test (WBT). efficiency may be determined using Equation 4.

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

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 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

fNRB Calculation

fNRB is calculated as per "TOOL30: Calculation of the fraction of non-renewable biomass", v 4.0. For detailed information on calculation of fNRB, please refer to the Appendix 3.

Ex-ante calculation of emission reduction

PA-1 Rwanda

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	12,274	0	0	12,274
01/06/2023 – 31/05/2024	72,504	0	0	72,504
01/06/2024 – 31/05/2025	170,505	0	0	170,505
01/06/2025 – 31/05/2026	265,411	0	0	265,411
01/06/2026 – 31/05/2027	357,266	0	0	357,266
01/06/2027 – 31/05/2028	446,118	0	0	446,118
01/06/2028 – 31/05/2029	532,012	0	0	532,012
Total	1,856,093	0	0	1,856,093

PA-2 Malawi

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
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01/06/2022 – 31/05/2023	0	0	0	0
01/06/2023 – 31/05/2024	16,361	0	0	16,361
01/06/2024 – 31/05/2025	48,318	0	0	48,318
01/06/2025 – 31/05/2026	79,264	0	0	79,264
01/06/2026 – 31/05/2027	109,216	0	0	109,216
01/06/2027 – 31/05/2028	138,189	0	0	138,189
01/06/2028 – 31/05/2029	166,196	0	0	166,196
Total	557,545	0	0	557,545

PA-3 Nigeria

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	5,719	0	0	5,719
01/06/2023 – 31/05/2024	16,893	0	0	16,893
01/06/2024 – 31/05/2025	31,412	0	0	31,412
01/06/2025 – 31/05/2026	49,107	0	0	49,107
01/06/2026 – 31/05/2027	66,234	0	0	66,234
01/06/2027 – 31/05/2028	82,801	0	0	82,801
01/06/2028 – 31/05/2029	98,816	0	0	98,816
Total	350,983	0	0	350,983

PA-4 Mali

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	4,538	0	0	4,538
01/06/2023 – 31/05/2024	13,401	0	0	13,401
01/06/2024 – 31/05/2025	24,917	0	0	24,917
01/06/2025 – 31/05/2026	38,951	0	0	38,951
01/06/2026 – 31/05/2027	52,532	0	0	52,532
01/06/2027 – 31/05/2028	65,666	0	0	65,666
01/06/2028 – 31/05/2029	78,361	0	0	78,361
Total	278,366	0	0	278,366

PA-5 Madagascar

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	4,584	0	0	4,584
01/06/2023 – 31/05/2024	13,539	0	0	13,539

01/06/2024 – 31/05/2025	25,174	0	0	25,174
01/06/2025 – 31/05/2026	39,353	0	0	39,353
01/06/2026 – 31/05/2027	53,075	0	0	53,075
01/06/2027 – 31/05/2028	66,345	0	0	66,345
01/06/2028 – 31/05/2029	79,171	0	0	79,171
Total	281,242	0	0	281,242

PA-6 Senegal

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	4,114	0	0	4,114
01/06/2023 – 31/05/2024	12,150	0	0	12,150
01/06/2024 – 31/05/2025	22,591	0	0	22,591
01/06/2025 – 31/05/2026	35,314	0	0	35,314
01/06/2026 – 31/05/2027	47,624	0	0	47,624
01/06/2027 – 31/05/2028	59,529	0	0	59,529
01/06/2028 – 31/05/2029	71,034	0	0	71,034
Total	252,357	0	0	252,357

PA-7 Ivory Coast

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	5,699	0	0	5,699
01/06/2023 – 31/05/2024	16,830	0	0	16,830
01/06/2024 – 31/05/2025	31,296	0	0	31,296
01/06/2025 – 31/05/2026	48,925	0	0	48,925
01/06/2026 – 31/05/2027	65,987	0	0	65,987
01/06/2027 – 31/05/2028	82,490	0	0	82,490
01/06/2028 – 31/05/2029	98,443	0	0	98,443
Total	349,670	0	0	349,670

PA-8 DRC

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	5,539	0	0	5,539
01/06/2023 – 31/05/2024	16,359	0	0	16,359
01/06/2024 – 31/05/2025	30,418	0	0	30,418
01/06/2025 – 31/05/2026	47,553	0	0	47,553

01/06/2026 – 31/05/2027	64,137	0	0	64,137
01/06/2027 – 31/05/2028	80,177	0	0	80,177
01/06/2028 – 31/05/2029	95,683	0	0	95,683
Total	339,865	0	0	339,865

PA-9 Zambia

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	0	0	0	0
01/06/2023 – 31/05/2024	8,001	0	0	8,001
01/06/2024 – 31/05/2025	23,630	0	0	23,630
01/06/2025 – 31/05/2026	38,767	0	0	38,767
01/06/2026 – 31/05/2027	53,417	0	0	53,417
01/06/2027 – 31/05/2028	67,589	0	0	67,589
01/06/2028 – 31/05/2029	81,289	0	0	81,289
Total	272,693	0	0	272,693

PA-10 Uganda

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
01/06/2022 – 31/05/2023	0	0	0	0
01/06/2023 – 31/05/2024	6,067	0	0	6,067
01/06/2024 – 31/05/2025	14,932	0	0	14,932
01/06/2025 – 31/05/2026	26,456	0	0	26,456
01/06/2026 – 31/05/2027	37,610	0	0	37,610
01/06/2027 – 31/05/2028	48,402	0	0	48,402
01/06/2028 – 31/05/2029	58,835	0	0	58,835
Total	192,302	0	0	192,302

5 MONITORING

5.1 Data and Parameters Available at Validation

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

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

Data / Parameter	η_p										
Data unit	Fraction										
Description	Efficiency of project stove at the start of project activity										
Source of data	Manufacturer's specification										
Value applied	<table border="1"> <thead> <tr> <th>ICS Model</th><th>Manufacturer Efficiency</th></tr> </thead> <tbody> <tr> <td>Dura stove (firewood)</td><td>38.1%</td></tr> <tr> <td>Jiko fresh (charcoal)</td><td>45.7%</td></tr> <tr> <td>Mama Yao (charcoal)</td><td>55.1%</td></tr> <tr> <td>Jiko Malkia (charcoal)</td><td>50.07%</td></tr> </tbody> </table> XXXXX for other ICS models (to be presented at the time of verification, if applicable).	ICS Model	Manufacturer Efficiency	Dura stove (firewood)	38.1%	Jiko fresh (charcoal)	45.7%	Mama Yao (charcoal)	55.1%	Jiko Malkia (charcoal)	50.07%
ICS Model	Manufacturer Efficiency										
Dura stove (firewood)	38.1%										
Jiko fresh (charcoal)	45.7%										
Mama Yao (charcoal)	55.1%										
Jiko Malkia (charcoal)	50.07%										
Justification of choice of data or description of measurement methods and procedures applied	As per the specification sheet provided by the manufacturer										
Purpose of Data	Calculation of baseline emissions										
Comments	In case of inclusion of other/new models, during project lifetime, corresponding thermal efficiency values shall be considered for ER calculations										

Data / Parameter	f_{NRB}																						
Data unit	Fraction																						
Description	Fraction of woody biomass that can be established as non-renewable biomass																						
Source of data	Calculated																						
Value applied	<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>Ivory Coast</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	Ivory Coast	0.7642	DRC	0.7692	Zambia	0.8003	Uganda	0.7383
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Rwanda	0.8511																						
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Senegal	0.5437																						
Ivory Coast	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"																						
Purpose of Data	Calculation of baseline emissions																						
Comments	--																						

Data / Parameter	$NCV_{wood\ fuel}$
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass
Source of data	Default value (VMR0006 ver. 1.1, page 10)
Value applied	0.0156

Justification of choice of data or description of measurement methods and procedures applied	IPCC default for wood fuel, based on the gross weight of the wood that is 'air-dried', may be used if fuel used in the project device is woody biomass/renewable biomass.
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	EF _{wf,CO2}
Data unit	tCO ₂ /TJ
Description	CO ₂ Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass
Source of data	Default value (VMR0006 ver. 1.1, page 10)
Value applied	112
Justification of choice of data or description of measurement methods and procedures applied	IPCC default value for wood fuel
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	EF _{wf,non CO2}
Data unit	tCO ₂ /TJ
Description	CO ₂ Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass
Source of data	Default value (VMR0006 ver. 1.1, page 10)
Value applied	26.23
Justification of choice of data or description of measurement methods and procedures applied	IPCC default value for wood fuel
Purpose of Data	Calculation of baseline emissions
Comments	--

Data / Parameter	η_{old}
Data unit	Fraction
Description	Thermal efficiency of baseline cookstove
Source of data	Default value
Value applied	0.1 for Wood 0.2 for Charcoal
Justification of choice of data or description of measurement methods and procedures applied	A default value of 0.1 shall be used if the baseline device is a three-stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is, without a grate or a chimney. A default value of 0.2 shall be used for other types of devices.
Purpose of Data	Calculation of baseline emissions
Comments	As per the methodology, this value has been fixed for each household that receives project ICS based on the type of

	baseline stove replaced, 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 the project activity																
Source of data	Calculation																
Value applied	47.24% ²² As per equation (5) above the applicable efficiency of example ICS models ²³ to be used in Ex-post ER calculations is as follows:																
	<table border="1"> <thead> <tr> <th>Age of stove</th><th>η_{new}</th></tr> </thead> <tbody> <tr> <td>0-1 year</td><td>44.41%</td></tr> <tr> <td>1-2 year</td><td>43.96%</td></tr> <tr> <td>2-3 year</td><td>43.52%</td></tr> <tr> <td>3-4 year</td><td>43.09%</td></tr> <tr> <td>4-5 year</td><td>42.66%</td></tr> <tr> <td>5-6 year</td><td>42.23%</td></tr> <tr> <td>6-7 year</td><td>41.81%</td></tr> </tbody> </table>	Age of stove	η_{new}	0-1 year	44.41%	1-2 year	43.96%	2-3 year	43.52%	3-4 year	43.09%	4-5 year	42.66%	5-6 year	42.23%	6-7 year	41.81%
Age of stove	η_{new}																
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2-3 year	43.52%																
3-4 year	43.09%																
4-5 year	42.66%																
5-6 year	42.23%																
6-7 year	41.81%																
Justification of choice of data or description of measurement methods and procedures applied	To adopt Option V given in the methodology: "Efficiency of the improved cookstoves to be estimated using equation 5 of applied approved methodology where, loss in efficiency per year is calculated, and therefore this parameter does not need to be monitored"																

²² Average efficiency value of example ICS has been used for ex-ante calculations only. However, during verification, for ex-post calculations of ERs, the corresponding value of thermal efficiency as per equation (5) above shall be used. In case the project involves ICS models other than those listed above, its corresponding thermal efficiency value calculated in accordance with equation (5) shall be used.

²³ In case the project involves ICS models other than the one listed above; its corresponding thermal efficiency value calculated in accordance with equation (5) shall be used.

Purpose of Data	Calculation of baseline emissions
Comments	In case of inclusion of other/new models, during project lifetime, corresponding rated thermal efficiency value and applicable efficiency as per equation 5 shall be used for Ex-post ER calculations.

5.2 Data and Parameters Monitored

The following parameters as per section 9.2 of the methodology are deemed not applicable:

$\eta_{new,i,j}$	Fixed ex-ante using default discount factor as per methodology in equation (5)
η_{old}	Fixed ex-ante using default values as per the methodology
$B_{renewable,y}$	Applicable only in case of use of equation (7)
$\eta_{PJ,BL}$	Applicable only in case of use of equation (7)
$NCV_{biomass}$	Fixed ex-ante using default values as per the methodology

Data / Parameter	$N_{y,i,j}$																								
Data unit	Number																								
Description	Number of project devices of type i and batch j operating during year y																								
Source of data	Installation database and monitoring survey																								
Description of measurement methods and procedures to be applied	CME shall maintain a database of all ICS distributed. The usage rate of installed ICS shall be measured based on a representative sample. CDM Sampling standard shall be used for determining the sample size to achieve 90/10 confidence precision according to the latest version of CDM Standard for sampling and surveys for project activities and programme of activities. Alternatively, the simplified approach proposed in option (b), page 12 under Section 8.4 of the methodology may be used for determining the minimum sample size in which case compliance with 90/10 confidence precision is not obligatory.																								
Frequency of monitoring/recording	At least once every two years																								
Value applied	<table border="1"> <thead> <tr> <th>Country</th><th>Estimated Number of ICS</th></tr> </thead> <tbody> <tr> <td>Rwanda</td><td>143,000</td></tr> <tr> <td>Malawi</td><td>55,000</td></tr> <tr> <td>Nigeria</td><td>28,500</td></tr> <tr> <td>Mali</td><td>28,500</td></tr> <tr> <td>Madagascar</td><td>28,500</td></tr> <tr> <td>Senegal</td><td>28,500</td></tr> <tr> <td>Ivory Coast</td><td>28,500</td></tr> <tr> <td>DRC</td><td>28,500</td></tr> <tr> <td>Zambia</td><td>22,000</td></tr> <tr> <td>Uganda</td><td>21,000</td></tr> <tr> <td>Total</td><td>412,000</td></tr> </tbody> </table>	Country	Estimated Number of ICS	Rwanda	143,000	Malawi	55,000	Nigeria	28,500	Mali	28,500	Madagascar	28,500	Senegal	28,500	Ivory Coast	28,500	DRC	28,500	Zambia	22,000	Uganda	21,000	Total	412,000
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Uganda	21,000																								
Total	412,000																								
Monitoring equipment	Sampling based Monitoring survey																								
QA/QC procedures to be applied	In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of ICS																								

Purpose of data	Calculation of baseline emissions
Calculation method	The results from sample-based monitoring will be used to calculate $N_{y,i,j}$ as follows $N_{y,i,j} = (n_{i,j,operational} / n_{i,j,total}) * N_{y,i,j,distributed}$ Where: N = number of stoves n = number of samples
Comments	During the stove distribution, the presence of pre-existing project ICS, if any, shall be monitored and in case a pre-existing project ICS is found in the same household, the subsequent (second) ICS will not be included in the ER calculations. Alternatively, the presence of multiple project ICS in a household may be determined ex-post during sampling surveys and the total ICS population shall be discounted by the fraction of sampled households found using more than one project ICS.

Data / Parameter	$B_{y=1,new,i,survey}$																						
Data unit	tonnes/device/year																						
Description	Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i, determined in the first year of the implementation of the project through a sample survey																						
Source of data	Project fuel measurement campaigns/ survey																						
Description of measurement methods and procedures to be applied	Determined in the first year of the introduction of the devices (e.g. during the first year of the crediting period, $y=1$) through measurement campaigns at representative households and/or sample survey.																						
Frequency of monitoring/recording	Determined in the first year of project implementation																						
Value applied	For ex-ante calculation purpose, the value is assumed as <table border="1"> <thead> <tr> <th>Country</th><th>$B_{y=1,new,i,j,survey}$ (tonnes/device/year)</th></tr> </thead> <tbody> <tr><td>Rwanda</td><td>1.40</td></tr> <tr><td>Malawi</td><td>1.37</td></tr> <tr><td>Nigeria</td><td>1.35</td></tr> <tr><td>Mali</td><td>1.45</td></tr> <tr><td>Madagascar</td><td>1.42</td></tr> <tr><td>Senegal</td><td>1.48</td></tr> <tr><td>Ivory Coast</td><td>1.45</td></tr> <tr><td>DRC</td><td>1.40</td></tr> <tr><td>Zambia</td><td>1.48</td></tr> <tr><td>Uganda</td><td>1.22</td></tr> </tbody> </table>	Country	$B_{y=1,new,i,j,survey}$ (tonnes/device/year)	Rwanda	1.40	Malawi	1.37	Nigeria	1.35	Mali	1.45	Madagascar	1.42	Senegal	1.48	Ivory Coast	1.45	DRC	1.40	Zambia	1.48	Uganda	1.22
Country	$B_{y=1,new,i,j,survey}$ (tonnes/device/year)																						
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DRC	1.40																						
Zambia	1.48																						
Uganda	1.22																						

Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	
Purpose of Data	Calculation of baseline emissions
Calculation method	
Comments	Alternatively, Sample surveys to estimate this parameter, that are solely based on questionnaires or interviews (i.e., that do not implement measurement campaigns) may only be used if the following conditions are satisfied. (i) Baseline cookstoves have been completely decommissioned and only improved cookstoves are exclusively used in the project households. (ii) If multiple devices are used in the project; it is possible from the results of the survey questions to clearly differentiate the quantity of woody biomass being used by each device. In other words, if more than one device, or another device that consumes woody biomass, are in use in project households, then the sample survey needs to distinguish the quantity of woody biomass used by the project device and the other devices that use woody biomass.

Data / Parameter	Life Span
Data unit	Number of years
Description	The operating lifetime of project technology for projects opting Equation 5 for determining project stove efficiency.
Source of data	Manufacturer's specification
Description of measurement methods and procedures to be applied	The cookstoves will be manufactured to match the fixed design specification. This will ensure that ICS delivered to project households is standardized wrt to dimensions and performance.
Frequency of monitoring/recording	Once at the time of project stove installation
Value applied	7.0 years
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of data	Calculation of emission reductions
Calculation method	-
Comments	In case of inclusion of other/new models, during the project lifetime, corresponding thermal efficiency values shall be used for ER calculations.

Also, the PP shall either replace the ICS after end of its life with an equivalent device to continue claim credits or otherwise shall cease claiming credits after the rated lifespan.

5.3 Monitoring Plan

The monitoring plan is based on the applied methodology VMR0006, Version V1.1.

Sampling plan

Due to the large number of ICS envisioned to be distributed as part of the project activity, it is not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling will be undertaken as part of a cross-PAI Sampling Plan in line with the requirements of the methodology applied and the Standard: Sampling and surveys for CDM project activities and programmes of activities, version 9.0.

Sample sizes will be sufficient to ensure that the precision of the sample means/proportions are in accordance with the methodological / standard requirements. In cases where survey results indicate that desired precision is not achieved, the lower bound value of the corresponding confidence interval of the parameter value may be used as an alternative to repeating the survey. Alternatively, the survey may be expanded to reach the required confidence/precision, unless option (b) on page 12 of the VMR0006 is used.

The sampling methodology will be in accordance with the representative sampling methods provided by the sampling guidelines and standards as indicated along this section, with the applied methodology having precedence.

Sampling Methodology

Sampling Objective – The sampling objective for each parameter is to determine, via sampling survey, a statistically significant parameter value for the emission reduction calculations. These parameters are as listed in section 5.2:

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

Field Measurement Objective and data to be collected – As listed in Section 5.2 above

Target population and sampling frame – The target population is the total population served under the grouped project, and the sampling frame consists of aggregated data of end-users of the ICS as recorded in the PAI Databases. The sampling frame will be kept for 2 years following the crediting period or the last issuance of the CERs of the project activity.

Sample method – Sampling will be conducted using stratified random sampling techniques²⁴ over the sampling frame, and detailed calculations are provided below as per CDM guidelines “Sampling and surveys for CDM project activities and programmes of activities”. The ICS in the sampling frame shall be stratified as per parameter requirements.

²⁴ Other Sampling approaches may be applied during the course of crediting period, in case needed.

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

The sample size shall be determined using the following formula:

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

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 parameters):

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

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

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

Where,

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 parameters:

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

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

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

Where,

Mean = weighted overall mean

m_i = expected mean of strata i

Optionally, other sampling approaches may be used in accordance with Standard “Sampling and surveys for CDM project activities and programmes of activities” and Guideline for Sampling and Surveys for CDM Project Activities and Programme of Activities when sampling techniques or statistical analysis necessitates it.

To ensure a random stratified sample selection, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its Serial ID number. Each ICS can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of ICS in the Database for that pre-defined stratified

sampling frame. Applying the random number generators, the ICS can then be randomly chosen from the defined population up to the required sample size as calculated by the CME.

In the case of parameters monitored for the first time the expected variation for that measure in the sample may be based on results from similar studies, pilot studies, or from the project planner's own knowledge / experience of the data.

The data will be collected using surveys carried out either by external third parties or by project implementer teams. Data collected from the surveys will be compiled into an Excel spreadsheet.

Data obtained from the samples will be used to estimate proportions and mean values for the parameters described above. The values will then be being factored into the emissions reduction calculations.

During sampling, there may be non-response from the target population. Over-sampling may be used to avoid non-response; however, sampling may be ceased once required confidence/precision is met.

Alternatively, a simplified approach proposed in option (b) under Section 8.4 of methodology may be used for determining the minimum sample size in which case compliance with required confidence/precision is not obligatory.

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

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

The PP may not do cross-PAI sampling and rather conduct separate sampling and monitoring for each PAI. In such case, the approached defined above shall be applied to each PA, albeit with 90/10 confidence / precision levels for annual sampling and 95/10 for biennial sampling (instead of 95/10 for annual/biennial sampling for cross-PAI sampling).

Similarly, for fuel measurement campaign, sample sizes may be alternatively determined as per the available KPT protocols.

Refer section 1.11 above for the management plan and operation framework (e.g., responsibilities and competencies of the personnel that will be carrying out monitoring activities, the procedures for internal auditing and QA/QC etc.).

Appendix 1: NPV Analysis

NPV analysis per unit ICS for Project Stove (Jiko Fresh)

NPV (Project without Carbon Revenue)	Rwanda	Malawi	Nigeria	Mali	Madagascar	Senegal	Cote D Ivoire	DRC	Zambia	Uganda
Variable	Per unit ICS revenue									
Currency	Rwandan Franc	Malawian Kwacha	Nigerian Naira	CFA Francs	Malagasy Ariary	CFA Francs	West African CFA	US Dollars	Zambian Kwacha	Ugandan Shillings
ICS sale revenue	16,378.69	13,129.53	6,490.31	9,818.33	73,702.00	9,795.86	9,818.33	16.24	288.35	66,120.75
Source	Assumed	Assumed	Distribution cost to end user	Distribution cost to end user	Distribution cost to end user	Distribution cost to end user	Distribution cost to end user	Distribution cost to end user	Assumed	Assumed
Total Revenue	16,378.69	13,129.53	6,490.31	9,818.33	73,702.00	9,795.86	9,818.33	16.24	288.35	66,120.75
Per unit ICS Costs										
Inflation rate	6.7%	13.9%	16%	3.7%	7.8%	1.8%	2.6%	7.4%	8.0%	5.9%
Source	https://www.imf.org/external/datamapper/PCPIPCH@WEO/OEMDC/ADVEC/WEOWORLD/									
ICS Purchase Cost	14,993.42	12,019.07	6,119.40	8,719.82	58,604.74	8,719.82	8,719.82	14.72	263.96	52,696.13
Source	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer
Tax (VAT)	0%	0%	7.5%	18.0%	20.0%	18.0%	18.0%	16.0%	0%	18.0%
Source	Assumed "0" as a conservative measure	Assumed "0" as a conservative measure	Customer Invoices	Customer Invoices	Customer Invoices	Customer Invoices	Customer Invoices	Customer Invoices	Assumed "0" as a conservative measure	Tax document
Shipping Cost per unit	1,385.26	1,110.46	764.92	805.64	10,829.14	805.64	1,080.20	1.44	24.39	4,868.66

Source	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence
Selling Commission to Sales agent	4,074.30	3,266.05	1,662.88	2,369.52	15,925.20	2,369.52	2,369.52	4.00	71.73	14,319.60
Source	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner
Total Costs	20,452.99	16,395.58	8,547.20	11,894.97	85,359.07	11,894.97	12,169.54	20.16	360.08	71,884.39
NPV	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Sensitivity Analysis (For "0" NPV)										
Increase in Revenue	25%	25%	39%	37%	32%	37%	40%	39%	25%	23%
Decrease in Purchase Cost	27%	27%	38%	35%	33%	36%	38%	37%	27%	25%
Decrease in other costs	75%	75%	104%	115%	87%	116%	114%	115%	75%	79%

NPV analysis per unit ICS for Project Stove (Jiko Malkia)

NPV (Project without Carbon Revenues)	Rwanda	Malawi	Nigeria	Mali	Madagascar	Senegal	Cote D'Ivoire	DRC	Zambia	Uganda
Variable	Per unit ICS revenue									
Currency	Rwandan Franc	Malawian Kwacha	Nigerian Naira	CFA Francs	Malagasy Ariary	CFA Francs	West African CFA	US Dollars	Zambian Kwacha	Ugandan Shillings
ICS sale revenues	26,045.14	20,878.38	11,757.81	17,677.89	1,20,127.50	14,084.80	17,685.74	27.55	458.53	1,04,114.00
Source	Assumed	Assumed	Distribution cost to end user	Distribution cost to end user	Distribution cost to end user	Distribution cost to end user	Distribution cost to end user	Distribution cost to end user	Assumed	Distribution cost to end user
Total Revenues	26,045.14	20,878.38	11,757.81	17,677.89	1,20,127.50	14,084.80	17,685.74	27.55	458.53	1,04,114.00
Per unit ICS Costs										

Inflation rate	6.7%	13.9%	16%	3.7%	7.8%	1.8%	2.6%	7.4%	8.0%	5.9%
Source	https://www.imf.org/external/datamapper/PCPIPCH@WEO/OEMDC/ADVEC/WEOWORLD/									
ICS Purchase Cost	24,343.94	19,514.66	9,935.71	14,157.86	95,153.07	14,157.86	14,157.86	23.90	428.58	85,559.61
Source	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer	Agreement with manufacturer
Tax (VAT)	0%	0%	7.5%	18.0%	20.0%	18.0%	18.0%	16.0%	0%	18.0%
Source	Assumed "0" as a conservative measure	Assumed "0" as a conservative measure	Customer Invoices	Customer Invoices	Customer Invoices	Customer Invoices	Customer Invoices	Customer Invoices	Assumed "0" as a conservative measure	Tax document
Shipping Cost per unit	1,701.20	1,363.72	939.38	989.38	13,298.94	989.38	1,326.57	1.77	29.95	5,979.06
Source	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence
Selling Commission to Sales agent	4,074.30	3,266.05	1,662.88	2,369.52	15,925.20	2,369.52	2,369.52	4.00	71.73	14,319.60
Source	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner	Commission to partner
Total Costs	30,119.44	24,144.44	12,537.97	17,516.75	1,24,377.21	17,516.75	17,853.94	29.67	530.26	1,05,858.27
NPV	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Sensitivity Analysis (For "0" NPV)										
Increase in Revenue	16%	16%	13%	14%	19%	42%	15%	22%	16%	16%
Decrease in Purchase Cost	17%	17%	14%	14%	20%	36%	16%	21%	17%	17%
Decrease in other costs	71%	71%	59%	71%	80%	178%	73%	103%	71%	84%

NPV analysis per unit ICS for Project Stove (Mama Yao)

NPV (Project without Carbon Revenues)	Rwanda	Malawi	Nigeria	Mali	Madagas car	Senegal	Cote D ivoire	DRC	Zambia	Uganda
Variable	Per unit ICS revenue									
Currency	Rwandan Franc	Malawian Kawacha	Nigerian Naira	CFA Francs	Malagasy Ariary	CFA Francs	West African CFA	US Dollars	Zambian Kwacha	Ugandan Shillings
ICS sale revenues	16,684.26	14,484.94	8,085.13	12,255.37	89,085.57	12,255.37	12,529.94	20.44	318.12	74,062.40
Source	Distributio n cost to end user	Assumed	Assumed	Assumed	Assumed	Assumed	Assumed	Assumed	Assumed	Assumed
Total Revenues	16,684.26	14,484.94	8,085.13	12,255.37	89,085.57	12,255.37	12,529.94	20.44	318.12	74,062.40
Per unit ICS Costs										
Inflation rate	6.7%	13.9%	16%	3.7%	7.8%	1.8%	2.6%	7.4%	8.0%	5.9%
Source	https://www.imf.org/external/datamapper/PCPIPCH@WEO/OEMDC/ADVEC/WEOWORLD/									
ICS Purchase Cost	20,381.69	16,338.43	8,318.56	11,853.50	79,665.81	11,853.50	11,853.50	20.01	358.82	71,633.80
Source	Agreemen t with manufactu rer	Agreemen t with manufactu rer	Agreemen t with manufactu rer	Agreemen t with manufactu rer	Agreemen t with manufactu rer	Agreemen t with manufactu rer	Agreemen t with manufactu rer	Agreemen t with manufactu rer	Agreemen t with manufactu rer	Agreemen t with manufactu rer
Tax (VAT)	0.0%	0.0%	7.5%	18.0%	20.0%	18.0%	18.0%	16.0%	0%	18.0%
Source	Customer Invoices	Assumed "0" as a conservati ve measure	Customer Invoices	Customer Invoices	Customer Invoices	Customer Invoices	Customer Invoices	Customer Invoices	Assumed "0" as a conservati ve measure	Tax document
Shipping Cost per unit	1,385.26	1,110.46	764.92	805.64	10,829.14	805.64	1,080.20	1.44	24.39	4,868.66
Source	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence	Logistic Cost evidence
Selling Commission to Sales agent	4,074.30	3,266.05	1,662.88	2,369.52	15,925.20	2,369.52	2,369.52	4.00	71.73	14,319.60
Source	Commissi on to partner	Commissi on to partner	Commissi on to partner	Commissi on to partner	Commissi on to partner	Commissi on to partner	Commissi on to partner	Commissi on to partner	Commissi on to partner	Commissi on to partner

Total Costs	25,841.25	20,714.94	10,746.36	15,028.66	1,06,420.15	15,028.66	15,303.22	25.45	454.94	90,822.06
NPV	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Sensitivity Analysis (For "0" NPV)										
Increase in Revenue	55%	43%	41%	40%	37%	40%	39%	40%	43%	40%
Decrease in Purchase Cost	45%	38%	37%	35%	35%	35%	35%	35%	38%	35%
Decrease in other costs	168%	142%	135%	155%	124%	155%	142%	151%	142%	155%

Appendix 2: Baseline scenario / Biomass Fuel prevalence in the host countries

Country	Population using Wood as cooking fuel	Population using Charcoal as cooking fuel	Source
Rwanda	61.40%	16.20%	DHS 2019-20, Table 2.3, page 25
Malawi	80.70%	17.40%	MIS 2018 January, Table 2.3, page 15
Nigeria	61.10%	5.80%	Nigeria DHS 2018, table 2.4, page 26
Mali	77.60%	19.30%	Mali DHS 2018, table 2.4, page 27
Madagascar	65.70%	27.70%	Madagascar DHS 2021, table 2.4, page 26
Senegal	51.70%	18.60%	EIPS, Senegal, table 2.6, page 26
Ivory Coast	56.30%	13.40%	Ivory coast MICS, 2016
DRC	58.70%	35.30%	DRC MICS 2018 table tc 4.2
Zambia	48.10%	42.40%	Zambia DHS 2018, table 2.4, page 22
Uganda	73.00%	21.00%	UNHS 2019-20, Page xviii

Cooking technologies prevalent in the Households: As per the report²⁵, page 77, amongst the 20 countries with the lowest rates of access to clean fuels and technologies, 19 are present in Sub Saharan Africa and of these 06 countries are being targeted under this grouped project.

²⁵ https://trackingsdg7.esmap.org/data/files/download-documents/sdg7-report2023-full_report.pdf

Appendix 3: f_{NRB} Calculation as per CDM Tool 30, V4.0

Rwanda

Applicability Condition as per para 3:

This tool may be used by:

- DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or*
- project participants to calculate project or PoA-specific f_{NRB} values.*

Justification: A project specific f_{NRB} value is being calculated.

Condition as per para 5:

Project participants and DNAs shall identify and clearly delineate the applicable area for which f_{NRB} is determined. For project- or PoA-specific f_{NRB} values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific f_{NRB} values, DNAs shall specify the applicable area.

Justification: Given the project boundary is geographical boundary of Rwanda and the ICSs implemented under the project shall be distributed across Rwanda, hence the applicable area being considered is Rwanda and the f_{NRB} value has been calculated for the same.

Condition as per para 6:

Project participants and DNAs may choose between the following two options to determine the value of f_{NRB} :

- Use the default value as provided in TOOL33; or*
- Calculate f_{NRB} by determining the share of renewable and non-renewable woody biomass in the total quantity of wood biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for f_{NRB} reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least:*
 - Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272.*

Justification: PP has opted option (b) to determine the value of f_{NRB} . The values that have been used in the calculation of f_{NRB} are directly sourced from latest publicly available, relevant scientific literature. Given the PP has not used any self-collected data, but directly sourced values from scientific published literature, hence a comparison with other sources is not deemed applicable. A detailed description of the data sources and values considered for determining f_{NRB} is presented in below section.

Further, para 6b) of tool 30 v 4.0 requires comparison of the calculated f_{NRB} value with other scientific literature wherein the literature **should (and not shall)**, and hence is not deemed mandatory for use) at least include the following:

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

An assessment of the aforesaid literature (Bailis et.al) yielded the following:

- The report is dated 2015 and does not present a recent scenario in Rwanda truly. Further, para 10 of the CDM Tool 30 v.4.0 clearly mentions that “in case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available.” Given the PP has calculated f_{NRB} using more recent reports providing data vintages

for 2020-21, hence its comparison with the aforesaid report (Bailis et. al.) being vintaged 2015 is not deemed appropriate.

- (ii) The aforesaid report (Bailis et. al.) under table 1 (page 12), cites the source of data used for determining the fuelwood consumption in urban and rural parts of a country. For Rwanda specifically, the source used is (reference # 21), as specified on page 45 of this report is Drigo, R., Munyehirwe, A., Nzabanita, V. & Munyampundu, A. Update and upgrade of WISDOM Rwanda. (Agriconsulting S.p.A., Kigale, 2013). Thus, this source necessarily does not reflect the most recent information on fuel consumption in the host country.
- (iii) Also, the inclusion of industrial roundwood consumption (specially for non-energy purposes) in determining the f_{NRB} is not stated in the report (Bailis et. al.) while para 17 of the CDM tool 30 v 4.0 clearly requires its inclusion.

Thus, the f_{NRB} calculation conducted by PP using relevant scientific literature is in compliance with para 6(b) of the CDM Tool 30, v 4.0.

Condition as per para 7:

The fraction of woody biomass that can be established as non-renewable is:

$$f_{NRB} = NRB / (NRB + RB) \quad \text{Equation (1)}$$

Justification: The f_{NRB} calculated follows Equation (1) as above. Refer below for details:

Data Symbol	Parameter Description	Units	Values	Reference	Source
RB Forest area	Annual Renewable Biomass production from Rwanda Forests (including area under Plantations)	m ³ /year	397,747	As per the report titled, "Forestry Research Strategy and Guidelines for Rwanda (2018-2024), by Ministry of Environment, Republic of Rwanda", section 6.1.1 D. Forest productivity in all categories, page 24, the productivity of woody biomass under different land categories is provided.	This report is now not available in the public domain, hence the same is being submitted as a supporting document along with submission of this document
RB Other wooded lands	Annual Renewable Biomass production from Shrublands in Rwanda	m ³ /year	78,209		
RB Other Lands	Annual Renewable Biomass production from Agroforestry Systems in Rwanda	m ³ /year	792,776		

RB	Annual Renewable Biomass production in Rwanda	m ³ /year	1,268,732	$RB = \sum (MAI_{forest,i} \times (F_{forest,i} - P_{forest,i})) + \sum (MAI_{other,i} \times (F_{other,i} - P_{other,i}))$	Calculated, as per equation (4), para 19 of applied tool
H	Total consumption of woody biomass	m ³ /year	9,840,000	Sourced from UN data, the total woody biomass consumption in Rwanda (total Fuelwood energy supply) for year 2022	http://data.un.org/Data.aspx?d=EDATA&f=cmID%3aFW
	Conservative value of total consumption of woody Biomass		8,520,321	As a conservative measure, UN value of 2022 is compared with the Woody Biomass Consumption value used in similar project	--
NRB = H- RB	Non renewable Biomass	m ³ /year	7,251,589	Calculated	--
$f_{NRB} = NRB / (NRB + RB)$	Fraction of non-renewable biomass	Percentage	85.11%	Calculated	--

Condition as per para 8:

The relevant period should be one year, unless the methodology referring to this tool specifies otherwise.

Justification: The f_{NRB} calculated is based on data vintage 2019/2020 and represents one year.

Condition as per para 9:

The value of f_{NRB} for the applicable area shall be calculated using either of the two following options:

- Ex ante: the f_{NRB} value is determined once at the validation stage, thus no monitoring and recalculation of the f_{NRB} value during the crediting period is required;*
- Ex post: the $f_{NRB,y}$ value is determined for the year y in the crediting period, requiring the f_{NRB} value to be updated annually, following a consistent calculation procedure throughout the crediting period.*

Justification: The f_{NRB} calculated is being fixed ex-ante.

Condition as per para 10:

In the case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of f_{NRB} , the parameter f_{NRB} shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB} . Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB}).

Justification: The f_{NRB} is being calculated ex-ante. As per above, the data vintage used is most recent available, pertaining to 2019-21.

Condition as per para 11:

The quantity of non-renewable biomass consumed in the applicable area (NRB) shall be determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):

$$NRB = H - RB \quad \text{Equation (2)}$$

Justification: The NRB has been calculated using above equation. Refer information under the “condition as per para 7” above.

Condition as per para 12:

Cubic meters (m^3) instead of tonnes (t) of wood may be used for estimation of f_{NRB} values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both the total consumption of woody biomass (H) and the renewable biomass available (RB).

Justification: The total consumption of woody biomass (H) and the renewable biomass available (RB) both are using cubic meters as the unit. Hence, both values with same units can be used to establish the f_{NRB} values.

Condition as per para 13:

If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of:

- (i) *total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and*
- (ii) *most recent available observed annual rate of deforestation (ha/yr).*

If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for the higher value for NRB.

Justification: Refer below for details:

In line with para 13, the NRB was compared to the product of average aboveground biomass (146.06 t/ha)²⁶, (FAO GFRA 2020 Rwanda Section 2c), page 34, values considered for year 2020) and the most recent annual deforestation data ($3,040 \text{ ha/yr}$)²⁷. NRB calculated was found to be greater than the cross-check results based on deforestation. It is expected that the cross-check estimate of biomass loss from deforestation could underestimate the extent of non-renewable biomass as it only considers the average biomass stocks from completely deforested areas. Unsustainable wood harvesting resulting in forest degradation and substantial reductions in biomass stocks, but not complete deforestation is not considered in the cross-check.

As per the GFRA 2020 Rwanda, page 20, there has been no deforestation in the country but a net forest expansion for the year 2015-2020. Thus, a comparison of loss rate of forests * AGB with NRB established over the entire country (considering forest area, and other wooded land area) is not deemed appropriate in absence of reliable data on rate and extent of deforestation in Rwanda.

²⁶ <https://openknowledge.fao.org/server/api/core/bitstreams/425ed585-9e7e-44fc-8c56-21aa6cdbee9b/content>

²⁷ <https://www.globalforestwatch.org/dashboards/country/RWA/?category=forest-change&location=WYJb3VudHJ5IiwidBII0%3D>

Malawi

Applicability Condition as per para 3:

This tool may be used by:

- DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or*
- project participants to calculate project or PoA-specific f_{NRB} values.*

Justification: A project specific f_{NRB} value is being calculated.

Condition as per para 5:

Project participants and DNAs shall identify and clearly delineate the applicable area for which f_{NRB} is determined. For project- or PoA-specific f_{NRB} values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific f_{NRB} values, DNAs shall specify the applicable area.

Justification: Given the project boundary is geographical boundary of Malawi and the ICSs implemented under the project shall be distributed across Malawi, hence the applicable area being considered is Malawi and the f_{NRB} value has been calculated for the same.

Condition as per para 6:

Project participants and DNAs may choose between the following two options to determine the value of f_{NRB} :

- Use the default value as provided in TOOL33; or*
- Calculate f_{NRB} by determining the share of renewable and non-renewable woody biomass in the total quantity of wood biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for f_{NRB} reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least:*
 - Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272.*

Justification: PP has opted option (b) to determine the value of f_{NRB} . The values that have been used in the calculation of f_{NRB} are directly sourced from latest publicly available, relevant scientific literature. Given the PP has not used any self-collected data, but directly sourced values from scientific published literature, hence a comparison with other sources is not deemed applicable. A detailed description of the data sources and values considered for determining f_{NRB} is presented in below section.

Further, para 6b) of tool 30 v 4.0 requires comparison of the calculated f_{NRB} value with other scientific literature wherein the literature **should (and not shall)**, and hence is not deemed mandatory for use) at least include the following:

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

An assessment of the aforesaid literature (Bailis et.al) yielded the following:

- The report is dated 2015 and does not present a recent scenario in Malawi truly. Further, para 10 of the CDM Tool 30 v.4.0 clearly mentions that “in case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available.” Given the PP has calculated f_{NRB} using

- more recent reports providing data vintages for 2020-21, hence its comparison with the aforesaid report (Bailis et. al.) being vintaged 2015 is not deemed appropriate.
- (ii) The aforesaid report (Bailis et. al.) under table 1 (page 12), cites the source of data used for determining the fuelwood consumption in urban and rural parts of a country. For Malawi specifically, the source used is FAO (reference # 8), as specified on page 45 of this report, is FAOSTAT. Forestry production and trade, <http://faostat3.fao.org/faostatgateway/go/to/download/F/*E> (2013). Thus, this source necessarily does not reflect the most recent information on fuel consumption in the host country.
 - (iii) Similarly, for non-energy use (domestic uses like houses, fencing etc.) consumption, the report (Bailis et. al.) states the following (page 13):
 - a) The consumption of construction material for fences, stables, rural houses construction and maintenance ranges between 5 and 20 kg per capita and per year. In this study, a mid-range value of 11 kg per capita year is applied to the rural population. This average is based on references (21, 29 and 33) of the report (Bailis et. al.) as listed on page 45-46. These three references pertain to Rwanda, Mozambique and Sudan respectively and hence are not deemed representative of Malawi.
 - (iv) Also, the inclusion of industrial roundwood consumption (specially for non-energy purposes) in determining the f_{NRB} is not stated in the report (Bailis et. al.) while para 17 of the CDM tool 30 v 4.0 clearly requires its inclusion.

Thus, the f_{NRB} calculation conducted by PP using relevant scientific literature is in compliance with para 6(b) of the CDM Tool 30, v 4.0.

Condition as per para 7:

The fraction of woody biomass that can be established as non-renewable is:

$$f_{NRB} = NRB / (NRB + RB) \quad \text{Equation (1)}$$

Justification: The f_{NRB} calculated follows Equation (1) as above. Refer below for details:

Data Symbol	Parameter Description	Units	Value	Reference	Source
$F_{\text{Forest},i}$	Extent of forest in the relevant period	ha	2,241,700	FAO Global Forest Resources Assessment 2020, Malawi, (herein after referred as 'FAO GFRA 2020 Malawi'), Section 1a), page 07, value considered for year 2020.	https://www.fao.org/3/cb0032en/cb0032en.pdf
$F_{\text{Other wooded land},i}$	Extent of other wooded land in the relevant period	ha	0	FAO GFRA 2020, Malawi, Section 1a), page 07 reports a value of 0 ha for this land category. This parameter value was further cross checked with other sources like-	https://www.fao.org/3/az265e/az265e.pdf https://www.fao.org/3/cb0032en/cb0032en.pdf

				FAO GFRA 2015, but again 0 value was reported for this land category.	
$P_{Forest,i}$	Forest area within Protected Areas	ha	757,900	Protected area in Malawi as per FAO GFRA 2020, Malawi, Section 3b), page 30 is reported to be 757,900 ha	https://www.fao.org/3/cb0032en/cb0032en.pdf
$F_{Forest,i} - P_{Forest,i}$	Forest area from where biomass can be sourced	ha	1,483,800	Calculated	--
$MAI_{forest,i}$	Mean Annual Increment of woody biomass growth per hectare in forest land for the relevant period	m ³ /ha/year	1.20	Calculated as weighted average of type of forest in Malawi, as per published report Page 20, Malawi's Green Gold: Challenges and Opportunities for Small and Medium Forest enterprises in reducing poverty	https://www.iiied.org/sites/default/files/pdfs/migrate/13545IIED.pdf
RB	Annual Renewable Biomass	m ³ /year	1,780,560	$RB = \sum (MAI_{forest,i} \times (F_{forest,i} - P_{forest,i})) + \sum (MAI_{other,i} \times (F_{other,i} - P_{other,i}))$	Calculated, as per equation (4), para 19 of applied tool
H	Annual Biomass Consumption	m ³ /year	6,107,000	Sourced from UN data, the total woody biomass consumption in Malawi (total Fuelwood energy supply) for year 2021/2022	http://data.un.org/Data.aspx?d=E&f=cmID%3aFW
NRB = H - RB	Non renewable Biomass	m ³ /year	4,326,440	Calculated	--
$f_{NRB} = \frac{NRB}{NRB + RB}$	Fraction of non-renewable biomass	Percentage	70.84%	Calculated	--
Condition as per para 8: <i>The relevant period should be one year, unless the methodology referring to this tool specifies otherwise.</i>					

Justification: The f_{NRB} calculated is based on data vintage 2020/2021/2022 and represents one year.
Condition as per para 9: <i>The value of f_{NRB} for the applicable area shall be calculated using either of the two following options:</i> a) <i>Ex ante: the f_{NRB} value is determined once at the validation stage, thus no monitoring and recalculation of the f_{NRB} value during the crediting period is required;</i> b) <i>Ex post: the $f_{NRB,y}$ value is determined for the year y in the crediting period, requiring the f_{NRB} value to be updated annually, following a consistent calculation procedure throughout the crediting period.</i>
Justification: The f_{NRB} calculated is being fixed ex-ante.
Condition as per para 10: <i>In the case of ex ante calculation of f_{NRB}, the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of f_{NRB}, the parameter f_{NRB} shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB}. Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB}).</i>
Justification: The f_{NRB} is being calculated ex-ante. As per above, the data vintage used is most recent available, pertaining to 2020-2021/2022.
Condition as per para 11: <i>The quantity of non-renewable biomass consumed in the applicable area (NRB) shall be determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):</i> $NRB = H - RB \quad \text{Equation (2)}$
Justification: The NRB has been calculated using above equation. Refer information under the “condition as per para 7” above.
Condition as per para 12: <i>Cubic meters (m^3) instead of tonnes (t) of wood may be used for estimation of f_{NRB} values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both the total consumption of woody biomass (H) and the renewable biomass available (RB).</i>
Justification: The total consumption of woody biomass (H) and the renewable biomass available (RB) both are using cubic meters as the unit. The total woody biomass consumption is sourced from UN Data (http://data.un.org/Data.aspx?d=EDATA&f=cmID%3aFW) and is presented in cubic meters. For renewable biomass estimations, the Mean Annual Increment (MAI) values ($m^3/ha/year$) under different land use categories are multiplied with the respective land areas (ha). Hence, both the values are having same units and can be used to establish the f_{NRB} values.
Condition as per para 13: <i>If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of:</i> (i) <i>total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and</i> (ii) <i>most recent available observed annual rate of deforestation (ha/yr).</i>

If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for the higher value for NRB.

Justification: Refer below for details:

Parameter	Value	Unit	Reference	Source
Average net forest lost per year	42,000	ha/year	FAO GFRA 2020 Malawi Section 1d), page 14, values considered for the vintage 2015-2020	https://www.fao.org/3/cb0032en/cb0032en.pdf
Above Ground Biomass for Malawi as per GFRA	78.7	tonnes/ha	FAO GFRA 2020 Malawi Section 2c), page 24, values considered for year 2020	https://www.fao.org/3/cb0032en/cb0032en.pdf
AGB lost per year	3,305,400	tonnes	Calculated	--
AGB lost per year	5,687,490	m ³	Applying a density factor of 0.581, calculated as average of 282 tree species in Tropical Africa	http://www.fao.org/3/W4095E/w4095e0c.htm
Estimated NRB in the fnrb calculations	4,326,440	m ³	The Estimated NRB is less than the AGB lost per year (based on deforestation rate and AGB/Ha), substantiating that the value of fNRB established by the project is highly conservative.	--
Check for para 13 compliance	Para 13 compliance met	--	Calculated	--

Since the estimated NRB value is less than the value calculated as per the product of biomass and deforestation rate. Hence the estimated NRB is less than the AGB lost per year (based on deforestation rate and AGB/Ha), substantiating that the value of fNRB established by the project is highly conservative.

Nigeria

Applicability Condition as per para 3:

This tool may be used by:

- DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or*
- project participants to calculate project or PoA-specific f_{NRB} values.*

Justification: A project specific f_{NRB} value is being calculated.

Condition as per para 5:

Project participants and DNAs shall identify and clearly delineate the applicable area for which f_{NRB} is determined. For project- or PoA-specific f_{NRB} values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific f_{NRB} values, DNAs shall specify the applicable area.

Justification: Given the project boundary is geographical boundary of Nigeria and the ICSs implemented under the project shall be distributed across Nigeria, hence the applicable area being considered is Nigeria and the f_{NRB} value has been calculated for the same.

Condition as per para 6:

Project participants and DNAs may choose between the following two options to determine the value of f_{NRB} :

- a) *Use the default value as provided in TOOL33; or*
- b) *Calculate f_{NRB} by determining the share of renewable and non-renewable woody biomass in the total quantity of wood biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for f_{NRB} reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least:*
 - (i) *Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272.*

Justification: PP has opted option (b) to determine the value of f_{NRB} . The values that have been used in the calculation of f_{NRB} are directly sourced from latest publicly available, relevant scientific literature. Given the PP has not used any self-collected data, but directly sourced values from scientific published literature, hence a comparison with other sources is not deemed applicable. A detailed description of the data sources and values considered for determining f_{NRB} is presented in below section.

Further, para 6b) of tool 30 v 4.0 requires comparison of the calculated f_{NRB} value with other scientific literature wherein the literature **should (and not shall)**, and hence is not deemed mandatory for use) at least include the following:

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

An assessment of the aforesaid literature (Bailis et.al) yielded the following:

- (i) *The report is dated 2015 and does not present a recent scenario in Nigeria truly. Further, para 10 of the CDM Tool 30 v.4.0 clearly mentions that “in case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available.” Given the PP has calculated f_{NRB} using more recent reports providing data vintages for 2020-21, hence its comparison with the aforesaid report (Bailis et. al.) being vintaged 2015 is not deemed appropriate.*
- (ii) *The aforesaid report (Bailis et. al.) under table 1 (page 12), cites the source of data used for determining the fuelwood consumption in urban and rural parts of a country. For Nigeria specifically, the source used is FAO (reference # 8), as specified on page 45 of this report, is FAOSTAT. Forestry production and trade, <http://faostat3.fao.org/faostatgateway/go/to/download/F/*/E> (2013). Thus, this source necessarily does not reflects the most recent information on fuel consumption in the host country.*
- (iii) *Similarly, for non-energy use (domestic uses like houses, fencing etc.) consumption, the report (Bailis et. al.) states the following (page 12):*
 - a) *The consumption of construction material for fences, stables, rural houses construction and maintenance ranges between 5 and 20 kg per capita and per year. In this study, a mid-range value of 11 kg per capita year is applied to the rural population. This average is based on references (21, 29 and 33) of the report (Bailis et. al.) as listed on page 45-46. These three references pertain to Rwanda, Mozambique and Sudan respectively and hence are not deemed representative of Nigeria.*

- (iv) Also, the inclusion of industrial roundwood consumption (specially for non-energy purposes) in determining the f_{NRB} is not stated in the report (Bailis et. al.) while para 17 of the CDM tool 30 v 4.0 clearly requires its inclusion.

Thus, the f_{NRB} calculation conducted by PP using relevant scientific literature is in compliance with para 6(b) of the CDM Tool 30, v 4.0.

Condition as per para 7:

The fraction of woody biomass that can be established as non-renewable is:

$$f_{NRB} = NRB / (NRB + RB) \quad \text{Equation (1)}$$

Justification: The f_{NRB} calculated follows Equation (1) as above. Refer below for details:

Data Symbol	Parameter Description	Units	2020 Value	Reference	Source
F Forest,i	Extent of forest in the relevant period	ha	21,410,680	FAO Global Forest Resources Assessment 2020, Nigeria, (herein after referred as 'FAO GFRA 2020 Nigeria'), Section 1b), page 12, value considered for year 2020.	https://www.fao.org/3/cb0037en/cb0037en.pdf
F Plantation Forest,i	Extent of plantation forest in the relevant period	ha	216,270	The Forest area reported in FAO GFRA 2020 Nigeria is considerably higher (more than three times) than the value reported in FAO GFRA 2015 Nigeria, due to the availability of new and better data (FAO GFRA 2020 Nigeria, page 9, "comments").	
F Other wooded land,i	Extent of other wooded land in the relevant period	ha	2,681,000	FAO GFRA 2020, Nigeria, Section 1a), page 9, reports a value of 0 ha for this land category. However, instead of applying the 0 value as per FAO GFRA 2020 Nigeria, the value for year 2015 as reported in FAO GFRA 2015 Nigeria, Section 1.4 Data, Table 1a, page 14, has been considered. This is deemed overly conservative as firstly, FAO GFRA 2015 Nigeria, table 1a) shows a decreasing trend for this parameter (from 9,717k ha in 1990 to 2,681k ha in 2015) and secondly, this parameter	https://www.fao.org/3/cb0037en/cb0037en.pdf https://www.fao.org/documents/card/en?details=0d5c98d4-f6db-471e-9309-3199d3cf13ad

				contributes to renewable biomass.	
F Other land,i with tree cover	Extent of other land with the tree cover in the relevant period	ha	270,000	FAO GFRA 2020, Nigeria, Section 1f), page 19-20, reports a value of 0 ha for this land category. However, instead of applying the 0 value as per FAO GFRA 2020 Nigeria, the value for year 2015 as reported in FAO GFRA 2015 Nigeria, Section 1.4 Data, Table 1a, page 14, has been considered. This is deemed overly conservative as this parameter contributes to renewable biomass.	
P Forest,i	Forest area within Protected Areas	ha	2,890,700	Protected area in Nigeria as per FAO GFRA 2020, Nigeria, Section 3b), page 33 is reported to be 2,890,700 ha.	https://www.fao.org/3/cb0037en/cb0037en.pdf
F Forest,i - P Forest,i	Forest area from where biomass can be sourced	ha	18,519,980	Calculated	--
MAI forest,i	Mean Annual Increment of woody biomass growth per hectare in forest land for the relevant period	m ³ /ha/yr	2	As per the report titled, "Forestry and Macroeconomic Accounts of Nigeria: The Importance of Linking Ecosystem Services to Macroeconomics Executive summary for decision-makers, section 3.4, page 26 , "The weighted average means annual increment (MAI) of the total forest estate of Nigeria is estimated at 2 m ³ /ha/year. Planted forests in Nigeria however can achieve MAIs of up to 15 m ³ /ha/year".	https://www.unclearn.org/wp-content/uploads/library/final_report_summary_for_decision_makers_red_nigeria_unep.pdf
MAI Plantation forest,i	Mean Annual Increment of woody biomass growth per hectare in plantation forest areas in the relevant period	m ³ /ha/yr	15		

MAI_{other}	Mean Annual Increment of woody biomass growth per hectare in other wooded lands in the relevant period	m ³ /ha/yr	2	As a conservative estimate, MAI value for other wooded land as well as other lands with tree cover is considered same as that of the forest estate	--
RB	Annual Renewable Biomass	m ³ /yr	46,186,010	$RB = \sum (MAI_{forest,i} \times (F_{forest,i} - P_{forest,i})) + \sum (MAI_{other,i} \times (F_{other,i} - P_{other,i}))$	Calculated, as per equation (4), para 19 of applied tool
H	Total consumption of woody biomass	m ³ /yr	260,884,000	Sourced from UN data, the total woody biomass consumption in Nigeria (total Fuelwood energy supply) for year 2020	http://data.un.org/Data.aspx?d=EDA&f=cmID%3aFW
			262,908,000	Sourced from UN data, the total woody biomass consumption in Nigeria (total Fuelwood energy supply) for year 2021	
	Conservative value of total consumption of woody Biomass		260,884,000	As a conservative measure, value of 2020 has been considered being lower than that of 2021.	--
NRB = H - RB	Non-renewable Biomass	m ³ /year	214,697,990	Calculated	--
f_{NRB} = NRB / (NRB + RB)	Fraction of non-renewable biomass	%	82.30%	Calculated	--

Condition as per para 8:

The relevant period should be one year, unless the methodology referring to this tool specifies otherwise.

Justification: The f_{NRB} calculated is based on data vintage 2020/2021 and represents one year.

Condition as per para 9:

The value of f_{NRB} for the applicable area shall be calculated using either of the two following options:

- Ex ante: the f_{NRB} value is determined once at the validation stage, thus no monitoring and recalculation of the f_{NRB} value during the crediting period is required;*
- Ex post: the f_{NRB,y} value is determined for the year y in the crediting period, requiring the f_{NRB} value to be updated annually, following a consistent calculation procedure throughout the crediting period.*

Justification: The f_{NRB} calculated is being fixed ex-ante.				
Condition as per para 10: <i>In the case of ex ante calculation of f_{NRB}, the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of f_{NRB}, the parameter f_{NRB} shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB}. Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB}).</i>				
Justification: The f_{NRB} is being calculated ex-ante. As per above, the data vintage used is most recent available, pertaining to 2020-21.				
Condition as per para 11: <i>The quantity of non-renewable biomass consumed in the applicable area (NRB) shall be determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):</i> $NRB = H - RB \quad \text{Equation (2)}$				
Justification: The NRB has been calculated using above equation. Refer information under the “condition as per para 7” above.				
Condition as per para 12: <i>Cubic meters (m^3) instead of tonnes (t) of wood may be used for estimation of f_{NRB} values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both the total consumption of woody biomass (H) and the renewable biomass available (RB).</i>				
Justification: The total consumption of woody biomass (H) and the renewable biomass available (RB) both are using cubic meters as the unit. The total woody biomass consumption is sourced from UN Data (http://data.un.org/Data.aspx?d=EDATA&f=cmID%3aFW) and is presented in cubic meters. For renewable biomass estimations, the Mean Annual Increment (MAI) values (m^3 /ha/year) under different land use categories are multiplied with the respective land areas (ha). Hence, both the values are having same units and can be used to establish the f_{NRB} values.				
Condition as per para 13: <i>If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of:</i> <i>total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and</i> <i>most recent available observed annual rate of deforestation (ha/yr).</i> <i>If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for the higher value for NRB.</i>				
Justification: Refer below for details:				
Parameter	Value	Unit	Reference	Source

Average net forest lost per year	409,600	ha/yr	Report “Forestry and Macroeconomic Accounts of Nigeria: The Importance of Linking Ecosystem Services to Macroeconomics Executive summary for decision-makers”, January 2017, page 07, executive summary, para 2 shows that the long term annual average rate of deforestation in Nigeria corresponds to 409,600 ha/yr.	https://www.uncclea rn.org/wp-content/uploads/library/final_report_summary_for_decisio n_makers_redd_nigeria_unep.pdf
Above Ground Biomass for Nigeria as per GFRA	134.77	tonnes/ha	FAO GFRA 2020 Nigeria Section 2c), page 27, values considered for year 2020	https://www.fao.org/3/cb0037en/cb0037en.pdf
AGB lost per year	55,201,792	tonnes	Calculated	--
AGB lost per year	94,983,863.23	m ³ /yr	Applying a density factor of 0.581, calculated as average of 282 tree species in Tropical Africa	http://www.fao.org/3/W4095E/w4095e0c.htm
Estimated NRB in the fnrb calculations	214,697,990	m ³ /yr	The Estimated NRB is more than the AGB lost per year (based on deforestation rate and AGB/Ha)	--

In line with para 13 of Tool 30, the Non-Renewable Biomass is compared to the product of average aboveground biomass and the most recent annual deforestation data (94,983,863.23 m³/yr = 134.77 t/ha * 409,600 ha/yr, applying a wood density factor of 0.581t/m³). The NRB calculated above (= 214,697,990 m³/yr) is much greater than the cross-check value.

It is expected that the cross-check estimate of biomass loss from deforestation would grossly underestimate the actual extent of non-renewable biomass consumption as it only considers the average biomass stocks from areas that are completely deforested. Unsustainable wood harvesting resulting in forest degradation and significant reductions in biomass stocks, but not complete deforestation, are not considered in the crosscheck. Also, the deforestation rate in the report referred above (409,600 ha/yr) pertains to loss rate of forests and does not necessarily include loss rate (deforestation) of trees outside forests.

This is further substantiated by publicly available information confirming the total long term annul average degradation (from 1990-2005) to be ~697,600 ha/yr including forest and other wooded land (<https://worldrainforests.com/deforestation/forest-information-archive/Nigeria.htm>).

Other literature / public sources, refer to Nigeria having the highest rates of deforestation in the world with 3.7% forest loss every year. (<https://www.green.earth/blog/deforestation-in-nigeria-causes-effects-and-solutions>) A loss rate of 3.7% forest cover / year, yields an average loss rate of >800,000 ha/yr if calculated based on total forest and forest plantation area reported in FAO GFRA 2020 Nigeria.

Thus, a comparison of loss rate of forests * AGB with NRB established over the entire country (considering forest area, and other wooded land area) is not deemed appropriate in absence of reliable data on rate and extent of deforestation in Nigeria.

Mali

Applicability Condition as per para 3:

This tool may be used by:

- a) DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or
- b) project participants to calculate project or PoA-specific f_{NRB} values.

Justification: A project specific f_{NRB} value is being calculated.

Condition as per para 5:

Project participants and DNAs shall identify and clearly delineate the applicable area for which f_{NRB} is determined. For project- or PoA-specific f_{NRB} values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific f_{NRB} values, DNAs shall specify the applicable area.

Justification: Given the project boundary is geographical boundary of Mali and the ICSs implemented under the project shall be distributed across Mali, hence the applicable area being considered is Mali and the f_{NRB} value has been calculated for the same.

Condition as per para 6:

Project participants and DNAs may choose between the following two options to determine the value of f_{NRB} :

- a) Use the default value as provided in TOOL33; or
- b) Calculate f_{NRB} by determining the share of renewable and non-renewable woody biomass in the total quantity of wood biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for f_{NRB} reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least:
 - (i) Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. *Nature Climate Change*, 5(3), pp. 266–272.

Justification: PP has opted option (b) to determine the value of f_{NRB} . The values that have been used in the calculation of f_{NRB} are directly sourced from latest publicly available, relevant scientific literature. Given the PP has not used any self-collected data, but directly sourced values from scientific published literature, hence a comparison with other sources is not deemed applicable. A detailed description of the data sources and values considered for determining f_{NRB} is presented in below section.

Further, para 6b) of tool 30 v 4.0 requires comparison of the calculated f_{NRB} value with other scientific literature wherein the literature **should (and not shall)**, and hence is not deemed mandatory for use) at least include the following:

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

An assessment of the aforesaid literature (Bailis et.al) yielded the following:

- (i) The report is dated 2015 and does not present a recent scenario in Mali truly. Further, para 10 of the CDM Tool 30 v.4.0 clearly mentions that “in case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available.” Given the PP has calculated f_{NRB} using more recent reports providing data vintages for 2020-21, hence its comparison with the aforesaid report (Bailis et. al.) being vintaged 2015 is not deemed appropriate.
- (ii) The aforesaid report (Bailis et. al.) under table 1 (page 12), cites the source of data used for determining the fuelwood consumption in urban and rural parts of a country. For Mali specifically, the source used is FAO (reference # 8), as specified on page 45 of this report, is FAOSTAT. Forestry production and trade, <http://faostat3.fao.org/faostatgateway/go/to/download/F/*E> (2013). Thus, this source necessarily does not reflect the most recent information on fuel consumption in the host country.
- (iii) Similarly, for non-energy use (domestic uses like houses, fencing etc.) consumption, the report (Bailis et. al.) states the following (page 13):
 - a) The consumption of construction material for fences, stables, rural houses construction and maintenance ranges between 5 and 20 kg per capita and per year. In this study, a mid-range value of 11 kg per capita year is applied to the rural population. This average is based on references (21, 29 and 33) of the report (Bailis et. al.) as listed on page 45-46. These three references pertain to Rwanda, Mozambique and Sudan respectively and hence are not deemed representative of Mali.
- (iv) Also, the inclusion of industrial roundwood consumption (specially for non-energy purposes) in determining the f_{NRB} is not stated in the report (Bailis et. al.) while para 17 of the CDM tool 30 v 4.0 clearly requires its inclusion.

Thus, the f_{NRB} calculation conducted by PP using relevant scientific literature is in compliance with para 6(b) of the CDM Tool 30, v 4.0.

Condition as per para 7:

The fraction of woody biomass that can be established as non-renewable is:

$$f_{NRB} = NRB / (NRB + RB) \quad \text{Equation (1)}$$

Justification: The f_{NRB} calculated follows Equation (1) as above. Refer below for details:

Parameter	Description	Value	Unit	Reference	Sources
Extent of different Forests types	% of Forest Tropical shrubland	2%	%	FAO Global Forest Resources Assessment 2020, Table 2c Biomass on page 44	https://openknowledge.fao.org/server/api/core/bitstreams/2d743d20-c0c1-4de8-a1d1-60caeb2e5967/content
	% of Forest Tropical Moist	17%	%		
	% of Forest Tropical Dry	81%	%		
	% of Forest Tropical Rain Forest	-	%		
	Natural forests in the year 2000	13,241,000	ha	FAO Global Forest	

Natural Forests extent	Natural forests in the year 2020	12,728,000	ha	Resources Assessment 2020, Table 1b Biomass on page 18	
Above Ground Biomass calculations	Above-ground biomass growth of tropical shrubland in Africa (≤20 y)	0.70	tonnes/ha/year	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 4, Table 4.9.	https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch04_Forest%20Land.pdf
	Above-ground biomass growth of tropical shrubland in Africa (>20 y)	0.90	tonnes/ha/year		
	Above-ground biomass growth of tropical moist deciduous forest in Africa (≤20 y)	2.90	tonnes/ha/year		
	Above-ground biomass growth of tropical moist deciduous forest in Africa (>20 y)	0.90	tonnes/ha/year		
	Above-ground biomass growth of tropical dry forest in Africa (≤20 y)	3.90	tonnes/ha/year		
	Above-ground biomass growth of tropical dry forest in Africa (>20 y)	1.60	tonnes/ha/year		
MAI forest, i	Mean Annual Increment of woody biomass growth per hectare in forest area in the relevant period	1.38	tonnes/ha/year	Calculated	--
MAI other, i	Mean Annual Increment of woody biomass growth per hectare in other wooded land in the relevant period	0.90	tonnes/ha/year	As the savannas are the most dominant vegetation type besides forests in Mali, hence the value of Biomass growth in Tropical shrublands-Africa as	https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch04_Forest%20Land.pdf

				reported in the IPCC guidelines, Chapter-4, Forest Land on page 4.35, is selected as the Mean Annual Increment value for other wooded land in Mali.	
F forest, i	Extent of forest in sub-category i in the relevant period	13,296,000	ha	FAO Global Forest Resources Assessment 2020, Table 1a on Page 14	https://openknowledge.fao.org/server/api/core/bitstreams/2d743d20-c0c1-4de8-a1d1-60caeb2e5967/content
F other, i	Extent of other land in sub-category i in the relevant period	13,842,000	ha		
Protected area	Protected Area Extent in Mali	9,459,100	ha	The value has been sourced from the document mentioned on the link- https://www.cbd.int/pa/doc/dossiers/mali-abt11-country-dossier2021.pdf	https://www.protectedplanet.net/en/country/MLI
P Forest, i	Extent of Protected areas in Forest area	2,953,430	ha	FAO Global Forest Resources Assessment 2020, Table 1a on Page 52	https://openknowledge.fao.org/server/api/core/bitstreams/2d743d20-c0c1-4de8-a1d1-60caeb2e5967/content
P other, i	Extent of non-accessible area in other wooded lands	6,505,670	ha	Calculated	--
H	Total consumption of woody biomass	53,583,082	tonnes	National Report on the State of the Environment in Mali-2017, P.80	PROJET REE 2017 .pdf (cbd.int)

RB	$RB = \sum (MAI_{forest,j} \times (F_{forest,j} - P_{forest,j})) + \sum (MAI_{other,j} \times (F_{other,j} - P_{other,j}))$	20,858,582	tonnes/ yr	Calculated	--
fNRB	Fraction of non-renewable biomass	61.07%	%	Calculated	--

Condition as per para 8:

The relevant period should be one year, unless the methodology referring to this tool specifies otherwise.

Justification: The f_{NRB} calculated is based on data vintage 2020/2021 and represents one year.

Condition as per para 9:

The value of f_{NRB} for the applicable area shall be calculated using either of the two following options:

- Ex ante: the f_{NRB} value is determined once at the validation stage, thus no monitoring and recalculation of the f_{NRB} value during the crediting period is required;*
- Ex post: the f_{NRB,y} value is determined for the year y in the crediting period, requiring the f_{NRB} value to be updated annually, following a consistent calculation procedure throughout the crediting period.*

Justification: The f_{NRB} calculated is being fixed ex-ante.

Condition as per para 10:

In the case of ex ante calculation of f_{NRB}, the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of f_{NRB}, the parameter f_{NRB} shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB}. Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB}).

Justification: The f_{NRB} is being calculated ex-ante. As per above, the data vintage used is most recent available, pertaining to 2020-21.

Condition as per para 11:

The quantity of non-renewable biomass consumed in the applicable area (NRB) shall be determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):

$$NRB = H - RB \quad \text{Equation (2)}$$

Justification: The NRB has been calculated using above equation. Refer information under the "condition as per para 7" above.

Condition as per para 12:

Cubic meters (m³) instead of tonnes (t) of wood may be used for estimation of f_{NRB} values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both the total consumption of woody biomass (H) and the renewable biomass available (RB).

Justification: The total consumption of woody biomass (H) and the renewable biomass available (RB) both are using tonnes as the unit. Hence, both the values are having same units and can be used to establish the f_{NRB} values.

Condition as per para 13:

If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of:

- (i) *total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and*
- (ii) *most recent available observed annual rate of deforestation (ha/yr).*

If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for the higher value for NRB.

Justification: Refer below for details:

In line with para 13, the NRB was compared to the product of average aboveground biomass (46.36 t/ha), (FAO GFRA 2020, Mali, Section 2c), page 43, values considered for year 2020) and the long-term annual deforestation data (100,000 ha/yr²⁸). NRB calculated was found to be greater than the cross-check results based on deforestation. It is expected that the cross-check estimate of biomass loss from deforestation could underestimate the extent of non-renewable biomass as it only considers the average biomass stocks from completely deforested areas. Unsustainable wood harvesting resulting in forest degradation and substantial reductions in biomass stocks, but not complete deforestation is not considered in the cross-check.

As per the GFRA 2020, Mali, page 22, there has been no deforestation in the country for the year 2015-2020. Thus, a comparison of loss rate of forests * AGB with NRB established over the entire country (considering forest area, and other wooded land area) is not deemed appropriate in absence of reliable data on rate and extent of deforestation in Mali.

Madagascar
Applicability Condition as per para 3:

This tool may be used by:

- a) *DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or*
- b) *project participants to calculate project or PoA-specific f_{NRB} values.*

Justification: A project specific f_{NRB} value is being calculated.

Condition as per para 5:

Project participants and DNAs shall identify and clearly delineate the applicable area for which f_{NRB} is determined. For project- or PoA-specific f_{NRB} values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific f_{NRB} values, DNAs shall specify the applicable area.

Justification: Given the project boundary is geographical boundary of Madagascar and the ICSs implemented under the project shall be distributed across Madagascar, hence the applicable area being considered is Madagascar and the f_{NRB} value has been calculated for the same.

Condition as per para 6:

Project participants and DNAs may choose between the following two options to determine the value of f_{NRB} :

- a) *Use the default value as provided in TOOL33; or*

²⁸ https://worldrainforests.com/deforestation/forest-information-archive/Mali.htm#google_vignette

b) Calculate f_{NRB} by determining the share of renewable and non-renewable woody biomass in the total quantity of wood biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for f_{NRB} reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least:

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

Justification: PP has opted option (b) to determine the value of f_{NRB} . The values that have been used in the calculation of f_{NRB} are directly sourced from latest publicly available, relevant scientific literature. Given the PP has not used any self-collected data, but directly sourced values from scientific published literature, hence a comparison with other sources is not deemed applicable. A detailed description of the data sources and values considered for determining f_{NRB} is presented in below section.

Further, para 6b) of tool 30 v 4.0 requires comparison of the calculated f_{NRB} value with other scientific literature wherein the literature **should (and not shall)**, and hence is not deemed mandatory for use) at least include the following:

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

An assessment of the aforesaid literature (Bailis et.al) yielded the following:

- (i) The report is dated 2015 and does not present a recent scenario in Madagascar truly. Further, para 10 of the CDM Tool 30 v.4.0 clearly mentions that “in case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available.” Given the PP has calculated f_{NRB} using more recent reports providing data vintages for 2020-21/22, hence its comparison with the aforesaid report (Bailis et. al.) being vintaged 2015 is not deemed appropriate.
- (ii) The aforesaid report (Bailis et. al.) under table 1 (page 12), cites the source of data used for determining the fuelwood consumption in urban and rural parts of a country. For Madagascar specifically, the source used is FAO (reference # 8), as specified on page 45 of this report, is FAOSTAT. Forestry production and trade, <http://faostat3.fao.org/faostatgateway/go/to/download/F/*/E> (2013). Thus, this source necessarily does not reflect the most recent information on fuel consumption in the host country.
- (iii) Similarly, for non-energy use (domestic uses like houses, fencing etc.) consumption, the report (Bailis et. al.) states the following (page 13):
 - a) The consumption of construction material for fences, stables, rural houses construction and maintenance ranges between 5 and 20 kg per capita and per year. In this study, a mid-range value of 11 kg per capita year is applied to the rural population. This average is based on references (21, 29 and 33) of the report (Bailis et. al.) as listed on page 45-46. These three references pertain to Rwanda, Mozambique and Sudan respectively and hence are not deemed representative of Madagascar.
- (iv) Also, the inclusion of industrial roundwood consumption (specially for non-energy purposes) in determining the f_{NRB} is not stated in the report (Bailis et. al.) while para 17 of the CDM tool 30 v 4.0 clearly requires its inclusion.

Thus, the f_{NRB} calculation conducted by PP using relevant scientific literature is in compliance with para 6(b) of the CDM Tool 30, v 4.0.

Condition as per para 7:

The fraction of woody biomass that can be established as non-renewable is:

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

Equation (1)

Justification: The f_{NRB} calculated follows Equation (1) as above. Refer below for details:

Data Symbol	Parameter Description	Units	Value	Reference	Source
$F_{Forest,i}$	Extent of forest in the relevant period	ha	12,117,810	FAO Global Forest Resources Assessment 2020, Madagascar, (herein after referred as 'FAO GFRA 2020 Madagascar'), Section 1b), page 16, value considered for Forests in year 2020.	https://www.fao.org/3/cb0139fr/cb0139fr.pdf
$F_{Plantation Forest,i}$	Extent of Plantation forest in the relevant period	ha	312,000	FAO Global Forest Resources Assessment 2020, Madagascar, (herein after referred as 'FAO GFRA 2020 Madagascar'), Section 1b), page 16, value considered for Forests in year 2020.	https://www.fao.org/3/cb0139fr/cb0139fr.pdf
$F_{Other wooded land,i}$	Extent of other wooded land in the relevant period	ha	13,244,000	FAO Global Forest Resources Assessment 2020, Madagascar, (herein after referred as 'FAO GFRA 2020 Madagascar'), Section 1a), page 11, value considered for Other wooded lands in year 2020.	https://www.fao.org/3/cb0139fr/cb0139fr.pdf
$P_{Forest,i}$	Forest area within Protected Areas	ha	4,973,000	Protected area in Madagascar as per FAO GFRA 2020, Madagascar, Section 3b), page 44 is reported to be 4,973,000 ha	https://www.fao.org/3/cb0139fr/cb0139fr.pdf
$F_{Forest,i} - P_{Forest,i}$	Forest area from where biomass can be sourced	ha	7,144,810	Calculated and as a conservative estimate all Protected areas are subtracted from Forest area, since its productivity is less when compared with plantations.	--
$MAI_{forest,i}$	Mean Annual Increment of woody biomass growth per hectare in	m ³ /ha/year	0.40	As per the World Bank report, page number 26 reports that wood annual increment for all	https://documents1.worldbank.org/curated/en/1273314682991

	forest land for the relevant period			Madagascar forests is 0.4 m ³ per hectare per year.	52929/pdf/multi0page.pdf
MAI Plantation forest, I	Mean Annual Increment of woody biomass growth per hectare in plantation forest land for the relevant period	m ³ /ha/year	10.00	As per the World Bank report, page number 26 reports that wood annual increment for all Madagascar Plantation forests is 10 t per hectare per year.	
MAI other wooded lands, I	Mean Annual Increment of woody biomass growth per hectare in other wooded land for the relevant period	m ³ /ha/year	0.40	Considered same as that of forest as a conservative estimate	
RB	Annual Renewable Biomass	m ³ /year	11,275,524	$RB = \sum (MAI_{forest,j} \times (F_{forest,j} - P_{forest,j})) + \sum (MAI_{other,j} \times (F_{other,j} - P_{other,j}))$	Calculated, as per equation (4), para 19 of applied tool
H	Total consumption of woody biomass	m ³ /year	30,451,000	Sourced from UN data, the total woody biomass consumption in Madagascar (total Fuelwood energy supply) for year 2021/2022	http://data.un.org/Data.aspx?d=EDATA&f=cmlD%3aFW
NRB = H - RB	Non-renewable Biomass	m ³ /year	19,175,476	Calculated	--
f_{NRB} = NRB / (NRB + RB)	Fraction of non-renewable biomass	%	62.97%	Calculated	--

Condition as per para 8:

The relevant period should be one year, unless the methodology referring to this tool specifies otherwise.

Justification: The f_{NRB} calculated is based on data vintage 2020/2021 and represents one year.
Condition as per para 9: <i>The value of f_{NRB} for the applicable area shall be calculated using either of the two following options:</i> a) <i>Ex ante: the f_{NRB} value is determined once at the validation stage, thus no monitoring and recalculation of the f_{NRB} value during the crediting period is required;</i> b) <i>Ex post: the $f_{NRB,y}$ value is determined for the year y in the crediting period, requiring the f_{NRB} value to be updated annually, following a consistent calculation procedure throughout the crediting period.</i>
Justification: The f_{NRB} calculated is being fixed ex-ante.
Condition as per para 10: <i>In the case of ex ante calculation of f_{NRB}, the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of f_{NRB}, the parameter f_{NRB} shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB}. Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB}).</i>
Justification: The f_{NRB} is being calculated ex-ante. As per above, the data vintage used is most recent available, pertaining to 2020-21.
Condition as per para 11: <i>The quantity of non-renewable biomass consumed in the applicable area (NRB) shall be determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):</i> $NRB = H - RB \quad \text{Equation (2)}$
Justification: The NRB has been calculated using above equation. Refer information under the “condition as per para 7” above.
Condition as per para 12: <i>Cubic meters (m^3) instead of tonnes (t) of wood may be used for estimation of f_{NRB} values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both the total consumption of woody biomass (H) and the renewable biomass available (RB).</i>
Justification: The total consumption of woody biomass (H) and the renewable biomass available (RB) both are using cubic meters as the unit. The total woody biomass consumption is sourced from UN Data (http://data.un.org/Data.aspx?d=EDATA&f=cmlID%3aFW) and is presented in cubic meters. For renewable biomass estimations, the Mean Annual Increment (MAI) values ($m^3/ha/year$) under different land use categories are multiplied with the respective land areas (ha). Hence, both the values are having same units and can be used to establish the f_{NRB} values.
Condition as per para 13: <i>If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of:</i> (i) <i>total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and</i> (ii) <i>most recent available observed annual rate of deforestation (ha/yr).</i>

If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for the higher value for NRB.

Justification: Refer below for details:

Parameter	Value	Unit	Reference	Source
Average net forest lost per year	256,225.1287	ha/year	As per the Earthmap Data	Earth Map
Above Ground Biomass for Madagascar as per GFRA	163.2	tonnes/ha	FAO GFRA 2020 Madagascar Section 2c), page 36, values considered for year 2020	https://www.fao.org/3/cb0139fr/cb0139fr.pdf
AGB lost per year	41,815,941	tonnes	Calculated	--
AGB lost per year	71,951,281	m ³	Applying a density factor of 0.581, calculated as average of 282 tree species in Tropical Africa	http://www.fao.org/3/W4095E/w4095e0c.htm
Estimated NRB in the fNRB calculations	19,175,476	m ³	The Estimated NRB is less than the AGB lost per year (based on deforestation rate and AGB/Ha), substantiating that the value of fNRB established by the project is highly conservative.	--
Check for para 13 compliance	Para 13 compliance met	--	Calculated	--

Since the estimated NRB value is less than the value calculated as per the product of biomass and deforestation rate. Hence the estimated NRB is less than the AGB lost per year (based on deforestation rate and AGB/Ha), substantiating that the value of fNRB established by the project is highly conservative.

Senegal

Applicability Condition as per para 3:

This tool may be used by:

- DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or*
- project participants to calculate project or PoA-specific f_{NRB} values.*

Justification: A project specific f_{NRB} value is being calculated.

Condition as per para 5:

Project participants and DNAs shall identify and clearly delineate the applicable area for which f_{NRB} is determined. For project- or PoA-specific f_{NRB} values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific f_{NRB} values, DNAs shall specify the applicable area.

Justification: Given the project boundary is geographical boundary of Senegal and the ICSs implemented under the project shall be distributed across Senegal, hence the applicable area being considered is Senegal and the f_{NRB} value has been calculated for the same.

Condition as per para 6:

Project participants and DNAs may choose between the following two options to determine the value of f_{NRB} :

- a) *Use the default value as provided in TOOL33; or*
- b) *Calculate f_{NRB} by determining the share of renewable and non-renewable woody biomass in the total quantity of wood biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for f_{NRB} reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least:*
 - (i) *Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272.*

Justification: PP has opted option (b) to determine the value of f_{NRB} . The values that have been used in the calculation of f_{NRB} are directly sourced from latest publicly available, relevant scientific literature. Given the PP has not used any self-collected data, but directly sourced values from scientific published literature, hence a comparison with other sources is not deemed applicable. A detailed description of the data sources and values considered for determining f_{NRB} is presented in below section.

Further, para 6b) of tool 30 v 4.0 requires comparison of the calculated f_{NRB} value with other scientific literature wherein the literature **should (and not shall)**, and hence is not deemed mandatory for use) at least include the following:

- (i) Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272.

An assessment of the aforesaid literature (Bailis et.al) yielded the following:

- (i) The report is dated 2015 and does not present a recent scenario in Senegal truly. Further, para 10 of the CDM Tool 30 v.4.0 clearly mentions that “in case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available.” Given the PP has calculated f_{NRB} using more recent reports providing data vintages for 2020-21/22, hence its comparison with the aforesaid report (Bailis et. al.) being vintaged 2015 is not deemed appropriate.
- (ii) The aforesaid report (Bailis et. al.) under table 1 (page 12), cites the source of data used for determining the fuelwood consumption in urban and rural parts of a country. For Senegal specifically, the source used is FAO (reference # 8) and UN Data (reference #10), as specified on page 45 of this report, is FAOSTAT. Forestry production and trade, <http://faostat3.fao.org/faostatgateway/go/to/download/F/*/E> (2013) and UN Statistics Division. Energy Statistics Database, <<http://data.un.org/Explorer.aspx>> (2013). Thus, this source necessarily does not reflect the most recent information on fuel consumption in the host country.
- (iii) Similarly, for non-energy use (domestic uses like houses, fencing etc.) consumption, the report (Bailis et. al.) states the following (page 13):
 - a) The consumption of construction material for fences, stables, rural houses construction and maintenance ranges between 5 and 20 kg per capita and per year. In this study, a mid-range value of 11 kg per capita year is applied to the rural population. This average is based on references (21, 29 and 33) of the report (Bailis et. al.) as listed on page 45-46. These three references pertain to Rwanda,

- Mozambique and Sudan respectively and hence are not deemed representative of Senegal.
- (iv) Also, the inclusion of industrial roundwood consumption (specially for non-energy purposes) in determining the f_{NRB} is not stated in the report (Bailis et. al.) while para 17 of the CDM tool 30 v 4.0 clearly requires its inclusion.

Thus, the f_{NRB} calculation conducted by PP using relevant scientific literature is in compliance with para 6(b) of the CDM Tool 30, v 4.0.

Condition as per para 7:

The fraction of woody biomass that can be established as non-renewable is:

$$f_{NRB} = NRB / (NRB + RB) \quad \text{Equation (1)}$$

Justification: The f_{NRB} calculated follows Equation (1) as above. Refer below for details:

Data Symbol	Parameter Description	Units	Value	Reference	Source
$F_{Forest,i}$	Extent of forest in the relevant period	ha	8,068,160	FAO Global Forest Resources Assessment 2020, Senegal, (herein after referred as 'FAO GFRA 2020 Senegal'), Section 1b), page 09, value considered for Forests in year 2020.	https://www.fao.org/3/cb0152fr/cb0152fr.pdf
$F_{Other\ wooded\ land,i}$	Extent of other wooded land in the relevant period	ha	5,072,060	FAO Global Forest Resources Assessment 2020, Senegal, Section 1a), page 09, value considered for Other wooded lands in year 2020.	https://www.fao.org/3/cb0152fr/cb0152fr.pdf
$P_{Forest,i}$	Forest area within Protected Areas	ha	7,506,030	Protected area in Senegal as per FAO GFRA 2020, Senegal, Section 3b), page 39 is reported to be 7,506,030 ha	https://www.fao.org/3/cb0152fr/cb0152fr.pdf
$F_{Forest,i} - P_{Forest,i}$	Forest area from where biomass can be sourced	ha	562,130	Calculated and as a conservative estimate, areas under long term management plan have not been considered as Protected areas	--
$MAI_{forest,i}$	Mean Annual Increment of woody biomass	m ³ /ha/y ear	0.68	As per the US AID report, page number 125 reports that wood annual increment for all Senegal	https://pdf.usaid.gov/pdf_docs/PNAAW775.pdf

	growth per hectare in forest land for the relevant period			forests is 0.16 to 1.2 m ³ per hectare per year.	
MAI other wooded lands, I	Mean Annual Increment of woody biomass growth per hectare in other wooded land for the relevant period	m ³ /ha/year	0.68	Considered same as that of forest as a conservative estimate	
RB	Annual Renewable Biomass	m ³ /year	3,831,249	$RB = \sum (MAI_{forest,j} \times (F_{forest,j} - P_{forest,j})) + \sum (MAI_{other,j} \times (F_{other,j} - P_{other,j}))$	Calculated, as per equation (4), para 19 of applied tool
H	Total consumption of woody biomass	m ³ /year	8,397,000	Sourced from UN data, the total woody biomass consumption in Senegal (total Fuelwood energy supply) for year 2021	http://data.un.org/Data.aspx?d=EDATA&f=cmlID%3aFW
NRB = H - RB	Non-renewable Biomass	m ³ /year	4,565,751	Calculated	--
f_{NRB} = NRB / (NRB + RB)	Fraction of non-renewable biomass	%	54.37%	Calculated	--

Condition as per para 8:

The relevant period should be one year, unless the methodology referring to this tool specifies otherwise.

Justification: The f_{NRB} calculated is based on data vintage 2020/2021 and represents one year.

Condition as per para 9:

The value of f_{NRB} for the applicable area shall be calculated using either of the two following options:

- Ex ante: the f_{NRB} value is determined once at the validation stage, thus no monitoring and recalculation of the f_{NRB} value during the crediting period is required;*
- Ex post: the f_{NRB,y} value is determined for the year y in the crediting period, requiring the f_{NRB} value to be updated annually, following a consistent calculation procedure throughout the crediting period.*

Justification: The f_{NRB} calculated is being fixed ex-ante.
Condition as per para 10: <i>In the case of ex ante calculation of f_{NRB}, the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of f_{NRB}, the parameter f_{NRB} shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB}. Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB}).</i>
Justification: The f_{NRB} is being calculated ex-ante. As per above, the data vintage used is most recent available, pertaining to 2020-21.
Condition as per para 11: <i>The quantity of non-renewable biomass consumed in the applicable area (NRB) shall be determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):</i> $NRB = H - RB \quad \text{Equation (2)}$
Justification: The NRB has been calculated using above equation. Refer information under the “condition as per para 7” above.
Condition as per para 12: <i>Cubic meters (m^3) instead of tonnes (t) of wood may be used for estimation of f_{NRB} values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both the total consumption of woody biomass (H) and the renewable biomass available (RB).</i>
Justification: The total consumption of woody biomass (H) and the renewable biomass available (RB) both are using cubic meters as the unit. The total woody biomass consumption is sourced from UN Data (http://data.un.org/Data.aspx?d=EDATA&f=cmID%3aFW) and is presented in cubic meters. For renewable biomass estimations, the Mean Annual Increment (MAI) values ($m^3/ha/year$) under different land use categories are multiplied with the respective land areas (ha). Hence, both the values are having same units and can be used to establish the f_{NRB} values.
Condition as per para 13: <i>If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of:</i> (i) <i>total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and</i> (ii) <i>most recent available observed annual rate of deforestation (ha/yr).</i> <i>If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for the higher value for NRB.</i>
Justification: Refer below for details: In line with para 13, the NRB was compared to the product of average aboveground biomass (44.25 t/ha), (FAO GFRA 2020, Senegal, Section 2c), page 32, values considered for year 2020) and the long-term annual deforestation data (40,000 ha/yr), (FAO GFRA 2020, Senegal, page 18). NRB calculated was found to be greater than the cross-check results based on deforestation. It is expected that the cross-check estimate of biomass loss from deforestation could underestimate the extent of non-renewable biomass as it only considers the average biomass stocks from completely deforested areas.

Unsustainable wood harvesting resulting in forest degradation and substantial reductions in biomass stocks, but not complete deforestation is not considered in the cross-check.

As per GFRA²⁹, Senegal has lost only 758 ha of tree cover in the year 2020. Thus, a comparison of loss rate of forests * AGB with NRB established over the entire country (considering forest area, and other wooded land area) is not deemed appropriate in absence of reliable data on rate and extent of deforestation in Senegal.

Cote D Ivoire

Applicability Condition as per para 3:

This tool may be used by:

- DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or*
- project participants to calculate project or PoA-specific f_{NRB} values.*

Justification: A project specific f_{NRB} value is being calculated.

Condition as per para 5:

Project participants and DNAs shall identify and clearly delineate the applicable area for which f_{NRB} is determined. For project- or PoA-specific f_{NRB} values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific f_{NRB} values, DNAs shall specify the applicable area.

Justification: Given the project boundary is geographical boundary of Cote D Ivoire and the ICSS implemented under the project shall be distributed across Cote D Ivoire, hence the applicable area being considered is Cote D Ivoire and the f_{NRB} value has been calculated for the same.

Condition as per para 6:

Project participants and DNAs may choose between the following two options to determine the value of f_{NRB} :

- Use the default value as provided in TOOL33; or*
- Calculate f_{NRB} by determining the share of renewable and non-renewable woody biomass in the total quantity of wood biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for f_{NRB} reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least:*
 - Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272.*

Justification: PP has opted option (b) to determine the value of f_{NRB} . The values that have been used in the calculation of f_{NRB} are directly sourced from latest publicly available, relevant scientific literature. Given the PP has not used any self-collected data, but directly sourced values from scientific published literature, hence a comparison with other sources is not deemed applicable. A detailed description of the data sources and values considered for determining f_{NRB} is presented in below section.

Further, para 6b) of tool 30 v 4.0 requires comparison of the calculated f_{NRB} value with other scientific literature wherein the literature **should (and not shall)**, and hence is not deemed mandatory for use) at least include the following:

²⁹ <https://www.globalforestwatch.org/dashboards/country/SEN/>

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

An assessment of the aforesaid literature (Bailis et.al) yielded the following:

- (i) The report is dated 2015 and does not present a recent scenario in Cote D Ivoire truly. Further, para 10 of the CDM Tool 30 v.4.0 clearly mentions that “in case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available.” Given the PP has calculated f_{NRB} using more recent reports providing data vintages for 2020-21/22, hence its comparison with the aforesaid report (Bailis et. al.) being vintaged 2015 is not deemed appropriate.
- (ii) The aforesaid report (Bailis et. al.) under table 1 (page 12), cites the source of data used for determining the fuelwood and charcoal consumption in country. For Cote D Ivoire specifically, the source used is IEA (reference # 9) as specified on page 45 of this report, is International Energy Agency. IEA World Energy Statistics and Balances, <<http://www.oecdilibrary.org/statistics>> (2013). Thus, this source necessarily does not reflect the most recent information on fuel consumption in the host country.
- (iii) Similarly, for non-energy use (domestic uses like houses, fencing etc.) consumption, the report (Bailis et. al.) states the following (page 13):
 - a) The consumption of construction material for fences, stables, rural houses construction and maintenance ranges between 5 and 20 kg per capita and per year. In this study, a mid-range value of 11 kg per capita year is applied to the rural population. This average is based on references (21, 29 and 33) of the report (Bailis et. al.) as listed on page 45-46. These three references pertain to Rwanda, Mozambique and Sudan respectively and hence are not deemed representative of Cote D Ivoire.
- (iv) Also, the inclusion of industrial roundwood consumption (specially for non-energy purposes) in determining the f_{NRB} is not stated in the report (Bailis et. al.) while para 17 of the CDM tool 30 v 4.0 clearly requires its inclusion.

Thus, the f_{NRB} calculation conducted by PP using relevant scientific literature is in compliance with para 6(b) of the CDM Tool 30, v 4.0.

Condition as per para 7:

The fraction of woody biomass that can be established as non-renewable is:

$$f_{NRB} = NRB / (NRB + RB) \quad \text{Equation (1)}$$

Justification: The f_{NRB} calculated follows Equation (1) as above. Refer below for details:

Data Segment	Assumption Parameters	Value	Unit	Reference	Source
RB Forests	Annual wood production (From Forests) in Côte-d'Ivoire	4,392,887.70	m ³	As per the report titled, "Rapport d'évaluation des documents clés de légalité pour l'exploitation du bois Cas des dix principaux producteurs de bois en Côte-d'Ivoire", page 7, the theoretical annual logging quota is	https://rem.org.uk/wp-content/uploads/2020/03/Rapport-dObservation-Ind%C3%A9pendante-sur-la-l%C3%A9galit%C3%A9-des-PEF-1.pdf

				estimated at 3,553,846.15 m³ for 387 operating perimeters (PEF) including 377 allocated and 305 authorized for operation, which represents 80.90% of the PEF allocated. Thus, the total annual production from Côte-d'Ivoire forest accounts to 4392887.70 m³/year or 4.39 million m³/year.	
F other wooded land	Extent of other wooded land in the relevant period	2,518,000.00	ha	FAO Global Forest Resources Assessment 2020, Côte-d'Ivoire, (herein after referred as 'FAO GFRA 2020 Côte-d'Ivoire'), Section 1a), page 07, value considered for year 2020	https://www.fao.org/3/cb0126fr/cb0126fr.pdf
MAI other wooded land	Mean Annual Increment of woody biomass growth per hectare in other wooded lands in the relevant period	0.90	tonnes/ha	As the savannas are the most dominant vegetation type besides forests in Côte-d'Ivoire, hence the value of Biomass growth in Tropical shrublands- Africa as reported in the IPCC guidelines, Chapter-4, Forest Land on page 4.35, is selected as the Mean Annual Increment value for other wooded land in Côte-d'Ivoire.	https://www.researchgate.net/figure/A-Distribution-of-the-major-vegetation-zones-in-Ivory-Coast-B-Location-of-the-study_fig1_287957097 https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch04_Forest%20Land.pdf
RB Other wooded land	Annual wood Production (from other wooded lands) in Côte-d'Ivoire	2,266,200.00	tonnes	This value is calculated based on product of MAI of other wooded land and extent of other wooded lands in the relevant period Côte-d'Ivoire	Calculated

RB	Annual wood production (Forests + other wooded lands) in Côte-d'Ivoire	4,819,215.48	tonnes	Thus, the total annual production of wood in Côte-d'Ivoire accounts to 4,819,215 tonnes/year or 4.8 million tonnes/year.	Calculated
H	Annual woody biomass consumption in Côte-d'Ivoire as reported in the UN data	35,164,000.00	m ³	Sourced from UN data, the total woody biomass consumption in Côte-d'Ivoire (Industrial (Energy, non-energy) and domestic use) for the year 2021	http://data.un.org/Data.aspx?d=EDA&f=cmlID%3aFW
		2,04,36,269.36	tonnes	Value converted to tonnes by applying the wood density of tree species found in Tropical Africa	Calculated
NRB	Non-renewable Biomass	1,56,17,053.88	tonnes	--	
--	f_{NRB}	76.42%	%	--	

Condition as per para 8:

The relevant period should be one year, unless the methodology referring to this tool specifies otherwise.

Justification: The f_{NRB} calculated is based on data vintage 2020/2021 and represents one year.

Condition as per para 9:

The value of f_{NRB} for the applicable area shall be calculated using either of the two following options:

- Ex ante: the f_{NRB} value is determined once at the validation stage, thus no monitoring and recalculation of the f_{NRB} value during the crediting period is required;*
- Ex post: the $f_{NRB,y}$ value is determined for the year y in the crediting period, requiring the f_{NRB} value to be updated annually, following a consistent calculation procedure throughout the crediting period.*

Justification: The f_{NRB} calculated is being fixed ex-ante.

Condition as per para 10:

In the case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of f_{NRB} , the parameter f_{NRB} shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB} . Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB}).

Justification: The f_{NRB} is being calculated ex-ante. As per above, the data vintage used is most recent available, pertaining to 2020-21.

Condition as per para 11:

The quantity of non-renewable biomass consumed in the applicable area (NRB) shall be determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):

$$NRB = H - RB \quad \text{Equation (2)}$$

Justification: The NRB has been calculated using above equation. Refer information under the “condition as per para 7” above.

Condition as per para 12:

Cubic meters (m³) instead of tonnes (t) of wood may be used for estimation of f_{NRB} values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both the total consumption of woody biomass (H) and the renewable biomass available (RB).

Justification: The total consumption of woody biomass (H) and the renewable biomass available (RB) both are using “tonnes” as the unit. The total woody biomass consumption is sourced from UN Data (<http://data.un.org/Data.aspx?d=EDATA&f=cmlID%3aFW>) and is presented in cubic meters, it is then multiplied with wood density of tree species present in Tropical Africa to convert into tonnes. For renewable biomass estimations, the Mean Annual Increment (MAI) values (tonnes/ha) under different land use categories are multiplied with the respective land areas (ha). Hence, both the values are having same units (tonnes) and can be used to establish the f_{NRB} values.

Condition as per para 13:

If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of:

- (i) *total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and*
- (ii) *most recent available observed annual rate of deforestation (ha/yr).*

If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for the higher value for NRB.

Justification: Refer below for details:

Parameter	Value	Unit	Reference	Source
Average net forest lost per year	175,000	ha/year	As per Global Forest Watch, Côte-d'Ivoire in 2023 lost 175 kha of natural forest, equivalent to 124 Mt of CO ₂ emissions	https://www.globalforestwatch.org/dashboards/country/CIV/?category=undefined
Above Ground Biomass for Côte-d'Ivoire as per GFRA	94.45	tonnes/ha	FAO GFRA 2020 Côte-d'Ivoire Section 2c), page 27, values considered for year 2020	https://www.fao.org/3/cb0126fr/cb0126fr.pdf
AGB lost per year	16,528,750	tonnes	Calculated	--
Estimated NRB in the f_{nrB} calculations	15,617,054	tonnes	The Estimated NRB is less than the AGB lost per year (based on deforestation rate and AGB/Ha),	--

			substantiating that the value of f_{NRB} established by the project is highly conservative.	
Check for para 13 compliance	Para 13 compliance met	--	Calculated	--

Since the estimated NRB value is less than the value calculated as per the product of biomass and deforestation rate. Hence the estimated NRB is less than the AGB lost per year (based on deforestation rate and AGB/Ha), substantiating that the value of f_{NRB} established by the project is highly conservative.

Democratic Republic of Congo

Applicability Condition as per para 3:

This tool may be used by:

- DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or*
- project participants to calculate project or PoA-specific f_{NRB} values.*

Justification: A project specific f_{NRB} value is being calculated.

Condition as per para 5:

Project participants and DNAs shall identify and clearly delineate the applicable area for which f_{NRB} is determined. For project- or PoA-specific f_{NRB} values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific f_{NRB} values, DNAs shall specify the applicable area.

Justification: Given the project boundary is geographical boundary of Democratic Republic of Congo and the ICSs implemented under the project shall be distributed across Democratic Republic of Congo, hence the applicable area being considered is Democratic Republic of Congo and the f_{NRB} value has been calculated for the same.

Condition as per para 6:

Project participants and DNAs may choose between the following two options to determine the value of f_{NRB} :

- Use the default value as provided in TOOL33; or*
- Calculate f_{NRB} by determining the share of renewable and non-renewable woody biomass in the total quantity of wood biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for f_{NRB} reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least:*
 - Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272.*

Justification: PP has opted option (b) to determine the value of f_{NRB} . The values that have been used in the calculation of f_{NRB} are directly sourced from latest publicly available, relevant scientific literature. Given the PP has not used any self-collected data, but directly sourced values from scientific published literature, hence a comparison with other sources is not deemed applicable. A detailed description of the data sources and values considered for determining f_{NRB} is presented in below section.

Further, para 6b) of tool 30 v 4.0 requires comparison of the calculated f_{NRB} value with other scientific literature wherein the literature **should (and not shall)**, and hence is not deemed mandatory for use) at least include the following:

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

An assessment of the aforesaid literature (Bailis et.al) yielded the following:

- (i) The report is dated 2015 and does not present a recent scenario in Democratic Republic of Congo truly. Further, para 10 of the CDM Tool 30 v.4.0 clearly mentions that “in case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available.” Given the PP has calculated f_{NRB} using more recent reports providing data vintages for 2020-21, hence its comparison with the aforesaid report (Bailis et. al.) being vintaged 2015 is not deemed appropriate.
- (ii) The aforesaid report (Bailis et. al.) under table 1 (page 12), cites the source of data used for determining the fuelwood and charcoal consumption in country. For Democratic Republic of Congo specifically, the source used is IEA (reference # 9) as specified on page 45 of this report, is International Energy Agency. IEA World Energy Statistics and Balances, <<http://www.oecdilibrary.org/statistics>> (2013). Thus, this source necessarily does not reflect the most recent information on fuel consumption in the host country.
- (iii) Similarly, for non-energy use (domestic uses like houses, fencing etc.) consumption, the report (Bailis et. al.) states the following (page 13):
 - a) The consumption of construction material for fences, stables, rural houses construction and maintenance ranges between 5 and 20 kg per capita and per year. In this study, a mid-range value of 11 kg per capita year is applied to the rural population. This average is based on references (21, 29 and 33) of the report (Bailis et. al.) as listed on page 45-46. These three references pertain to Rwanda, Mozambique and Sudan respectively and hence are not deemed representative of Democratic Republic of Congo.
- (iv) Also, the inclusion of industrial roundwood consumption (specially for non-energy purposes) in determining the f_{NRB} is not stated in the report (Bailis et. al.) while para 17 of the CDM tool 30 v 4.0 clearly requires its inclusion.

Thus, the f_{NRB} calculation conducted by PP using relevant scientific literature is in compliance with para 6(b) of the CDM Tool 30, v 4.0.

Condition as per para 7:

The fraction of woody biomass that can be established as non-renewable is:

$$f_{NRB} = NRB / (NRB + RB) \quad \text{Equation (1)}$$

Justification: The f_{NRB} calculated follows Equation (1) as above. Refer below for details:

Data Symbol	Parameter Description	Units	Value	Reference	Source
F Forest,i	Extent of forest in the relevant period	126,155,240	ha	https://www.fao.org/3/cb0125fr/cb0125fr.pdf	Page-8 of FRA, 2020, country report of DRC

F Other wooded land, <i>i</i>	Extent of other wooded land in the relevant period	11,512,000	ha	https://www.fao.org/3/cb0125fr/cb0125fr.pdf	Page-8 of FRA, 2020, country report of DRC
P Forest, <i>i</i>	Protected areas within forests	24,297,000	ha	https://www.fao.org/3/cb0125fr/cb0125fr.pdf	Page-32 of FRA, 2020, country report of DRC
F Forest, <i>i</i> - P Forest, <i>i</i>	Net area from which biomass can be sourced	113,370,240	ha	-	Calculated
MAI forest, <i>i</i>	Mean Annual Increment of woody biomass growth per hectare in forest areas in the relevant period	2	m ³ /ha/year	https://wedocs.unep.org/handle/20.500.11822/28515	Page 75 of the report, Review of Woodfuel Biomass Production and Utilization in Africa
Wood density	Density of wood in the reference region	0.581	tonnes/m ³	https://www.researchgate.net/publication/237339477_Wood_Densities_of_Tropical_Tree_Species	Calculated
t fuel collected	Time taken by people in DRC to collect fuelwood	3	hours	https://reliefweb.int/report/democratic-republic-congo/dr-congo-aid-workers-blog-how-fuel-efficient-stoves-can-help-women	Para 4 of the link
f accessible	Fraction of total area accessible for fuelwood collection	0.530	fraction	https://www.researchgate.net/publication/312021671_Pan-tropical_analysis_of_woodfuel_supply_demand_and_sustainability_2014	As per the Wisdom report, pg. 104, table A5.5
RB accessible	Annual accessible Renewable Biomass	69,840,651	tonnes/year	Calculated	-
Forest Loss , <i>y</i>	Forest loss in DRC for the year 2020	1,310,000	ha	https://www.globalforestwatch.org/da	Forest loss considered for the year 2020

				shboards/country/COD/	
AGB	Above Ground Biomass in DRC Forests	231	tonnes/ha	https://www.fao.org/3/cb0125fr/cb0125fr.pdf	Page-26 of FRA 2020, country report of DRC
H	Total biomass consumption in DRC	302,610,000	tonnes	Calculated	-
NRB = H - RB	Non-Renewable Biomass	232,769,349	tonnes	Calculated	-
$f_{NRB} = \frac{NRB}{NRB + RB}$	Fraction of non-renewable biomass	76.92%	%	Calculated	-

Condition as per para 8:

The relevant period should be one year, unless the methodology referring to this tool specifies otherwise.

Justification: The f_{NRB} calculated is based on data vintage 2020/2021 and represents one year.

Condition as per para 9:

The value of f_{NRB} for the applicable area shall be calculated using either of the two following options:

- Ex ante: the f_{NRB} value is determined once at the validation stage, thus no monitoring and recalculation of the f_{NRB} value during the crediting period is required;*
- Ex post: the $f_{NRB,y}$ value is determined for the year y in the crediting period, requiring the f_{NRB} value to be updated annually, following a consistent calculation procedure throughout the crediting period.*

Justification: The f_{NRB} calculated is being fixed ex-ante.

Condition as per para 10:

In the case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of f_{NRB} , the parameter f_{NRB} shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB} . Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB}).

Justification: The f_{NRB} is being calculated ex-ante. As per above, the data vintage used is most recent available, pertaining to 2020-21.

Condition as per para 11:

The quantity of non-renewable biomass consumed in the applicable area (NRB) shall be determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):

$$NRB = H - RB \quad \text{Equation (2)}$$

Justification: The NRB has been calculated using above equation. Refer information under the "condition as per para 7" above.

Condition as per para 12:

Cubic meters (m^3) instead of tonnes (t) of wood may be used for estimation of f_{NRB} values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both the total consumption of woody biomass (H) and the renewable biomass available (RB).

Justification: The total consumption of woody biomass (H) and the renewable biomass available (RB) both are using “tonnes” as the unit. The total woody biomass consumption is calculated in tonnes. For renewable biomass estimations, the Mean Annual Increment (MAI) values ($m^3/ha/year$) under different land use categories are multiplied with the respective land areas (ha) and with wood density of Tropical Africa Tree species. Hence, both the values are having same units (tonnes) and can be used to establish the f_{NRB} values.

Condition as per para 13:

If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of:

- (i) *total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and*
- (ii) *most recent available observed annual rate of deforestation (ha/yr).*

If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for the higher value for NRB.

Justification: Refer below for details:

Since the estimated NRB value (232,769,349 tonnes) is less than the value calculated as per the product of biomass and deforestation rate (302,610,000 tonnes). Hence the estimated NRB is less than the AGB lost per year (based on deforestation rate and AGB/Ha), substantiating that the value of f_{NRB} established by the project is highly conservative.

Zambia
Applicability Condition as per para 3:

This tool may be used by:

- a) *DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or*
- b) *project participants to calculate project or PoA-specific f_{NRB} values.*

Justification: A project specific f_{NRB} value is being calculated.

Condition as per para 5:

Project participants and DNAs shall identify and clearly delineate the applicable area for which f_{NRB} is determined. For project- or PoA-specific f_{NRB} values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific f_{NRB} values, DNAs shall specify the applicable area.

Justification: Given the project boundary is geographical boundary of Zambia and the ICSs implemented under the project shall be distributed across Zambia, hence the applicable area being considered is Zambia and the f_{NRB} value has been calculated for the same.

Condition as per para 6:

Project participants and DNAs may choose between the following two options to determine the value of f_{NRB} :

- a) *Use the default value as provided in TOOL33; or*
- b) *Calculate f_{NRB} by determining the share of renewable and non-renewable woody biomass in the total quantity of wood biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for f_{NRB} reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least:*
 - (i) *Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272.*

Justification: PP has opted option (b) to determine the value of f_{NRB} . The values that have been used in the calculation of f_{NRB} are directly sourced from latest publicly available, relevant scientific literature. Given the PP has not used any self-collected data, but directly sourced values from scientific published literature, hence a comparison with other sources is not deemed applicable. A detailed description of the data sources and values considered for determining f_{NRB} is presented in below section.

Further, para 6b) of tool 30 v 4.0 requires comparison of the calculated f_{NRB} value with other scientific literature wherein the literature **should (and not shall)**, and hence is not deemed mandatory for use) at least include the following:

- (i) Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272.

An assessment of the aforesaid literature (Bailis et.al) yielded the following:

- (i) The report is dated 2015 and does not present a recent scenario in Zambia truly. Further, para 10 of the CDM Tool 30 v.4.0 clearly mentions that “in case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available.” Given the PP has calculated f_{NRB} using more recent reports, hence its comparison with the aforesaid report (Bailis et. al.) being vintaged 2015 is not deemed appropriate.
- (ii) The aforesaid report (Bailis et. al.) under table 1 (page 13), cites the source of data used for determining the fuelwood and charcoal consumption in country. For Zambia specifically, the source used is IEA (reference # 9) as specified on page 45 of this report, is International Energy Agency. IEA World Energy Statistics and Balances, <<http://www.oecdilibrary.org/statistics>> (2013). Thus, this source necessarily does not reflect the most recent information on fuel consumption in the host country.
- (iii) Similarly, for non-energy use (domestic uses like houses, fencing etc.) consumption, the report (Bailis et. al.) states the following (page 13):
 - a) The consumption of construction material for fences, stables, rural houses construction and maintenance ranges between 5 and 20 kg per capita and per year. In this study, a mid-range value of 11 kg per capita year is applied to the rural population. This average is based on references (21, 29 and 33) of the report (Bailis et. al.) as listed on page 45-46. These three references pertain to Rwanda, Mozambique and Sudan respectively and hence are not deemed representative of Zambia.
- (iv) Also, the inclusion of industrial roundwood consumption (specially for non-energy purposes) in determining the f_{NRB} is not stated in the report (Bailis et. al.) while para 17 of the CDM tool 30 v 4.0 clearly requires its inclusion.

Thus, the f_{NRB} calculation conducted by PP using relevant scientific literature is in compliance with para 6(b) of the CDM Tool 30, v 4.0.

Condition as per para 7:

The fraction of woody biomass that can be established as non-renewable is:

$$f_{NRB} = NRB / (NRB + RB) \quad \text{Equation (1)}$$

Justification: The f_{NRB} calculated follows Equation (1) as above. Refer below for details:

Data Symbol	Parameter Description	Units	Value	Reference	Source
$F_{Forest,i}$	Extent of forest in the relevant period	ha	44,814,030	FAO Global Forest Resources Assessment 2020, Zambia, (herein after referred as 'FAO GFRA 2020 Zambia'), Section 1a), page 10, value considered for Forests in year 2020.	https://www.fao.org/3/cb0092en/cb0092en.pdf
$F_{Other\ wooded\ land,i}$	Extent of other wooded land in the relevant period	ha	13,219,000	FAO Global Forest Resources Assessment 2020, Zambia, (herein after referred as 'FAO GFRA 2020 Zambia'), Section 1a), page 10, value considered for Other wooded lands in year 2020.	https://www.fao.org/3/cb0092en/cb0092en.pdf
$P_{Forest,i}$	Forest area within Protected Areas	ha	31,831,000	Protected area in Zambia as per FAO GFRA 2020, Zambia, Section 3b), page 34 is reported to be 31,831,000 ha	https://www.fao.org/3/cb0092en/cb0092en.pdf
$F_{Forest,i} - P_{Forest,i}$	Forest area from where biomass can be sourced	ha	12,983,030	Calculated	--
$MAI_{forest,i}$	Mean Annual Increment of woody biomass growth per hectare in forest land for	tonnes/ha/year	2.00	As per the report titled, "Zambia country profile Monitoring, reporting and verification for REDD+", section 3.1.1 on page number 18 reports that wood annual increment for	https://www.cicraf.org/publications/pdf_files/OccPapers/OP-113.pdf

	the relevant period			all Zambian forests is 1.3– 2.7 t per hectare per year.	
MAI other wooded lands, ¹	Mean Annual Increment of woody biomass growth per hectare in forest land for the relevant period	tonnes/ha/year	2.00	Considered same as that of forest as a conservative estimate	
RB	Annual Renewable Biomass	tonnes/ha/year	52,404,060	$RB = \sum (MAI_{forest,j} \times (F_{forest,j} - P_{forest,j})) + \sum (MAI_{other,j} \times (F_{other,j} - P_{other,j}))$	Calculated, as per equation (4), para 19 of applied tool
RB	Annual Renewable Biomass	m ³ /year	90,169,900		
H	Total consumption of woody biomass	m ³ /year	451,577,000	As per the report titled, "Natural Capital Accounts for Forests 2010 to 2015", dated March, 2020 by Ministry of Lands and Natural Resources Forestry Department, Republic of Zambia, page 7, the long time average of Total wood extracted in Zambia for the year 2010 to 2015.	https://seea.un.org/content/natural-capital-accounts-forests-2010-2015-first-results-and-next-steps-republic-zambia
NRB = H- RB	Non-renewable Biomass	m ³ /year	361,407,100	Calculated	--
f_{NRB} = NRB/ NRB + RB	Fraction of non-renewable biomass	%	80.03%	Calculated	--

Condition as per para 8:

The relevant period should be one year, unless the methodology referring to this tool specifies otherwise.

Justification: The f_{NRB} calculated is based on data vintage 2020 and represents one year.

Condition as per para 9:

The value of f_{NRB} for the applicable area shall be calculated using either of the two following options:

- a) Ex ante: the f_{NRB} value is determined once at the validation stage, thus no monitoring and recalculation of the f_{NRB} value during the crediting period is required;*
- b) Ex post: the $f_{NRB,y}$ value is determined for the year y in the crediting period, requiring the f_{NRB} value to be updated annually, following a consistent calculation procedure throughout the crediting period.*

Justification: The f_{NRB} calculated is being fixed ex-ante.

Condition as per para 10:

In the case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of f_{NRB} , the parameter f_{NRB} shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB} . Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB}).

Justification: The f_{NRB} is being calculated ex-ante. As per above, the data vintage used is most recent available, pertaining to 2020-21.

Condition as per para 11:

The quantity of non-renewable biomass consumed in the applicable area (NRB) shall be determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):

$$NRB = H - RB \quad \text{Equation (2)}$$

Justification: The NRB has been calculated using above equation. Refer information under the “condition as per para 7” above.

Condition as per para 12:

Cubic meters (m^3) instead of tonnes (t) of wood may be used for estimation of f_{NRB} values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both the total consumption of woody biomass (H) and the renewable biomass available (RB).

Justification: The total consumption of woody biomass (H) and the renewable biomass available (RB) both are using “ m^3 ” as the unit. The total woody biomass consumption is present in m^3 . For renewable biomass estimations, the Mean Annual Increment (MAI) values (tonnes/ha/year) under different land use categories are multiplied with the respective land areas (ha) and the divided with wood density of Tropical African tree species to obtain the value in m^3 . Hence, both the values are having same units (m^3) and can be used to establish the f_{NRB} values.

Condition as per para 13:

If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of:

- (i) total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and*
- (ii) most recent available observed annual rate of deforestation (ha/yr).*

If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for the higher value for NRB.

Justification: Refer below for details:

In line with para 13, the NRB was compared to the product of average aboveground biomass (44.0 t/ha), FAO GFRA 2020, Zambia, Section 2c, page 29, values considered for year 2020 and the long-term annual deforestation data (189,710 ha/yr), (FAO GFRA 2020, Zambia, page 17, table 1d). NRB calculated was found to be greater than the cross-check results based on deforestation. It is expected that the cross-check estimate of biomass loss from deforestation could underestimate the extent of non-renewable biomass as it only considers the average biomass stocks from completely deforested areas. Unsustainable wood harvesting resulting in forest degradation and substantial reductions in biomass stocks, but not complete deforestation is not considered in the cross-check.

Uganda

Applicability Condition as per para 3:

This tool may be used by:

- DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or*
- project participants to calculate project or PoA-specific f_{NRB} values.*

Justification: A project specific f_{NRB} value is being calculated.

Condition as per para 5:

Project participants and DNAs shall identify and clearly delineate the applicable area for which f_{NRB} is determined. For project- or PoA-specific f_{NRB} values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific f_{NRB} values, DNAs shall specify the applicable area.

Justification: Given the project boundary is geographical boundary of Uganda and the ICSs implemented under the project shall be distributed across Uganda, hence the applicable area being considered is Uganda and the f_{NRB} value has been calculated for the same.

Condition as per para 6:

Project participants and DNAs may choose between the following two options to determine the value of f_{NRB} :

- Use the default value as provided in TOOL33; or*
- Calculate f_{NRB} by determining the share of renewable and non-renewable woody biomass in the total quantity of wood biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for f_{NRB} reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least:*
 - Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272.*

Justification: PP has opted option (b) to determine the value of f_{NRB} . The values that have been used in the calculation of f_{NRB} are directly sourced from latest publicly available, relevant scientific literature. Given the PP has not used any self-collected data, but directly sourced values from scientific published literature, hence a comparison with other sources is not deemed applicable. A detailed description of the data sources and values considered for determining f_{NRB} is presented in below section.

Further, para 6b) of tool 30 v 4.0 requires comparison of the calculated f_{NRB} value with other scientific literature wherein the literature **should (and not shall)**, and hence is not deemed mandatory for use) at least include the following:

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

An assessment of the aforesaid literature (Bailis et.al) yielded the following:

- (i) The report is dated 2015 and does not present a recent scenario in Uganda truly. Further, para 10 of the CDM Tool 30 v.4.0 clearly mentions that “in case of ex ante calculation of f_{NRB} , the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available.” Given the PP has calculated f_{NRB} using more recent reports, hence its comparison with the aforesaid report (Bailis et. al.) being vintaged 2015 is not deemed appropriate.
- (ii) The aforesaid report (Bailis et. al.) under table 1 (page 12), cites the source of data used for determining the fuelwood and charcoal consumption in country. For Uganda specifically, the source used is FAOSTAT (reference # 8) as specified on page 45 of this report is, FAOSTAT. Forestry production and trade, <http://faostat3.fao.org/faostatgateway/go/to/download/F/*E> (2013). Thus, this source necessarily does not reflect the most recent information on fuel consumption in the host country.
- (iii) Similarly, for non-energy use (domestic uses like houses, fencing etc.) consumption, the report (Bailis et. al.) states the following (page 13):
 - a) The consumption of construction material for fences, stables, rural houses construction and maintenance ranges between 5 and 20 kg per capita and per year. In this study, a mid-range value of 11 kg per capita year is applied to the rural population. This average is based on references (21, 29 and 33) of the report (Bailis et. al.) as listed on page 45-46. These three references pertain to Rwanda, Mozambique and Sudan respectively and hence are not deemed representative of Uganda.
- (iv) Also, the inclusion of industrial roundwood consumption (specially for non-energy purposes) in determining the f_{NRB} is not stated in the report (Bailis et. al.) while para 17 of the CDM tool 30 v 4.0 clearly requires its inclusion.

Thus, the f_{NRB} calculation conducted by PP using relevant scientific literature is in compliance with para 6(b) of the CDM Tool 30, v 4.0.

Condition as per para 7:

The fraction of woody biomass that can be established as non-renewable is:

$$f_{NRB} = NRB / (NRB + RB) \quad \text{Equation (1)}$$

Justification: The f_{NRB} calculated follows Equation (1) as above. Refer below for details:

Data Symbol	Parameter Description	Units	Value	Reference	Source
F Forest,i	Extent of forest in the relevant period	ha	1,872,750	FAO Global Forest Resources Assessment 2020, Uganda, (herein after referred as 'FAO GFRA 2020 Uganda'), Section 1b), page 11, value	https://www.fao.org/3/cb0084en/cb0084en.pdf
F Plantation Forest,i	Extent of plantation forest in the relevant period	ha	465,160		

				considered for year 2020	
F Other wooded land,i	Extent of other wooded land in the relevant period	ha	3,234,322	FAO GFRA 2020, Uganda, Section 1a), page 8, value considered for year 2020.	https://www.fao.org/3/cb0084en/cb0084en.pdf
P Protected,i	Total extent of Protected areas in Uganda	ha	1,079,600	Protected area in Uganda as per FAO GFRA 2020, Uganda, Section 3b), page 31 is missing. Hence the value is sourced from FAO GFRA 2015, Table 6, page 53 of the report, value considered for the year 2015	https://openknowledge.fao.org/server/api/core/bitstreams/aa3fface-f56b-4031-800c-bdc145cc949d/content
P Forest,i	Forest area within Protected Areas	ha	731,000		
P Other Lands,i	Other land area within Protected Areas	ha	348,600	Calculated	--
F Forest,i - P Forest,i	Forest area from where biomass can be sourced	ha	1,141,750	Calculated	--
F Other wooded land,i - P Other wooded land,i	Other wooded land area from where biomass can be sourced	ha	2,885,722	Calculated	--
MAI forest,i	Mean Annual Increment of woody biomass growth per hectare in forest land for the relevant period	m ³ /ha/year	2	As per the report titled ,"Forestry and Macroeconomic Accounts of Uganda: The Importance of Linking Ecosystem Services to Macroeconomics, page 10 ,"The usable roundwood (or weighted average mean annual increment (MAI)) of the total forest estate of Uganda is estimated at 2 m ³ /ha/a. Planted forests in Uganda however can achieve	https://www.ucclearn.org/wp-content/uploads/library/uganda_forest_technical_report_mailversion-1_ok.pdf
MAI Plantation forest,i	Mean Annual Increment of woody biomass growth per hectare in plantation forest areas in the relevant period	m ³ /ha/year	24		

				MAIs of up to 24 m ³ /ha/a.	
MAI other wooded lands, _i	Mean Annual Increment of woody biomass growth per hectare in other wooded lands in the relevant period	m ³ /ha/year	2	As a conservative estimate, MAI value for other wooded land is considered same as that of the forest estate	--
RB	Annual Renewable Biomass	m ³ /year	19,218,784	$RB = \sum (MAI_{forest,j} \times (F_{forest,j} - P_{forest,j})) + \sum (MAI_{other,j} \times (F_{other,j} - P_{other,j}))$	Calculated, as per equation (4), para 19 of applied tool
H	Total consumption of woody biomass	m ³ /year	73,441,000	Sourced from UN data, the total woody biomass consumption in Uganda (total Fuelwood energy supply) for year 2022	http://data.un.org/Data.aspx?d=EDATA&f=cmID%3aFW
NRB = H - RB	Non-renewable Biomass	m ³ /year	54,222,216	Calculated	--
f_{NRB} = NRB / (NRB + RB)	Fraction of non-renewable biomass	%	73.83%	Calculated	--

Condition as per para 8:

The relevant period should be one year, unless the methodology referring to this tool specifies otherwise.

Justification: The f_{NRB} calculated is based on data vintage 2020-2021 and represents one year.

Condition as per para 9:

The value of f_{NRB} for the applicable area shall be calculated using either of the two following options:

- Ex ante: the f_{NRB} value is determined once at the validation stage, thus no monitoring and recalculation of the f_{NRB} value during the crediting period is required;*
- Ex post: the f_{NRB,y} value is determined for the year y in the crediting period, requiring the f_{NRB} value to be updated annually, following a consistent calculation procedure throughout the crediting period.*

Justification: The f_{NRB} calculated is being fixed ex-ante.

Condition as per para 10:

In the case of ex ante calculation of f_{NRB}, the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available. In the case of ex-post calculation of f_{NRB}, the parameter f_{NRB} shall be estimated for the applicable year y of the crediting period. Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB}. Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB}).

Justification: The f_{NRB} is being calculated ex-ante. As per above, the data vintage used is most recent available, pertaining to 2020-21.

Condition as per para 11:

The quantity of non-renewable biomass consumed in the applicable area (NRB) shall be determined as the difference between the total consumption of woody biomass in the applicable area (H) and the quantity of renewable biomass that can be sustainably harvested in the applicable area (RB):

$$NRB = H - RB \quad \text{Equation (2)}$$

Justification: The NRB has been calculated using above equation. Refer information under the “condition as per para 7” above.

Condition as per para 12:

Cubic meters (m³) instead of tonnes (t) of wood may be used for estimation of f_{NRB} values, as long as the same unit and the same conversion factor (e.g. wood density, moisture content) are consistently used for estimation of both the total consumption of woody biomass (H) and the renewable biomass available (RB).

Justification: The total consumption of woody biomass (H) and the renewable biomass available (RB) both are using “m³” as the unit. Hence, both the values are having same units and can be used to establish the f_{NRB} values.

Condition as per para 13:

If the f_{NRB} value is estimated at the national level, as a cross check, project proponent shall compare the value of estimated NRB with the product of:

- (i) *total average above ground biomass tonnage of the area of forest areas deforested in recent past (tonnes/ha), and*
- (ii) *most recent available observed annual rate of deforestation (ha/yr).*

If the estimated NRB value is more than 10% above the value calculated as per the product of biomass and deforestation rate, justification shall be provided for the higher value for NRB.

Justification: Refer below for details:

In line with para 13, the NRB was compared to the product of average aboveground biomass (96.0 t/ha), FAO GFRA 2020, Uganda, Section 2c, page 25, values considered for year 2020 and the long-term annual deforestation data (51,090 ha/yr), (FAO GFRA 2020, Uganda, page 15, table 1d). NRB calculated was found to be greater than the cross-check results based on deforestation. It is expected that the cross-check estimate of biomass loss from deforestation could underestimate the extent of non-renewable biomass as it only considers the average biomass stocks from completely deforested areas. Unsustainable wood harvesting resulting in forest degradation and substantial reductions in biomass stocks, but not complete deforestation is not considered in the cross-check.