



3RD MONITORING REPORT: FUEL EFFICIENT COOKING IN SOUTH AFRICA



Document Prepared by TASC SA (PTY) LTD

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Prepared By	TASC SA (PTY) LTD.
Contact	TASC SA (PTY) LTD 22 Jamieson Road, Rondebosch, South Africa, 7700 +27 (0) 82 579 9611 shelley@tasc.je www.tasc.je

CONTENTS

1	PROJECT DETAILS.....	3
1.1	Summary Description of the Implementation Status of the Project.....	3
1.2	Sectoral Scope and Project Type	4
1.3	Project Proponent	5
1.4	Other Entities Involved in the Project	5
1.5	Project Start Date	6
1.6	Project Crediting Period.....	6
1.7	Project Location	7
1.8	Title and Reference of Methodology.....	8
1.9	Participation under other GHG Programs	8
1.10	Other Forms of Credit and Supply Chain (Scope 3) Emissions	8
1.11	Sustainable Development Contributions.....	9
2	SAFEGUARDS.....	13
2.1	No Net Harm.....	13
2.2	Local Stakeholder Consultation	13
3	IMPLEMENTATION STATUS	17
3.1	Implementation Status of the Project Activity.....	17
3.2	Deviations	19
3.3	Grouped Projects	20
4	DATA AND PARAMETERS.....	41
4.1	Data and Parameters Available at Validation	41
4.2	Data and Parameters Monitored.....	44
4.3	Monitoring Plan.....	51
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	57
5.1	Baseline Emissions	57
5.2	Project Emissions	57
5.3	Leakage	57
5.4	Net GHG Emission Reductions and Removals.....	57

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project Monitoring Report: VCS Version 4.2

This is the third monitoring report for the “Fuel Efficient Cooking in South Africa” (VCS ID 2505) Grouped Project (“GP”) by TASC, which is aimed at distributing fuel-efficient improved cookstoves (ICS) to local communities in South Africa, who rely on baseline open-fire wood-fuelled cooking. This monitoring report covers the period of 01 February 2023 to 31 July 2023 (01/02/2023 – 31/07/2023).

The ICS disseminated under this GP is based on rocket stove design principles, which reduce GHG emissions from biomass burning through improved combustion efficiency of wood fuel and decreased wood fuel consumption. The ICSs improve heat transfer to cooking pots through the insulated walls and design of the stove top when compared to traditional cooking methods over open- and three-stone fires. The ICSs directly decrease wood fuel demand and reduce the pressure on the ecosystem from wood cutting within the project boundary. When compared to three-stone fire cooking, a 30-50% saving of firewood has been reported for certain ICS models¹. The time spent collecting wood fuel is reduced, saving time for especially women to engage in other economic-driven activities.

Summary of the implemented activities: Three Project Instances (“PIs”) were implemented within the GP boundary during the monitoring period, namely Project Instance 1 – Kruger 2 Canyons (PI1-K2C), Project Instance 2 – Waterberg (PI2-WB), and Project Instance 3 – Vhembe (PI3-VH).

Across the three instances, 183,063 RocketWorks Zama Zama rocket stoves were distributed in this monitoring period. Since the project start date, a total of 625,926 ICS have been distributed.

Implementation dates: The first ICS was distributed on 20 August 2021. The total emission reductions from all the PIs in the GP during the second monitoring period are as follows:

GHG emission reductions in this monitoring period:

Total: 1,203,743 tCO₂e

Total in PI1-K2C²: 788,710 tCO₂e

¹ <https://www.engineeringforchange.org/solutions/product/zama-zama/#:~:text=The%20Zama%20Zama%20is%20a,reflective%20grade%20of%20stainless%20steel>

² Project Instance 1 – Kruger 2 Canyons

Total in PI2-WB³: 390,655 tCO₂e

Total in PI3-VH⁴: 24,378 tCO₂e

Audit Type	Period	Program	VVB Name	Number of years
Validation	08-November-2021	VCS	TÜV NORD CERT GmbH	-
Verification	20-August-2021 to 09-February-2022	VCS	Carbon Check (India) (Pty) Ltd	0.47
Verification	10-February-2022 to 31-January-2023	VCS	Carbon Check (India) (Pty) Ltd	0.97
Verification	01-February-2023 to 31-July-2023	VCS	Carbon Check (India) (Pty) Ltd	0.47
Total				1.91

1.2 Sectoral Scope and Project Type

Sectoral Scope: 03 – Energy demand

Type II – Energy efficiency improvement projects

The project is a Grouped Project that includes several Project Instances of the same project activity.

³ Project Instance 2 - Waterberg

⁴ Project Instance 3 - Vhembe

1.3 Project Proponent

Organization name	TASC SA (PTY) LTD
Contact person	Shelley Estcourt
Title	CEO
Address	22 Jamieson Road, Rondebosch, South Africa, 7700
Telephone	+27 (0) 82 579 9611
Email	shelley@tasc.je

1.4 Other Entities Involved in the Project

TASC SA (PTY) LTD. engaged with Implementation Partners for each PI.

For PI1-K2C and PI3-VH

Organization name	Kruger to Canyons Biosphere Region Non-Profit Company (K2C BR NPC)
Role in the Project	Instance implementation partner
Contact person	Marie-Tinka Uys
Title	Chief Operations Officer
Address	+27 (0) 82 551 7261 K2C Nodal Centre, Zandspruit Bush & Aero Estate, Hoedspruit, South Africa, 1380
Telephone	+27 (0) 82 551 7261
Email	info@kruger2canyons.org
Website	www.kruger2canyons.org

For PI2-WB

Organization name	Mogalakwena Training (Pty) Ltd
Role in the Project	Instance implementation partner
Contact person	Peter Coombes
Title	Chief Executive Officer
Address	357 Hartbees Street, Waterkloof Ridge, Pretoria, South Africa, 0181
Telephone	+27 (0)83 576 4287
Email	peterc@kwenatraining.co.za

1.5 Project Start Date

The start date of the GP is 20 August 2021. The PI start dates are as follows:

Project Instance	Project Instance Start Date
PI1-K2C	20-August-2021
PI2-WB	03-September-2021
PI3-VH	27-March-2023

1.6 Project Crediting Period

The crediting period for the GP is fixed for 10 years, from 20 August 2021 to 19 August 2031. All PIs are eligible for crediting from the start date of the instance through to the end date of the GP crediting period on 19 August 2031.

Project Instance	Crediting period start date	Crediting period end date
PI1-K2C	20-August-2021	19-August-2031
PI2-WB	03-September-2021	19-August-2031
PI3-VH	27-March-2023	19-August-2031

1.7 Project Location

The Grouped Project and the Project Instances are located within the geographic boundaries of the Republic of South Africa (Figure 1). A description of the boundaries for PI1-K2C can be found in the latest version of the PDD in Section 1.12, for PI2-WB can be found in Section 3.4.3 of the first monitoring report titled “1st Monitoring Report: Fuel Efficient Cooking in South Africa”⁵, and for PI3-VH is described in Section 3.3.3 of this report.

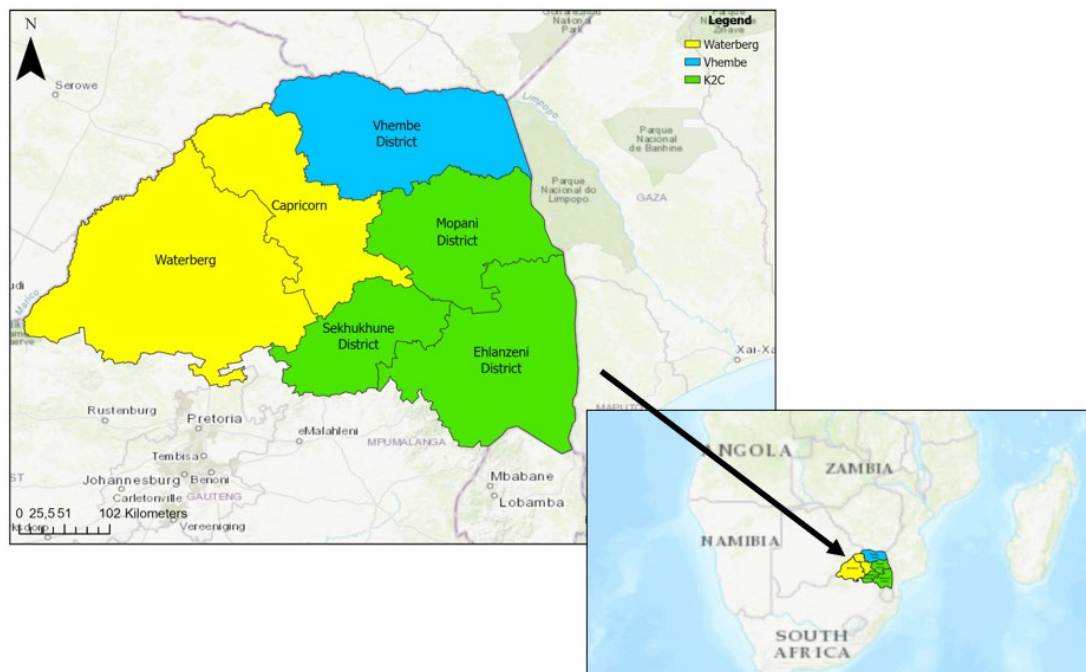


Figure 1 The Grouped Project is located within the Republic of South Africa. The three project instances, PI1-K2C (green), PI2-WB (yellow), and Vhembe (blue), spans the Limpopo Province and the northern District of the Mpumalanga Province.

All PIs currently included in the GP are within the geographic borders of South Africa (Figure 1). All three PIs can be classified as being:

1. Within the hot- and temperate- interior climatic regions
2. Within the Limpopo and Mpumalanga Provinces of South Africa

⁵ 1st Monitoring Report: Fuel efficient cooking in South Africa, Project ID: 2505, Date of issue: 07-02-2022

1.8 Title and Reference of Methodology

All Project Instances included in this monitoring report follow the VCS Methodology from Sectoral Scope 3 –

- *VMR0006 Methodology for Installation of High Efficiency Firewood Cookstoves v1.1.*^{6 7}

The associated tools and guideline documents in the Project Instances in this monitoring report include:

- *CDM Guideline: Sampling and surveys for CDM project activities and programmes of activities, v4*⁸
- *CDM TOOL19: Demonstration of additionality of microscale project activities, v9*⁹
- *CDM TOOL30: Calculation of the fraction of non-renewable biomass v3*¹⁰

All prior and preceding references to the methodology and tools in this monitoring report refer to the respective versions of the documents stated above.

1.9 Participation under other GHG Programs

This is a new project and the Grouped Project and the Project Instances included in this document has not been registered or seeking registration under any other GHG programs.

1.10 Other Forms of Credit and Supply Chain (Scope 3) Emissions

Emissions Trading Programs and Other Binding Limits:

The project is not included in an emissions trading program or any other mechanism that includes GHG allowance trading.

Other forms of Environmental Credit

The project has not sought, nor received another form of GHG-related environmental credit.

Supply Chain (Scope 3) Emissions

⁶ Available at: <https://verra.org/methodology/vmr0006-methodology-for-installation-of-high-efficiency-firewood-cookstoves/>

⁷ CDM methodology Energy efficiency measures in thermal applications of non-renewable biomass, v13.0. Available at: https://cdm.unfccc.int/filestorage/6/T/O/6TOUCX21D0BHNVRZFWMEKALY94GS7/EB115_repan11_AMS-II.G_v13.0.pdf?t=MHI8cnF1dmVwfDCZbkVj5eQAghWeFw5i1YwuO

⁸ Available at: https://cdm.unfccc.int/filestorage/e/x/t/extfile-20151023152925164-Meth_GC48_-ver04.0-.pdf/Meth_GC48_%28ver04.0%29?t=akV8cXVjNnNrfDCCBpv3U-UXoHTmniOSuhTH

⁹ Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-19-v9.pdf>

¹⁰ Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v3.0.pdf>

Scope 3 emissions are not impacted by this project.

1.11 Sustainable Development Contributions

The GP contributes to sustainable development through the distribution of fuel-efficient improved cookstoves (ICS) to local communities in South Africa, who rely on baseline open-fire wood-fueled cooking. The ICS disseminated under this GP is based on rocket stove design principles, which reduce GHG emissions from biomass burning through improved combustion efficiency of wood fuel and decreased wood fuel consumption. The ICSs directly decrease wood fuel demand and reduce the pressure on the ecosystem from wood cutting within the project boundary. A 30-50% saving of firewood, when compared to three-stone fire cooking, has been reported in certain models.¹¹ The time spent by, especially by women and children foraging for wood fuel is reduced.

From the Priorities listed in the Sustainable Development Goals Country Report 2019 – South Africa¹², this project will contribute to the SDG priorities in the following ways:

a) Social sustainability

- Health benefits due to reduced exposure to air pollution from biomass burning.
- Time saved on wood harvesting can be used to engage in economic driven activities.
- Reduced accidental burn risk.
- Preservation of wood resources can reduce the risk of intercommunal and/or inter-ethnic conflict over resources.

b) Economic sustainability

- Reduced wood fuel consumption results in savings on firewood purchases and/or travel costs to acquire resources.
- Time saved from wood fuel harvesting can be used in economic driven activities.
- Employment of local people throughout the manufacturing, distribution and monitoring of the project.

c) Environmental sustainability

- Reduce GHG emissions.
- Reduce wood cutting which leads to deforestation and loss of biodiversity. Promote sustainable ecosystems and ecological balance.
- Protection of vegetation ensures better maintenance of water table levels, prevents soil erosion, flash flooding and maintenance of watersheds.

¹¹ <https://www.engineeringforchange.org/solutions/product/zama-zama/#:~:text=The%20Zama%20Zama%20is%20a,reflective%20grade%20of%20stainless%20steel>

¹² http://www.statssa.gov.za/MDG/SDGs_Country_Report_2019_South_Africa.pdf

- Decreased household exposure to biomass burning emissions and improvement of general air quality.
- Reduced run-away fire risk when compared to conventional open-fire cooking methods.

Monitoring Report: VCS Version 4.2

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	By distributing 183,063 ICS during this monitoring period, the project has reduced 1,203,743 tCO ₂ e during the monitoring period.	To date, the project has prevented the release of 2,227,439 tCO ₂ e into the atmosphere through the distribution of 625,926 ICS.
2)	3.0	Number of households reporting improved indoor and ambient air quality due to reduced smoke emissions	Implemented activities to increase	The distribution of ICS during this monitoring period results in reduction in exposure to indoor air pollutants associated with biomass fuel based traditional cooking.¹³ Across the GP, 80% of project households, or 502,827 total (625,926*0.80), reported a reduction in smoke while cooking on the project ICS vs. the baseline fire in this monitoring period.¹⁴	To date, 502,827 households reported a reduction in smoke while cooking on the project ICS vs. the baseline fire.

¹³ Stove thermal efficiency and emissions interim test report. 2013. University of Johannesburg., SeTAR Centre.

¹⁴ Habit surveys were carried out as part of the monitoring plan. Please see 2505_MRV3_K2C_v1.xlsx

3)	7.0	Number of households with access to clean fuels and technology	Implemented activities to increase	By distributing ICS, the project has increased the number of households with access to efficient, modern technology for cooking and enables more efficient use of available energy sources. 183,063 households received ICS during this monitoring period	By distributing ICS, the project has increased the number of households with access to affordable, reliable and modern energy services to 625,926 households.
4)	12.0	Domestic fuel consumption	Implemented activities to decrease	During this monitoring period, the project has reduced domestic fuel consumption in project households by an average of 2.25 t/HH/yr (Average of By,savings across the three Pls)) ¹⁵	To date, the project has reduced domestic non-renewable woodfuel consumption in project households by an average of 2.25 t/HH/yr (Average of By,savings across MP2 and MP3 for the three Pls.)

¹⁵ Household wood fuel use measurements as part of the household surveys were carried out as part of the monitoring plan. Please see 2505_MRV3_K2C_v1.xlsx, 2505_MRV3_WB_v1.xlsx, and 2505_MRV3_VH_v1.xlsx

2 SAFEGUARDS

2.1 No Net Harm

Monitoring Report: VCS Version 4.2

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

2.2 Local Stakeholder Consultation

Local stakeholder consultations were conducted prior to the implementation of the Project Instances following the implementation plan for engaging with local stakeholders outlined in the latest Project Description and in the first and second Monitoring Report. During this monitoring period, continued stakeholder consultations were conducted for all instances as summarized below:

Procedures or methods used for engaging local stakeholders:

The community members are consulted in sensitisation meetings where the non-technical summary of the project is described, including the End-User Agreement, the environmental impact of open-fire cooking, emission reductions through the efficient cookstoves, as well as the use and maintenance of the stoves is demonstrated. The meetings are carried out pre- and post- distribution.

Procedures or methods used for documenting the outcomes of the local stakeholder communication:

Meeting notes are recorded on a mobile app, including details such as the date and time of the meeting, the location and GPS coordinates, the Traditional Authority consulted in planning the meeting, the number of attendees and notes of what was discussed at the meeting. The consultation meetings include a question-and-answer session. Overall, the reception to the stove and project has been positive. Questions are of a practical nature and include topics such as how to light the stove, how to clean and maintain the stove, how to feed the fire, when distribution will take place and who are eligible for receiving a stove.

Mechanism for ongoing communication with local stakeholders:

The sensitisation meetings described above are part of the ongoing communication with local stakeholders. These meetings aim to demonstrate the ICS usage and maintenance, as well as introduce the social-, economic- and environmental benefits of using the ICS and are being held at village level. These meetings are presented in collaboration with the PI Implementation Partners (IPs). The relevant local tribal authorities are consulted during the sensitisation process and the appropriate permissions obtained to hold the meetings.

Continued engagement with the communities are planned and implemented by TASC and the IPs throughout the project lifecycle. The contact details of TASC and of the respective IPs are provided during the meetings and on the how-to guide distributed with the stoves. No potential negative environmental or socio-economic impacts have been identified for the project.

Monitoring Report: VCS Version 4.2

How due account of all and any input received during ongoing communications has been taken:

The community sensitisation meetings were conducted in the prevalent language of the region, namely Sepedi, isiTsonga and Tshivenda. General feedback and questions translated in English received during the meetings in this monitoring period included¹⁶:

Feedback received	Response
In Rolle village, recipients have commented that some of their pots are too large to fit on the stove, and that their firewood is too large to fit in the stove.	The monitoring team has explained that the stoves are designed to use small pieces of wood and so save firewood. The community was encouraged to embrace this opportunity to save firewood and either collect smaller pieces of wood or cut their current wood.
Some community members have asked for a bigger stove or a stove with two plates.	Households tend to use bigger pots for family and/or social gatherings. It is explained to stakeholders that the stove is intended to aid the daily cooking habits and not to replace cooking at large gatherings. The project proponent is constantly on the lookout for the best ICS technology available, including options for 2 plate stoves.

¹⁶ Community meeting logs are submitted alongside this Monitoring Report. (2505_MRV2_Community Meetings_v1)



Figure 2 A sensitization meeting in the Mawa village in PI1-K2C

In general, feedback from these meetings is positive towards the stove. The communities recognize how the stove can save them time in collecting wood and in cooking, as well as reducing the amount of wood needed to cook with. None of the comments received during the monitoring period are related to the design of the project, and the design has therefore remained unchanged during this monitoring period. The table below lists the community meetings held in this monitoring period.

Table 2 Summary of stakeholder consultations in the form of community meetings in MP3

PI1-K2C			
Meeting Date	Village	Meeting Location	Number of Attendees
2023/04/12	Mawa	Ga-Mawa Block 6 meeting point	107
2023/04/14	Rolle	Rolle Village	52
2023/04/13	Acornhoek	Mokgwethi Kgorong	200
PI2-WB			
Meeting Date	Village	Meeting Location	Number of Attendees
2023/02/02	Kgotlhwane	Community Hall	220
2023/02/02	Kgotlhwane	Community hall	142
2023/02/03	Ga-Mokibelo	Community hall.	896

2023/02/06	Ga-Semenya	Ga-semenya community hall.	178
2023/02/06	Ga-Mabitsela_1	Ga -Mabitsela Community Hall	167
2023/02/07	Blood_River	Masesha primary school.	750
2023/02/07	Blood_River	Morobi busy corner.	123
2023/02/07	Kgabo	Dikolobe community hall.	95
2023/02/10	Ga-Hlahla	Ga-hlahla community hall.	482
2023/02/10	Ga-Matamanyane	Matamanyama community hall.	450
2023/02/23	Ga-Kobo	Ga -mashamaite community hall	287
2023/02/23	Mashoahleng	Mashahleng community hall.	107
2023/02/23	Ga-Mabitsela_2	Ga mabitsela chief place.	130
2023/02/24	Ga-Matamanyane	Ga-matamanyama community hall.	106
2023/02/24	Ga-Matamanyane	Setati community hall.	109
2023/03/03	Ga-Piet	Ga -piet community hall.	242
2023/03/09	Ga-Komape	Ga-maribane community hall.	403
2023/03/13	Ga-Kobo	Maruwe community hall.	492
2023/03/14	Ga-Kobo	Moletsane community hall.	172
2023/03/16	Ga-Kobo	Ext 44community hall.	992
2023/03/17	Kgabo	Kolopo community hall.	
2023/03/27	Blood_River	75	300
2023/03/31	Blood_River	Extension 106	200
2023/04/26	Bakenberg	Nkube secondary school.	220
2023/04/26	Dibeng	Kgomo school (maowaneng secondary school).	100
2023/04/26	Goedgevonden	Semorish(mmamalope secondary school)	400

2023/05/19	Mahwibitswane	Lethaleng community ground.	
2023/05/25	Bakenberg	Ramolwane high school	100
2023/05/31	Ga-Semenya	Movers ground	900
2023/06/01	Mahwibitswane	Primary ground	800
2023/06/19	Kgware	LMakongwana primary Ground	800
2023/06/19	Turfloop	Mabetlas mohlagaseng centre	220

PI3-VH

Meeting Date	Village	Meeting Location	Number of Attendees
2023/04/24	Mtititi	Mtititi Tribal authority	56
2023/04/24	Makuleke	Makuleke tribal authority	47
2023/04/24	Bhevula	Bhevula village	28
2023/04/25	Tshifudi	Tshifudi village	22
2023/04/25	Matiyane	Matiyane village	30
2023/04/25	Makhuva	Makhuva	
2023/04/26	Tiyani	Tiyani village	41
2023/04/26	Ribungwani	Ribungwani village	31
2023/05/18	Ribungwani	Ribungwani Tribal authority	216

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

Three PIs have been implemented under the Grouped Project during this monitoring period. The total number of ICS distributed in each instance are:

Project Instance	Number of ICS distributed during this monitoring period	Total number of ICS distributed
PI1-K2C	48,947	341,649

PI2-WB	73,614	223,775
PI3-VH	60,502	60,502
Total	183,063	625,926

Operation of the Project Activities during the monitoring period

There were no changes to the project, the project proponent, or entities during the monitoring period additional to the inclusion of PI3-VH.

As described in the previous monitoring report¹⁷, community and project support teams have been deployed across all three PIs during this monitoring period. These teams, members of which are referred to individually as 'monitors', have been employed to support and encourage the widespread adoption and use of the ICS in the PIs.

Cooking habits are passed down through generations, are influenced by tradition and religious beliefs and are formed around the tools, energy sources and technologies available. With household device projects, it is quite normal for adoption and usage to increase over time, as end-users become more familiar with the technology and start to recognize its benefits. People do not tend to make an instant switch to a new technology; adoption takes time. ICS were distributed progressively over time.

Enabling optimal stove adoption in the communities and decreasing open-fire cooking after ICS distribution requires an understanding of the end-user journey and factors that may limit or encourage stove adoption. To this end, the community and support teams are deployed to educate communities on stove use and its benefits, and responsible resource use, as well as engage and survey communities to understand the local practices and promote project participation. The primary focus of this team is pre- and post-distribution sensitisation (which includes education and demonstrations), with a secondary focus on household surveys to measure stove adoption and inform the project process.

The community and project support teams are tasked with engaging with the project communities post-distribution with the goal of increasing stove uptake and encouraging continuous usage of the project stoves. They are responsible for arranging the appropriate permissions with the Traditional Authorities (TAs), and planning and executing community engagements. In addition, the teams are tasked with conducting internal and compliance monitoring through household surveys.

The teams engage with the participating communities through various stakeholder engagement platforms including community meetings, pop-up stands at popular places, school engagements, combined meetings with other social and environmental projects in the region, radio interviews, and engagement through social media (e.g. TikTok). Household surveys are also conducted to resolve any data discrepancies, for internal monitoring and project feedback, as well as for compliance surveys.

¹⁷ Fuel Efficient Cooking in South Africa: 2nd Monitoring Report. 27-June-2023

Monitors are hired from the local communities allowing the teams to engage in a culturally appropriate manner and serve as the first point of contact in the grievance mechanism. A total of 10 permanent monitors have been employed during this monitoring period.

Approximately 1,022 stove recipients have been directly engaged with, just through community meetings and household surveys in this monitoring period, however it is expected that significantly more end users will have been reached by the various stakeholder engagement platforms.

The behavioural science involved in adopting clean cooking practices is dependent on the capability, motivation, and opportunity to use the stove. Understanding the journey map of a cookstove user enables us to support recipients continually to overcome the barriers to adoption. Taking a behavioural approach to complement the traditional approach of monitoring addresses aspects such as thinking automatically, thinking socially, and thinking with mental models. The behavioural approach aims to define and diagnose problems, design the support to be contextually relevant, implement and evaluate the implementation, adapt and finally redefine and analyse the challenges to the adoption of ICS.

3.2 Deviations

3.2.1 Methodology Deviations

No methodology deviations were applied during this monitoring period.

3.2.2 Project Description Deviations

This Project Description Deviation is included due to an omission of the Implementation Partner details in Section 1.6 of the PDD.

Project Implementation Partners are described in the PDD under No.3.16.3 in Section 2.2 of the PDD. Future instances may include other Implementation Partners, which will be included in the relevant future monitoring reports. Both entities were involved from the relevant PI start dates, (i.e. 20 August 2021 for PI1-K2C, 27 March 2023 for PI3-VH, and 3 September 2021 for PI2-WB). This Project Description Deviation is included due to an omission of the Implementation Partner details in Section 1.6 of the PDD.

The Implementation Partner for PI3-VH is the same as for PI1-K2C.

The two entities involved are:

For PI1-K2C and PI3-VH:

Organization name	Kruger to Canyons Biosphere Region Non-Profit Company (K2C BR NPC)
Role in the project	Implementation Partner – PI1-K2C
Contact person	Marie-Tinka Uys

Title	Chief Operations Officer
Address	K2C Nodal Centre, Zandspruit Bush & Aero Estate, Hoedspruit, South Africa, 1380
Telephone	+27 (0)82 551 7261
Email	info@kruger2canyons.org
Website	www.kruger2canyons.org

For PI2-WB:

Organization name	Mogalakwena Training (Pty) Ltd
Role in the project	Implementation Partner – PI2-WB
Contact person	Peter Coombes
Title	Chief Executive Officer
Address	357 Hartbees Street, Waterkloof Ridge, Pretoria, South Africa, 0181
Telephone	+27 (0)83 576 4287
Email	peterc@kwenatraining.co.za

3.3 Grouped Projects

Three PIs were implemented during the monitoring period namely, PI1-K2C, PI2-WB, and PI3-VH. In all three PIs, the same ICS technology was distributed to local communities identified as relying on baseline open-fire wood-fueled cooking methods. The Rocketworks Zama Zama rocketstove was distributed by TASC and the relevant PI Implementation Partners.

Eligibility Criteria for New Devices Distributed in Existing Instances

The distribution of ICS in the existing two PIs (i.e. PI1-K2C₁₉ and PI2-WB₂₀) during this monitoring period meets the eligibility criteria for the inclusion into the Grouped Project, as demonstrated below:

No	Eligibility Criterion	Required condition of Project Instances	Evidence provided and applicability to ICS distributed
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in PI1-K2C and PI2-WB in this monitoring period			
1	Project Instances (PIs) must meet the applicability conditions set out in the applied methodology.	Each new PI must demonstrate compliance with the applicability conditions set out in the employed methodology: VMR0006.	All newly distributed stoves adhere to the applicability conditions in the VMR0006 methodology as demonstrated in section 3.3.1 of this report.
2	Use the technologies or measures specified in the project description.	Only ICS that conform with the GP description are to be distributed in the project. The ICS will be chosen to deliver a level of service at least equivalent to the baseline appliance.	The manufacturer's technology description. ^{18, 19} All newly distributed ICS were the Rocket Works Zama Zama rocket stove. The ICS delivers a level of service at least equivalent to the baseline appliance as evidenced in the technology description.
3	Apply the technologies or measures in the same manner as specified in the project description.	The ICS distributed in the PIs will adhere to the GP description and replace biomass burned in the baseline scenario.	a) The manufacturer's technology description describes the applicability of the ICS technology distributed in both PIs. b) End users were asked to state their source of energy and baseline appliance at the point of distribution and during the project monitoring. c) This information is stored in the monitoring and data collection database.
4	Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.	All new PIs will be implemented only in regions within the geographic borders of South Africa subject to the same baseline scenario determined in Section 3.4 of the latest version of the Project Description.	a) GPS/location data captured from each end user, and stored in the monitoring and data collection database demonstrate the location of the newly distributed ICS in both PIs within South Africa. b) Both PIs are subject to the same baseline scenario

¹⁸ SeTAR Centre. 2013 Stove Thermal Efficiency and Emissions Interim Test Report- RocketWorks Wood Stove.

¹⁹ BECT. 2015. Stove Thermal Efficiency Test Report- Rocket Works Zama Zama

			described in Section 3.4 of the latest version of the Project Description as identified and demonstrated by baseline surveys. ^{20 21}
5	Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area.	All new PIs will use the activity method for demonstration of additionality and of: Step 1: Regulatory Surplus There is no government mandated programme or policy in host country of this project ensuring the distribution of new project activity instances. Step 2: Positive List The inclusion of new project activity instances will comply with the positive list as it satisfies criterion 1 where it meets all the applicability conditions of the methodology. 1. Where the project activity installs or distributes stoves at zero cost to the end-user and has no other source of revenue other than the sale of GHG credits, the project activity shall be deemed additional. 2. Project activities that are implemented as part of government schemes or are supported by multilateral funds cannot be considered additional even if the stoves are distributed free of cost or at a highly	There is no government mandated programme or policy in South Africa ensuring the distribution of new project activity instances or fuel efficient cookstoves. - Both PIs comply with the positive list in the methodology and satisfies criterion 1 as it meets all the applicability conditions of the methodology. - The End User Agreements confirm that the PIs “installs or distributes stoves at zero cost to the end-user and has no other source of revenue other than the sale of GHG credits”²² The PIs are not implemented as part of a government scheme nor are they supported by multilateral funds. This is evidenced through Agreements with investors (confidential parts of the document may be redacted). The CME confirms that no PI will result in the diversion of official development assistance.

²⁰ Kok, L. 2021. Field Baseline Report – Waterberg. Fuel Efficient Cooking in South Africa.

²¹ Kok, L. 2021. Field Baseline Report – Kruger 2 Canyons. Fuel Efficient Cooking in South Africa.

²² An example of the End-User Agreement is submitted alongside this Monitoring Report

		subsidized rate and hence are not eligible to use this methodology. PIs under the GP will not result in the diversion of official development assistance.	
6	Where a capacity limit applies to a project activity included in the project, no project instance shall exceed such limit. Further, no single cluster of project activity instances shall exceed the capacity limit, determined as follows: • Each project activity instance that exceeds one percent of the capacity limit shall be identified. • Such instances shall be divided into clusters, whereby each cluster is comprised of any system of instances such that each instance is within one kilometer of at least one other instance in the cluster. Instances that are not within one kilometer of any other instance shall not be assigned to clusters. • None of the clusters shall exceed the capacity limit and no further project activity instances shall be added to the project that would cause any	The VMR0006 methodology does not contain a capacity limit.	A capacity limit does not apply under the VMR0006 methodology.

	of the clusters to exceed the capacity limit.		
7	Occur within one of the designated geographic areas specified in the project description.	a) New project activity instances will be located within the geographic boundaries of South Africa and defined in the instance description document. b) GPS/location data captured from each end user will demonstrate the location of the project and of each PI.	a) The geographic boundary of all newly distributed ICS is demonstrated to be within South Africa as evidenced by b). b) The GPS/location data captured from each end user demonstrating the location of the stoves distributed withing the PIs are provided. The GPS/location information is stored in the monitoring and data collection database.
8	Comply with at least one complete set of eligibility criteria for the inclusion of new project activity instances. Partial compliance with multiple sets of eligibility criteria is insufficient.	Compliance of new PIs will be evaluated exclusively against the eligibility criteria listed in this table.	All newly distributed ICS comply with the full set of eligibility criteria for the inclusion under the existing project activity instances as described in this table and Table 2 of the PDD.
9	Be included in the monitoring report with sufficient technical, financial, geographic, and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body.	New PIs will be described in the monitoring report with sufficient technical, financial, geographic, and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body. Monitoring data of PIs will be stored in the monitoring database, which will also allow for sampling by the validation/verification body. Evidence of relevant information such as local	The evidence relevant to local stakeholder engagements, baseline surveys and applicable provisions was submitted alongside this Monitoring Report and at validation of the instance inclusion. Complete descriptions of the two existing PIs are included in the PDD and in the first Monitoring Report Section 3.4. Monitoring data for all stoves distributed across the GP is provided to the VVB at verification.

		stakeholder engagements, baseline surveys ²³ and applicable provisions will be included when submitting for PI validation at verification.	
10	Be validated at the time of verification against the applicable set of eligibility criteria.	New PIs will be submitted for validation against the applicable set of eligibility criteria at the time of verification.	A new PI was submitted for this MP and the eligibility criteria and how it meet the eligibility criteria is presented in the previous table.
11	Have evidence of project ownership, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance (i.e., the date upon which the project activity instance began reducing or removing GHG emissions).	New PIs will demonstrate ownership by the project proponent, from the start date of the PI. Project ownership, as described in Section 1.7 of the latest version of the PDD, is applicable to all PIs included in this GP.	Project ownership of the Grouped Project, which includes all PIs, is demonstrated in Section 1.7 of the latest version of the PDD. This is confirmed as being with the Coordinating/ Managing Entity (CME) of the GP, which is TASC SA (Pty) Ltd. For all existing PIs, the End User Agreement contains the unique serial number that is embossed onto each ICS and are signed by the end user at the point of distribution. The End User Agreement includes the statement: "I understand that I have received the stove free of charge and that, in order to cover the costs of the stove, TASC SA (Pty) Ltd will claim the CO2 emissions reductions from the stove and sell these as carbon credits" All newly distributed ICS are unique in the project boundary demonstrated by the unique

²³ Desktop or field baseline surveys will be conducted at the PI level and will include quantitative survey on biomass fuel used for cooking and a fNRB survey in the PI boundary. Where a desktop or field baseline survey cannot be performed at the PI level, a conservative national default fNRB value may be applied.

			serial numbers that are recorded as part of the data collected at the point of distribution. As per section 3.6.1 of the VCS Standard, the End User Agreement is “<i>An enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals which vests project ownership in the project proponent.</i>”
12	Have a start date that is the same as or later than the grouped project start date.	New PIs will have a start date that is the same as or later than the GP start date. Distribution of the efficient cookstoves in the respective PIs will begin at the start date of the GP, or later. Distribution data including distribution dates will be collected and stored on the distribution database. The sale of the first device marks the start date.	The date of distribution for all newly distributed ICS, which is later than the grouped project start date, is included in the distribution database provided with this monitoring report.
13	Be eligible for crediting from the start date of the instance through to the end of the project crediting period (only).	New PIs will be eligible for crediting from the start date of the instance through to the end of the project crediting period (only). New PIs will be eligible for crediting from the start date of the instance through to the end date of the project crediting period on 19 August 2031.	All newly distributed ICS in this monitoring period are eligible for crediting from the distribution date (which is after the respective PI start dates) until the end of the project crediting period on 19 August 2031.

Eligibility Criteria for New Project Instances

The eligibility of the first PI (PI1-K2C) was demonstrated at the group project validation and is described in the latest version of the PDD. The eligibility of the second PI (PI2-WB) was demonstrated in the first monitoring report and validated at the first verification.

Monitoring Report: VCS Version 4.2

The adherence of the new PI (PI3-VH) to the eligibility criteria set out in section 3.6.16 and 3.6.17 of the VCS Standard v4.4 and section 4 of the VMR0006 v1.1 methodology and described in Table 1 in the registered PDD is demonstrated in below.

Table 3 Set of eligibility criteria for new Project Activity Instances

No	Eligibility Criterion	Required condition of Project Instances	Evidence provided and applicability to PI3-VH
1	Project Instances (PIs) must meet the applicability conditions set out in the applied methodology.	Each new PI must demonstrate compliance with the applicability conditions set out in the employed methodology: VMR0006.	PI3-VH is compliant with the applicability conditions set out in the applied VMR0006 methodology as demonstrated in Section 3.3.1 in this monitoring report. Please see details below
2	Use the technologies or measures specified in the project description.	Only ICS that conform with the GP description are to be distributed in the project. The ICS will be chosen to deliver a level of service at least equivalent to the baseline appliance.	The manufacturer's technology description describes the ^{24, 25} RocketWorks Zama Zama rocket stove, to be distributed in PI3-VH, delivers a level of service at least equivalent to the baseline appliance as evidenced in the technology description.
3	Apply the technologies or measures in the same manner as specified in the project description.	The ICS distributed in the PIs will adhere to the GP description and replace biomass burned in the baseline scenario.	d) The manufacturer's technology description describes the applicability of the ICS technology to be distributed in PI3-VH. e) End users will be asked to state their source of energy and baseline appliance at the point of distribution and during the project monitoring.

²⁴ SeTAR Centre. 2013 Stove Thermal Efficiency and Emissions Interim Test Report- RocketWorks Wood Stove.

²⁵ BECT. 2015. Stove Thermal Efficiency Test Report- Rocket Works Zama Zama

			f) This information will be stored in the monitoring and data collection database.
4	Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.	All new PIs will be implemented only in regions within the geographic borders of South Africa subject to the same baseline scenario determined in Section 3.4 of the latest version of the Project Description.	c) GPS/location data captured from each end user, and stored in the monitoring and data collection database will demonstrate the location of the PI within South Africa. d) PI3-VH is subject to the same baseline scenario described in Section 3.4 of the latest version of the Project Description as identified and demonstrated by a baseline survey, outlined in Section 3.3.4 below.²⁶
5	Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area.	All new PIs will use the activity method for demonstration of additionality and of: Step 1: Regulatory Surplus There is no government mandated programme or policy in host country of this project ensuring the distribution of new project activity instances. Step 2: Positive List The inclusion of new project activity instances will comply with the positive list as it satisfies criterion 1 where it meets all the applicability conditions of the methodology. 1. Where the project activity installs or distributes stoves at zero cost to the end-user and	There is no government mandated programme or policy in South Africa ensuring the distribution of new project activity instances or fuel efficient cookstoves. 3. PI3-VH complies with the positive list in the methodology and satisfies criterion 1 as it meets all the applicability conditions of the methodology. 4. The End User Agreement will confirm that the PI “installs or distributes stoves at zero cost to the end-user and has no other source of revenue other than the sale of GHG credits”²⁷ The PIs are not implemented as part of a government scheme nor

²⁶ Kok, L. 2021. Field Baseline Report – Waterberg. Fuel Efficient Cooking in South Africa.

²⁷ An example of the End-User Agreement is submitted alongside this Monitoring Report

		has no other source of revenue other than the sale of GHG credits, the project activity shall be deemed additional. 2. Project activities that are implemented as part of government schemes or are supported by multilateral funds cannot be considered additional even if the stoves are distributed free of cost or at a highly subsidized rate and hence are not eligible to use this methodology. PIs under the GP will not result in the diversion of official development assistance.	are they supported by multilateral funds. This is evidenced through Agreements with investors (confidential parts of the document may be redacted). The CME confirms that PI3-VH will not result in the diversion of official development assistance.
6	Where a capacity limit applies to a project activity included in the project, no project instance shall exceed such limit. Further, no single cluster of project activity instances shall exceed the capacity limit, determined as follows: - Each project activity instance that exceeds one percent of the capacity limit shall be identified. - Such instances shall be divided into clusters, whereby each cluster is comprised of any system of instances such that each instance is within one kilometer of at least one other instance in	The VMR0006 methodology does not contain a capacity limit.	A capacity limit does not apply under the VMR0006 methodology.

	the cluster. Instances that are not within one kilometer of any other instance shall not be assigned to clusters. None of the clusters shall exceed the capacity limit and no further project activity instances shall be added to the project that would cause any of the clusters to exceed the capacity limit.		
7	Occur within one of the designated geographic areas specified in the project description.	c) New project activity instances will be located within the geographic boundaries of South Africa and defined in the instance description document. d) GPS/location data captured from each end user will demonstrate the location of the project and of each PI.	a) The geographic boundary of PI3-VH is demonstrated to be within South Africa (Figure 1). and described in Section 3.3.3 below. b) The GPS/location data captured from each end user demonstrating the location of the PI will be provided at the time of verification. The GPS/location information will be stored in the monitoring and data collection database.
8	Comply with at least one complete set of eligibility criteria for the inclusion of new project activity instances. Partial compliance with multiple sets of eligibility criteria is insufficient.	Compliance of new PIs will be evaluated exclusively against the eligibility criteria listed in this table.	PI3-VH complies with the full set of eligibility criteria for the inclusion of new project activity instances as described in this table and Table 2 of the PDD.
9	Be included in the monitoring report with sufficient technical, financial, geographic, and other relevant information	New PIs will be described in the monitoring report with sufficient technical, financial, geographic, and other relevant information to demonstrate compliance with	The evidences relevant to PI3-VH for the local stakeholder engagements, baseline surveys and applicable provisions is submitted alongside this

	to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body.	the applicable set of eligibility criteria and enable sampling by the validation/verification body. Monitoring data of PIs will be stored in the monitoring database, which will also allow for sampling by the validation/verification body. Evidence of relevant information such as local stakeholder engagements, baseline surveys²⁸ and applicable provisions will be included when submitting for PI validation at verification.	Monitoring Report, and summarized below in Section 3.3.4. Monitoring data for PI3-VH will be provided to the VVB at verification.
10	Be validated at the time of verification against the applicable set of eligibility criteria.	New PIs will be submitted for validation against the applicable set of eligibility criteria at the time of verification.	PI3-VH conforms to the eligibility criteria set out in this table and will be validated at the time of verification.
11	Have evidence of project ownership, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance (i.e., the date upon which the project activity instance began reducing or removing GHG emissions).	New PIs will demonstrate ownership by the project proponent, from the start date of the PI. Project ownership, as described in Section 1.7 of the latest version of the PDD, is applicable to all PIs included in this GP.	Project ownership of the Grouped Project, which includes all PIs, is demonstrated in Section 1.7 of the latest version of the PDD. This is confirmed as being with the Coordinating/ Managing Entity (CME) of the GP, which is TASC SA (Pty) Ltd. In addition, for PI3-VH, Similar to PI1-K2C and PI2-WB, the End User Agreement contains the unique serial number that is embossed onto each ICS and will be signed by the end user at the point of distribution. The End User Agreement includes the statement: “I understand that I

²⁸ Desktop or field baseline surveys will be conducted at the PI level and will include quantitative survey on biomass fuel used for cooking and a fNRB survey in the PI boundary. Where a desktop or field baseline survey cannot be performed at the PI level, a conservative national default fNRB value may be applied.

			have received the stove free of charge and that, in order to cover the costs of the stove, TASC SA (Pty) Ltd will claim the CO2 emissions reductions from the stove and sell these as carbon credits” PI3-VH is a unique project instance in the project boundary which is demonstrated in the unique serial numbers that will be tracked as part of the data collected at the point of distribution. As per section 3.7.1 of the VCS Standard v4.4, the End User Agreement is “<i>An enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals which vests project ownership in the project proponent.</i>”
12	Have a start date that is the same as or later than the grouped project start date.	New PIs will have a start date that is the same as or later than the GP start date. Distribution of the efficient cookstoves in the respective PIs will begin at the start date of the GP, or later. Distribution data including distribution dates will be collected and stored on the distribution database. The sale of the first device marks the start date.	The start date of PI3-VH, evidenced as the sale of the first device in the database will be later than the start date of the GP as per section 1.8 of the latest version of the PDD. The start date of PI3-VH is 27-March-2023 and shown in Section 3.3.5 below.

13	Be eligible for crediting from the start date of the instance through to the end of the project crediting period (only).	New PIs will be eligible for crediting from the start date of the instance through to the end of the project crediting period (only). New PIs will be eligible for crediting from the start date of the instance through to the end date of the project crediting period on 19 August 2031.	PI3-VH is eligible for crediting from the start date of the instance until the end of the project crediting period on 19 August 2031.
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3.3.1 Evidences of Compliance to Eligibility criterion 1- PI3-VH

Table 3: Applicability of Methodology- VMR0006

No	Methodology Applicability Criterion	How PI3-VH Complies
1	Project activities shall be implemented in domestic premises or in community-based kitchens.	a) The project ensures the distribution of ICS to households or in community-based kitchens only. Evidenced by the manufacturer's technology description.²⁹ PI3-VH comprises the distribution of the RocketWorks' "Zama Zama" fuel efficient cookstoves which are designed specifically for domestic premises. b) Household or community-based kitchen information, including GPS coordinates and the recipient's details will be collected at point of distribution which will be kept in the PI monitoring database.
2	The project stove shall have specified high-power thermal efficiency of at least 25% per the manufacturer's specifications and shall exclusively use woody biomass and can be single pot or multi-pot; in case of project stove replacing fossil fuel	PI3-VH: a) The ICS distributed in this project has a thermal efficiency of at least 25%. The manufacturer's specification from RocketWorks for the Zama Zama rocket stove indicates a thermal efficiency of 38.3%.

²⁹ SeTAR Centre. 2013 Stove Thermal Efficiency and Emissions Interim Test Report - RocketWorks Wood Stove.

	baseline stove, it shall exclusively use renewable biomass.	b) End-users will be asked to state their source of energy at the point of distribution. c) This information will be stored in the monitoring database.
3	Both 'Projects' and 'Large Projects' can use the methodology.	The project size is allowed for the GP and PIs. The total ERs estimated ex-ante from PI3-VH over the crediting period is 4,039,305 tCO₂e and therefore defined as a "Large Project" according to the guidelines set out in the VMR0006 methodology. The PI therefore complies with the GP and methodology requirements.
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; and	Non-renewable biomass has been used in South Africa, the geographic boundary of the GP and the PI3-VH region since 31 December 1989 as demonstrated immediately below this table.
5	For the specific case of biomass residues processed as a fuel (e.g. briquettes, wood chips), it shall be demonstrated that: a) It is produced using exclusively renewable biomass (more than one type of biomass may be used). b) The consumption of the fuel should be monitored during the crediting period and c) Energy use for renewable biomass processing (e.g. shredding and compacting in the case of briquetting) may be considered as equivalent to the upstream emissions associated with the processing of the displaced fossil fuel and hence disregarded	Not applicable. The ICS is distributed as an energy efficiency measure to replace stoves under the baseline stove scenario of burning non-renewable biomass. The baseline fuel information will be collected on the distribution data collection app at the point of distribution.
6	The Project Design Document 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)	In order to avoid double counting of emission reductions through the method of distribution, each cookstove has a unique identifier number and the distribution of each stove is logged onto a database which includes unique information for each recipient (i.e. National identification number, geographic coordinates, etc.).

		Each PI will have system for avoiding double counting with data being collected via a smartphone app (where possible), or via paper forms, including: a) Date of distribution b) A unique serial number on each technology c) GPS coordinates of the end-user (where possible) Available end-user data: name, phone number, address/physical location, ID number. All data will be backed up physically in case of outage
7	The Project Design Document shall also explain how the proposed procedures prevent double counting of emission reductions, for example to avoid that project stove manufacturers, wholesale providers or others claim credit for emission reductions from the project devices.	The End User Agreement confirms that the ownership rights of the ER/VCUs generated by the PI reside with the CME. The signature of each end user confirming their understanding of this agreement will be collected at the point of distribution. The End User Agreement will be in English and translated into a local language where required. If necessary, it will be read out to the End User. Each ICS will have a serial number, made to order by the manufacturer, to uniquely identify it. All rights to distribute the delivered stoves and claim the resultant emissions reductions belong to the PP. The GP will not include any PI that has been rejected by another GP, or CPA-DDs of any other GHG programs. Each PI will include a statement on the uniqueness of the Project and by listing other similar activities (from other GHG programme registries) that are taking place within the project boundary to demonstrate its uniqueness.

PI3-VH is a unique project in the Waterberg region in the Limpopo Province. A list of projects within or close to the PI boundary is submitted to the VVB with this report.

Non-renewable biomass has been used in South Africa, the geographic boundary of the GP and the PI3-VH region since 31 December 1989. Williams (1986) reported that fuelwood is the sole source of energy for less-developed rural and peri-urban areas in South Africa³⁰. Wood fuel use in sub-Saharan Africa has increased from 1,500 million m³ to 3,500 million m³ from 1950 to 1990 (Durning, 1991, cited in Dovie et al. 2004)³¹. Nuwarinda et al. 2021³² reported that a sharp reduction of natural woodland in the Vhembe district between 1990 and 2013 and an increase in barren land can be linked to an increase in human activities that reduce the availability of natural resources for survival. Since 1992, between 80 and 99% of rural households in South Africa have relied on fuelwood to meet their energy needs. In 2012, 67% of households in South Africa still relied exclusively on fuelwood for their energy needs.³³ In sub-Saharan Africa, fuelwood use has steadily increased with population growth (ESMAP, 2020)³⁴. According to the Global Alliance for Clean Cookstoves (2011), 602,000 households are dependent on woodfuel³⁵. Therefore, it can be concluded that non-renewable biomass have been used in the project region since December 1989.

3.3.2 Evidences of Compliance to Eligibility criterion 2- PI3-VH

As described for PI1-K2C in the PDD and for PI2 – WB in the 1st MR, the Rocket Works Zama Zama rocket stove manufactured in KwaZulu-Natal, South Africa, with a thermal

³⁰ Williams, A.T., 1986. The potential for the production of energy from biomass in South Africa (Master's dissertation, University of Cape Town).

³¹ Dovie, D.B.K., Witkowski, E.T.F. & Shackleton, C.M. 2004. The fuelwood crisis in southern Africa – relating fuelwood use to livelihoods in a rural village. *GeoJournal* 60, 123-133. doi: 10.1023/B:GEJO.0000033597.34013.9f

³² Nuwarinda, H., Ramoelo, A. and Adelabu, S. 2021. Assessing natural resource change in Vhembe biosphere and surroundings. *Environmetal Monitoring and Assessment*. 193, 404 (2021). <https://doi.org/10.1007/s10661-021-09053-7>

³³ Wessels, K.J., Colgan, M.S., Erasmus, B.F.N., Asner, G.P., Twine, W.C., Mathieu, R., Van Aardt, J.A.N., Fisher, J.T. & Smit, I.P.J. 2013. Unsustainable fuelwood extraction from South African savannas. *Environmental Research Letters*. 8 014007.) doi:10.1088/1748-9326/8/1/014007

³⁴ Energy Sector Management Assistance Program (ESMAP). 2020. The State of Access to Modern Energy Cooking Services. Washington, DC: World Bank. License: Creative Commons Attribution CC BY 3.0 IGO

³⁵ Global Alliance for Clean Cookstoves. (2011). South Africa Market Assessment – Sector Mapping. Available online at: <https://cleancooking.org/binary-data/RESOURCE/file/000/000/172-1.pdf> e

efficiency of 38.30%³⁶ is distributed in all PIs. The stoves have a 1-year warranty and an expected average lifetime of 5 years, although this can vary from stove to stove. Project stoves may continue to be credited with emissions reductions beyond 5 years, if they are monitored and proven to still be functioning/in use.

Monitoring Report: VCS Version 4.2

The Zama Zama rocket stove (Figure 2) is made mainly from stainless-steel and is lightweight, portable and designed to fit flat-, round- and 3-legged pots. The interior of the stove is made of heat resistant 0.5 mm stainless steel. The outer material (heat shield) is chromed steel sheet. The pot rest and the stove bottom is made of 1.0 mm galvanized mild steel sheet. The fire tube is protected by a 2.5 mm galvanized wiring cage. The stove can boil 5 litres of water in 15 minutes using as little as 250 g of small pieces of wood. The stove is encased with an insulated grid that allows for handling the stove without causing burns. The bottom of the stove includes a grid that allows for ash to fall through to an ash collection chamber.



Figure 3 The Zama Zama rocket stove manufactured by RocketWorks

3.3.3 Evidences of Compliance to Eligibility criterion 7- PI3-VH

The PI3-VH is situated in Limpopo and is thus within the GP boundary defined as the geographic borders of South Africa (Figure 1). The PI is defined as being:

- i. Within the hot- and temperate- interior climatic regions
- ii. Within the Limpopo Province of South Africa
- iii. Within the boundaries of the District Municipality of Vhembe.

Operational management is based in Hoedspruit, with coordinates:

³⁶ SeTAR Centre. 2013. Stove Thermal Efficiency and Emissions Interim Test Report – RocketWorks Wood Stove.

Latitude: 24.3461° S,
Longitude: 30.9733° E

3.3.4 Evidences of Compliance to Eligibility criterion 8- PI3-VH

Monitoring Report: VCS Version 4.2

PI3-VH: Baseline Scenario

The baseline scenario in the PI has been identified as the continued use of non-renewable biomass in the absence of the project activity. A field baseline wood fuel use survey³⁷, as well as a fraction of non-renewable biomass survey³⁸ was carried out in the PI area.

The sample size and selection for the baseline study were determined in accordance with the CDM guidance on “Sampling and surveys for CDM project activities and programmes of activities v04.0” with a 90/10 confidence/precision level. The number of households, population and average household size in the region was considered. For PI1-K2C and PI2-WB, the sample size of 271 was derived based on an expected mean of 20 and SD of 20. A large standard deviation was used because of the limited information on household wood use quantities. A sample of 300 households were selected. For PI3-VH, a similar sample size calculation approach was followed. 300 households were selected on a simple random sampling basis across 14 villages within the PI boundary. The Kitchen Performance Test protocol v4.0³⁹ of the Clean Cooking Alliance was followed and included a qualitative habit survey and daily wood use measurements over four consecutive days. Additional habit surveys were also carried out.⁴⁰

The fNRB has been calculated according to the provision of the VCS methodology VMR0006, Methodology for Installation of High Efficiency Firewood Cookstoves, Version 1.1.⁴¹ VMR0006 requires the use of the CDM’s TOOL30 “Calculation of the fraction of non-renewable biomass” Version 3.0.⁴² The ex-ante approach was followed in accordance with section 3.9 of TOOL30.

TOOL30 also provides for the use of a default factor for fNRB of 0.3 (30%), in the absence of available data sources. This default value was not however applied as it is not

³⁷ TASC. 30 July 2023. Field Baseline Report – Vhembe_v1.0. Fuel Efficient Cooking in South Africa.

³⁸ 2023-03-14 fNRB assessment for Vhembe Municipality

³⁹ Bailis, R., Thompson, R., Lam, N., Berrueta, V., Muhwezi, G. & Adams, E. 2018. Kitchen Performance Test (KPT) v4.0. Clean Cooking Alliance. 16p.

⁴⁰ Vhembe_Baseline_Habit_Survey (clean)_v1.1

⁴¹ VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves. Available online at: <https://verra.org/methodology/vmr0006-methodology-for-installation-of-high-efficiency-firewood-cookstoves/>

⁴² TOOL30: Calculation of the fraction of non-renewable biomass. Available online at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v3.0.pdf>

considered to accurately reflect the fNRB in the areas in question. TOOL30 provides for the calculation of the project specific fNRB on a regional basis, which includes the utilisation of recent, national and local government statistics. The quantity of NRB has therefore been determined by calculating the total consumption of wood (H) in the Vhembe region and then deducting the quantity of renewable biomass (RB) from this value. The calculations are contained in Excel format⁴³. The fNRB, calculated with the desktop baseline survey results (H) was then updated to include the results of the subsequent field baseline results.

The results as determined through an independent 3rd party from the field baseline survey and updated fNRB calculations were^{44 45}:

H = 3.98 t/house/year

fNRB = 0.94

It should be noted that the above fNRB value was calculated using region specific land cover data and household wood consumption data determined through kitchen performance tests and is reported as such in the provided fNRB report. However, to be conservative, the PP has decided to use the FAO default wood use value of 0.4 t per capita per annum to determine the household wood consumption. Thus, the household size was determined during the baseline habit survey and set at 5.46 persons per household. Using the above 2 values to determine the annual household consumption the following fNRB results were obtained.

H = 2.18 t/house/year

fNRB = 0.88

PI3-VH: Local Stakeholder Engagements

Throughout the project lifecycle, local stakeholders are consulted via online webinars, physical stakeholder consultation meetings and sensitisation engagements. A list of these engagements are provided in Table 2 in Section 2.2 of this document. Meeting reports, attendance registers and feedback are provided in an addendum to this document.⁴⁶

These meetings are conducted by TASC and the relevant PI Implementation Partner. TASC have partnered with Implementation Partners (IP), who have a proven track record of implementing and managing projects in the region. Working with the IPs throughout the project lifecycle (from design, to implementation, and to the monitoring, reporting and

⁴³ 2023-03-14 TASC Baseline and fNRB Vhembe

⁴⁴TASC. 30 July 2023. Field Baseline Report – Vhembe_v1.0. Fuel Efficient Cooking in South Africa.

⁴⁵ 2023-03-14 fNRB assessment for Vhembe Municipality

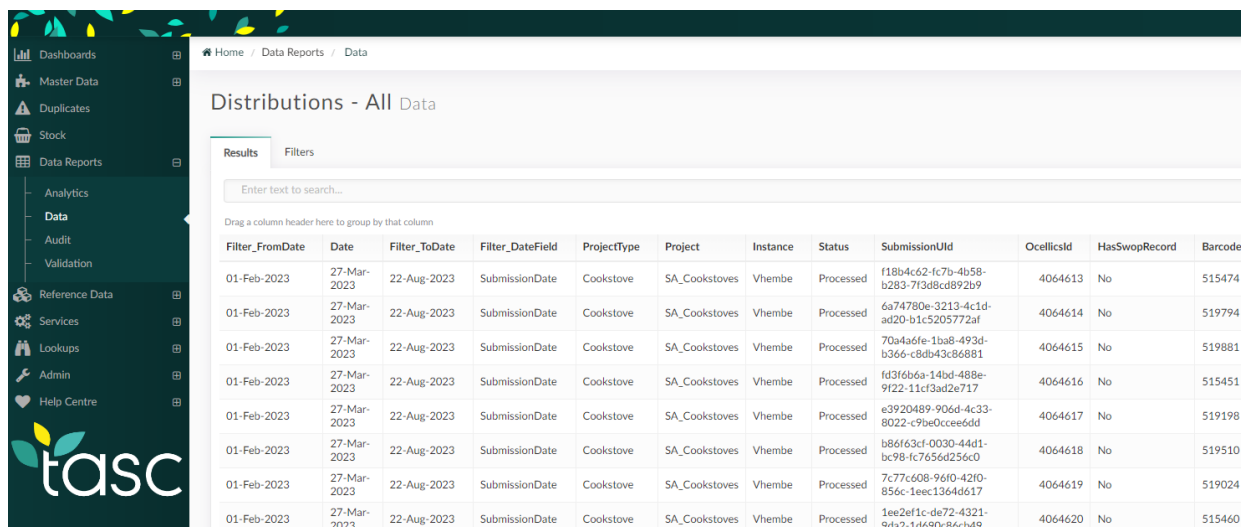
⁴⁶ 2505_LSC Report_PI3-VH

verification (MRV) cycles), enables constant on-the-ground interaction and communication with local stakeholders.

In PI3-VH, the Implementation Partner is Kruger 2 Canyons Biosphere Region (K2C) NPC⁴⁷, who is embedded in the region since 2011. K2C, part of the UNESCO Biosphere Reserve Network⁴⁸, is on a mission to support, promote and demonstrate within the Kruger to Canyons Biosphere Landscape a balanced and sustainable relationship between socio-economic development, the conservation of biodiversity and the sustainable use of natural resources on which people's livelihoods depend. K2C supports TASC in identifying local stakeholders, engaging with Traditional Authorities and communities, and arranging local meetings to communicate the non-technical description of the project and project information in a culturally appropriate manner. Communication channels are provided at all meetings and available on the How-To Guide, the meeting invitations and the Non-technical summary, which are included in the stakeholder engagement report.

3.3.5 Evidences of Compliance to Eligibility criterion 12- PI3-VH

PI3-VH: Start Date



Filter_FromDate	Date	Filter_ToDate	Filter_DateField	ProjectType	Project	Instance	Status	SubmissionUId	OcellId	HasSwapRecord	Barcode
01-Feb-2023	27-Mar-2023	22-Aug-2023	SubmissionDate	Cookstove	SA_Cookstoves	Vhembe	Processed	f18b4c62-fc7b-4b58-b283-7f3d8cd892b9	4064613	No	515474
01-Feb-2023	27-Mar-2023	22-Aug-2023	SubmissionDate	Cookstove	SA_Cookstoves	Vhembe	Processed	6a74780e-3213-4c1d-ad20-b1c5205772af	4064614	No	519794
01-Feb-2023	27-Mar-2023	22-Aug-2023	SubmissionDate	Cookstove	SA_Cookstoves	Vhembe	Processed	70a4a6fe-1ba8-493d-b366-c8db43c86881	4064615	No	519881
01-Feb-2023	27-Mar-2023	22-Aug-2023	SubmissionDate	Cookstove	SA_Cookstoves	Vhembe	Processed	fd3f6b6a-14bd-488e-9f22-11cf3ad2e717	4064616	No	515451
01-Feb-2023	27-Mar-2023	22-Aug-2023	SubmissionDate	Cookstove	SA_Cookstoves	Vhembe	Processed	e3920489-906d-4c33-8022-c9be0ccee6dd	4064617	No	519198
01-Feb-2023	27-Mar-2023	22-Aug-2023	SubmissionDate	Cookstove	SA_Cookstoves	Vhembe	Processed	b86f63cf-0030-44d1-bc98-fc7656d256c0	4064618	No	519510
01-Feb-2023	27-Mar-2023	22-Aug-2023	SubmissionDate	Cookstove	SA_Cookstoves	Vhembe	Processed	7c77c608-96f0-42f0-856c-1eec1364d617	4064619	No	519024
01-Feb-2023	27-Mar-2023	22-Aug-2023	SubmissionDate	Cookstove	SA_Cookstoves	Vhembe	Processed	1ee2ef1c-de72-4321-9da2-1d690c86cb49	4064620	No	515460

Figure 4 A screenshot of the distribution database showing the first stoves distributed in PI3-Vhembe

⁴⁷ <https://kruger2canyons.org/>

⁴⁸ <https://en.unesco.org/biosphere>

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Monitoring Report: VCS Version 4.2

Data / Parameter	Bold
Data unit	Tonnes/year
Description	Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices.
Source of data	Calculated according to options stated in 'Determination of quantity of firewood consumed in absence of project activity' as per options in Section 4.4 in the PDD. Based on Field Baseline surveys conducted by TASC for each PI ^{49 50 51}
Value applied	5.49 for PI1-K2C 5.00 for PI2-WB 3.98 for PI3-VH
Justification of choice of data or description of measurement methods and procedures applied	This parameter shall be determined at the Project Instance level. Field baseline surveys for PI3-VH were conducted by TASC from May to July 2023. The protocols followed are described in Section 3.3 above and in the Field Baseline Reports submitted alongside this document.
Purpose of Data	Calculation of emission reductions in Equations 3 & 6.
Comments	Parameter Bold once determined shall remain fixed for the entire crediting period. Where charcoal is used by the baseline device, a default wood to charcoal conversion factor of 6 kg of firewood per kg of charcoal may be used in line with paragraph 35 of AMS II.G, version 11.

Data / Parameter	f_{nrb,b,y}
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⁴⁹ Kok, L. 2021. Field Baseline Report – Waterberg. Fuel Efficient Cooking in South Africa. TASC.

⁵⁰ Kok, L. 2021. Field Baseline Report – Kruger 2 Canyons. Fuel Efficient Cooking in South Africa. TASC

⁵¹ TASC. 2023. Field Baseline Report – Vhembe_v1.0. Fuel Efficient Cooking in South Africa.

Data unit	Fraction
Description	Fraction of woody biomass that can be established as non-renewable biomass.
Source of data	Calculated based on the CDM TOOL 30 “Calculation of the fraction of non-renewable biomass” v3.0 for PI3-VH. See associated report: Desktop Study for fNRB assessment for the Vhembe Municipality; and fNRB calculation sheet: “2023-03-14 TASC Baseline and fNRB Vhembe” ^{52 53}
Value applied	0.89 for PI1-K2C 0.99 for PI2-WB 0.88 for PI3-VH
Justification of choice of data or description of measurement methods and procedures applied	This parameter shall be determined at the Project Instance level. Calculated based on the CDM TOOL30 “Calculation of the fraction of non-renewable biomass” v3.0 for PI3-VH ⁵⁴ .
Purpose of Data	Calculation of emission reductions.
Comments	

Data / Parameter	EF_{WF,CO2}
Data unit	tCO ₂ e/TJ
Description	CO ₂ emission factor of biomass that is substituted or reduced.
Source of data	VMR0006 methodology default: ⁵⁵ IPCC default for wood fuel
Value applied	112
Justification of choice of data or description of measurement methods and procedures applied	Default
Purpose of Data	Calculation of emission reductions.

⁵² 2023-03-14 TASC Baseline and fNRB Vhembe

⁵³ 2023-03-14 fNRB assessment for Vhembe Municipality

⁵⁴ TOOL30: Calculation of the fraction of non-renewable biomass. Available online at: <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-30-v3.0.pdf>

⁵⁵ Available at: <https://verra.org/methodology/vmr0006-methodology-for-installation-of-high-efficiency-firewood-cookstoves/>

Comments	
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Data / Parameter	$EF_{WF,non-CO_2}$
Data unit	tCO ₂ e/TJ
Description	Non-CO ₂ emission factor of biomass that is substituted or reduced.
Source of data	VMR0006 methodology default: ⁵⁶ IPCC default for wood fuel
Value applied	26.23
Justification of choice of data or description of measurement methods and procedures applied	Default
Purpose of Data	Calculation of emission reductions.
Comments	

Data / Parameter	η_p
Data unit	Fraction
Description	Efficiency of ICS at the start of project activity
Source of data	University of Johannesburg SeTAR Centre test report on Rocket Works' Zama Zama Stove; February 2013 ⁵⁷
Value applied	38.3%
Justification of choice of data or description of measurement methods and procedures applied	This parameter shall be determined at the Project Instance level. Value applied is for PI3-VH.
Purpose of Data	Calculation of $\eta_{new,i,j}$ in Equation 5, ex-ante.
Comments	

⁵⁶ Available at: <https://verra.org/methodology/vmr0006-methodology-for-installation-of-high-efficiency-firewood-cookstoves/>

⁵⁷ SeTAR Centre. 2013. Stove Thermal Efficiency and Emissions Interim Test Report – RocketWorks Wood Stove.

4.2 Data and Parameters Monitored

Grouped Project

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	ER Calculation Sheet "Summary" tab PI1-K2C: Cell D6 PI2-WB: Cell E6 PI3-VH: Cell F6
Description of measurement methods and procedures to be applied	The total number of devices in operation compared to the total number of distributed (according to the monitoring database) will be surveyed. Devices in operation in the sampled group will be counted during each monitoring period to derive an attrition rate (expressed as a percentage) and this percentage deduction will be applied to the total number of devices operating. Measured directly or based on a representative sample. Sampling standard shall be used for determining the sample size to achieve 90/10 confidence precision according to the latest version of Standard for sampling and surveys for project activities and programme of activities. Alternatively, simplified approach proposed in option (b) under section 8.4 in the VMR0006 version 1.1 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 monitored	PI1-K2C = 293,818 PI2-WB = 221,537 PI3-VH = 53,241
Monitoring equipment	Survey form
QA/QC procedures to be applied	Data from the monitoring survey will be collected at least biennially and applied to the emission reductions calculations during that monitoring period. Where the required level of

	precision is not met either additional surveys may be completed, or the lower bound value applied.
Purpose of the data	Calculation of emission reductions in Equation 2
Calculation method	
Comments	Proportion of operational stoves obtained from the survey is multiplied by the total commissioned stoves to arrive at this value.

Data / Parameter	$\eta_{\text{new}, i, j}$
Data unit	Fraction
Description	Efficiency of the device of each type i and batch j implemented as part of the project activity.
Source of data	Measurements at project facility
Description of measurement methods and procedures to be applied	The methodology allows for 5 ways of measuring this parameter, as follows: - Conduct WBT test on a sample of three improved cookstoves with three tests conducted for each stove. The test can be carried out by project proponents by themselves or stove manufacturers or other third parties. - Efficiency to be tested is high-power thermal efficiency. The high-power thermal efficiency is the average of the Cold Start and Hot Start phases⁵⁸. - The average of all results for each device type/model and batch shall be taken as the efficiency for each device type and batch. - If the standard deviation of the test results indicated above is very small and 90/10 precision requirement is met (in this case, the value of the t-distribution for 90 per cent confidence shall be used instead of Z value), the efficiency determined is acceptable, otherwise more sample tests would be required until 90/10 precision is met. - Efficiency of the improved cookstoves can also be estimated ex-ante using equation 5 where loss in efficiency per year is calculated, and therefore this parameter does not need to be monitored.

⁵⁸ CDM Methodologies Panel Clarification on water boiling test under AMS II.G (SSC_752)

	Step v is applied during this monitoring period (using methodology equation 5), meaning this parameter does not need to be monitored and the calculated approach is adopted.
Frequency of monitoring/recording	Annually
Value monitored	Stoves less than 1 year old = 0.3637 Stoves more than 1 year old and less than 2 years old = 0.3600
Monitoring equipment	ER calculation sheet
QA/QC procedures to be applied	Data will be collected annually and applied to the emission reductions calculations during that monitoring period.
Purpose of the data	Calculation of emission reductions in Equation 3
Calculation method	Equation 5
Comments	See emission reductions calculation sheet for details

Data / Parameter	$B_{y=1,new,i,j,survey}$
Data unit	Tonnes
Description	Quantity of woody biomass used by project devices in tonnes per device of type i .
Source of data	Monitoring survey
Description of measurement methods and procedures to be applied	Minimum sample size of each type i and batch j should be in line with the latest version of Standard for sampling and surveys for project activities and programme of activities or guidelines provided in section 8.4 option (b). Determined in the first year of the introduction of the devices (e.g. during the first year of the crediting period, $y=1$) through measurement campaigns at representative households and/or sample survey. Sample surveys to estimate this parameter, that are solely based on questionnaires or interviews (i.e. that do not implement measurement campaigns) may only be used if the following conditions are satisfied. (i) Baseline cookstoves have been completely decommissioned and only improved cookstoves are exclusively used in the project households; (ii) If multiple devices are used in the project, it is possible from the results of the survey questions to clearly differentiate the quantity of firewood being used by each device. In other words, if more than one device, or another device that consumes firewood, are in use in project households, then the sample survey needs to

	distinguish the quantity of firewood used by the project device and the other devices that use firewood.
Frequency of monitoring/recording	N/A
Value monitored	N/A
Monitoring equipment	N/A
QA/QC procedures to be applied	Data collected will be applied to the emissions reduction calculations during that monitoring period. Where the required level of precision is not met either additional monitoring activities may be completed, or the lower bound value applied.
Purpose of the data	Calculation of emission reductions in Equation 3
Calculation method	Equation 4
Comments	Monitoring $B_{y=1,new,i,j,survey}$ is optional as calculating $B_{y,savings,i,j}$ can be estimated using either Equation 3 or 4 as per the methodology. The option to use Equation 3 was selected and therefore $B_{y=1,new,i,j,survey}$ is not applicable. Equation 3: $B_{y,savings,i,j} = B_{old} \times [1 - (\eta_{old}/\eta_{new,i,j})]$, where η_{old} is the efficiency of the baseline cookstove and $\eta_{new,i,j}$ is determined through Equation 5 in the methodology.

Data / Parameter	μy
Data unit	Fraction
Description	Adjustment to account for any continued use of pre-project devices during the year y
Source of data	Monitoring survey
Description of measurement methods and procedures to be applied	Minimum sample size of each type i and batch j should be in line with the guidelines provide in section 8.4 option (b) of the methodology. This parameter should be monitored using one of the following methods: - If the baseline cookstoves are decommissioned and no longer used, as determined by the monitoring survey its value is 0 and $B_{old,adjusted}$ is equal to B_{old} - If both the improved cookstove and baseline cookstoves are used together then surveys shall be conducted to

	record the average continued operation of baseline cookstoves in a sample of households. The surveys should be designed to capture the cooking habits and stove usage of households in the region, including quantification of use of baseline cookstoves, by formulating questions and/or collecting evidence to determine the frequency of usage of both the improved cookstoves and baseline cookstoves. For example, if there were 3 baseline cookstoves in a household and it was determined during the survey that use of one of them continues during the crediting period then a conservative adjustment factor of 0.33. Another example would be the case where there was only one baseline cookstove per household and its use during the project period continues along with the improved cookstove to meet 25% of the cooking needs of the household in which case the adjustment factor will be 0.25. Another example would be to interview the household and have them estimate the time of usage of the baseline cookstoves and improved cookstove on an average day.⁵⁹
Frequency of monitoring/recording	At least once every two years
Value monitored	PI1-K2C = 0.22 PI2-WB = 0.42 PI3-VH = 0.41
Monitoring equipment	Survey form
QA/QC procedures to be applied	Data from the monitoring survey will be collected at least once every two years and applied to the emission reductions calculations during that monitoring period. Where the required level of precision is not met either additional surveys may be completed or the lower bound value applied.
Purpose of the data	Calculation of emission reductions in Equation 6
Calculation method	As per the methodology: For projects that opt for $B_{y=1,new,i,j,survey}$ i.e., direct measurement of biomass used in project stoves (for example via KPT), then μ_y is not required to be computed.
Comments	-
Data / Parameter	η_{old}

⁵⁹ For example, if a household reports to be preparing 3 meals in a day using 35 minutes each, out of which one meal is prepared on the baseline stove, then cooking time on secondary stove and project stove would be 0.33 and 0.66 respectively.

Data unit	Fraction
Description	Efficiency of baseline stove
Source of data	- Methodology default 0.1 or 0.2 - Surveyed prior to implementation of project activity
Description of measurement methods and procedures to be applied	In most cases, PIs will use option A under the methodology, but options B-D may be utilized if required: - A default value of 0.1 shall be used if 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. - If more than one type of baseline device is being replaced in the project region, weighted average values (taking the amount of woody biomass consumed by each device as the weighting factor) shall be used. - If this parameter is surveyed, project promoters may use simplified guidelines stated under Option (b) in Section 4.4 in the PDD for arriving at the minimum sample size
Frequency of monitoring/recording	Fixed for each individual household at the time of project implementation
Value applied	0.1
Monitoring equipment	-
QA/QC procedures to be applied	The baseline surveys for PI1-K2C, PI2-WB, and PI3-VH shows predominant use of wood fuel amongst households in the first three PI Project Boundaries. PIs will expressly target households that cook predominantly on an open fire, hence the application of Option A as the ex-ante parameter value. In all cases, the baseline device replaced within each household will be captured at the point of ICS distribution and recorded in the monitoring database. Ex-post values will be adjusted accordingly.
Purpose of data	Calculation of emission reduction in Equation 3.
Calculation method	-
Comments	All distribution data will be collected and stored in the Monitoring Database

Data / Parameter	Life Span
Data unit	Years
Description	Operating lifetime of project device
Source of data	Manufacturer's specification
Description of measurement methods and procedures to be applied	Device manufacturers will provide a statement on the expected operational lifetime of the device ⁶⁰
Frequency of monitoring/recording	Once at point of distribution
Value applied	5
Monitoring equipment	-
QA/QC procedures to be applied	Stoves will have an expected operational lifetime and this value is used for ex-ante emissions reductions calculations. The actual operation of stoves is monitored via parameter Ny,i,j and therefore any stove found to be in operation beyond its expected lifetime may still be credited during the PI crediting period. Likewise, stoves found not to be in operation prior to the end of their lifetime will be discounted.
Purpose of data	Calculation of emissions reductions
Calculation method	-
Comments	-

Data / Parameter	NCV _{biomass}
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass, renewable biomass, briquettes or pellets used in project devices
Source of data	Default
Description of measurement methods and procedures to be applied	PIs will adopt the methodology (IPCC) default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is 'air-dried' may be used if fuel used in project device is woody biomass/renewable biomass.

⁶⁰ Rocket Works Stove Longevity. 2021.

Frequency of monitoring/recording	Annual
Value applied	0.0156
Monitoring equipment	None
QA/QC procedures to be applied	Measurement in laboratories according to relevant national/international standards based on dry biomass. Consistency of the measurements to be checked by comparing the measurement results with measurements from previous years, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC.
Purpose of data	Calculation of emission reduction
Calculation method	-
Comments	-

4.3 Monitoring Plan

4.3.1 Sampling Plan

The sampling plan is intended to enable the discovery of unbiased and reliable estimates of monitored parameter values used in the GHG emission reduction calculations. The sampling plan design is based on the CDM Guideline: Sampling and surveys for CDM project activities and programmes of activities, version 4.

Sampling Design

a. Objectives & Reliability Requirements

Sampling activities are defined at the Grouped Project-level and apply here to the execution of the sampling plan presented here to assess parameter values in Project Instances.

In accordance with the Methodology and the Standard, PI are categorized as CDM small scale, samples will be calculated on a 90/10 for individual PIs on an annual basis, or 95/10 confidence/precision basis for groups of PIs or sampling on a biennial basis.

In cases where the confidence/precision are not achieved, the lower bound of the confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts.

Parameter values may be estimated by sampling in accordance with Sampling Standard for a single or a group of PIs. A single sampling plan covering a group of PIs is justified when either the homogeneity of included PIs relative to the parameters of interest can be demonstrated or the differences among the included PIs is taken into account in the sample size calculation. Sampling was conducted per PI.

Monitoring Report: VCS Version 4.2

Sampling and surveys to determine parameter $N_{y,ij}$ and μ_y were conducted for each PI included in this GP.

b. Target Population

The target population is the combined unique entries of ICS users (i.e. the total number of devices distributed) by PI in the monitoring database from which the sample is being drawn. The target population for the monitoring is 625,926 households that received an ICS.

c. Sampling Method

For each survey, the sampling method is determined by using a random sample of the total population of distributed ICS from records generated in the monitoring database and based on the precision requirements listed above, and as required by the methodology and guidance in the Sampling Standard.

d. Sample Size

The sample size for each monitoring activity will be the total number of ICS distributed and included in the monitoring database. A sample size calculation sheet will be used to calculate whether the precision was met.

Oversampling will be conducted to ensure that the required level of precision is met.

The formula used for sampling are as follows:

i. For proportion based parameters:

$$n \geq \frac{1.645^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.645^2 p(1-p)} \quad \text{Equation (1)}$$

Where:

n	=	Sample size
N	=	Total number of households (640,000)
p	=	Our expected proportion (0.50)
1.645	=	Represents the 90% confidence required
0.1	=	Represents the 10% relative precision ($0.1 \times 0.5 = 0.05 = 5\%$ points either side of p)

i. For mean based parameters:

$$n \geq \frac{1.645^2 NV}{(N-1) \times 0.1^2 + 1.645^2 V}$$

Equation (18)

Where:

$$V = \left(\frac{SD}{mean} \right)^2$$

n = Sample size

N = Total number of households

$Mean$ = Our expected mean (3.5 hours)

SD = Our expected standard deviation (2.5 hours)

1.645 = Represents the 90% confidence required

CS Version 4.2

Using the CDM Survey Sample Calculator v03.1⁶¹, the sample size for $N_{y,i,j}$ and μ_y was determined for a proportion parameter:

Expected proportion, p	0.82
Confidence level	90%
Z multiplier	1.645
Relative precision	10%
Population size, N	625,926
Predicted sample size, n	60

The expected proportion was informed by the previous monitoring and verification process for this GP, which was concluded in June 2023. However, to satisfy the minimum sample size according to Section 8.4 Option (b) of the VMR0006 v1.1 methodology, i.e., Project target population > 1000: Minimum sample size 100, a random sample of 100 was selected in each PI. The parameter μ_y was determined for the same sample set.

e. Sampling Frame

The Sampling Frame will be the monitoring database which may contain information from multiple PIs and therefore allows for sampling to be taken per PI or as a group of PIs. Each PI was sampled separately in this monitoring period.

⁶¹ Available at: <https://cdm.unfccc.int/Reference/Guidclarif/index.html>

4.3.2 Data Recording

Field-based monitoring activities to determine monitored parameter values was a field survey including a qualitative questionnaire and quantitative household wood fuel use measurements.

Monitoring Report: VCS Version 4.2

Data was recorded directly onto a smartphone-based app designed for the purpose.

Once collected, data was submitted directly from the field to the TASC SA Carbon Project Manager for QA/QC and entry into the Monitoring Report.

4.3.3 Organizational Structure

The TASC SA Carbon Project Manager will have overall responsibility for the implementation of the monitoring plan.

Data collection was conducted by a dedicated monitoring team of trained individuals, either from TASC SA or the Project Instance Implementer using a survey questionnaire.

4.3.4 Quality Assurance/Quality Control

In order to minimize sampling errors, such as non-responses and errors, the field team practiced over-sampling from the population to ensure a total number respondents that meets the required level of precision and minimum sample size requirements. This will ensure the integrity of the sample group and maintains the randomness of participant selection. All sample groups will be re-selected for each monitoring period / year, as appropriate for the parameter in question.

If the required level of precision is not achieved, then further surveys may be completed or the lower bound value adopted in the calculations.

Where a survey may not be completed, or where there is a non-response, the reasons shall be clearly documented in the survey questionnaire.

4.3.5 Analysis

Completed survey questionnaires data was collected by the monitoring team and delivered to the TASC SA Carbon Project Manager for analysis. These were checked through for errors and completeness, and compiled into this monitoring report.

Monitoring surveys were conducted across both PIs between May and August 2023. The minimum sample size of 100 households as per VMR0006 Section 8.4 Option (b) were selected to survey for the proportion parameter $N_{y,ij}$ and μ_y . Each stove in the distribution database was a number from 1 to x, where x = the count of stoves in each PI. A random sample was extracted from each PI's distribution database using the Excel Sampling

function in the Data Analysis Tool.⁶² The survey database, which includes the GPS coordinates of each survey is submitted with this monitoring report.

Analysis of survey questions for parameter $N_{y,ij}$, indicated a proportion of 0.86, 0.99, and 0.88 for PI1-K2C, PI2-WB, and PI3-VH, respectively, of disseminated stoves are being used. To determine this proportion, stove recipients were asked if they use their stoves. Interviewees who responded “No” to the question “Do you use your stove” was considered a non-user, and those who responded “Yes”, were considered a user. The survey results meet the precision requirements at 6.6%, 1.7%, and 6.1% in PI1-K2C, PI2-WB, and PI3-VH, respectively, according to the CDM Survey Sample Calculator v03.1 and shown below.

Project Instance	PI1-K2C	PI2-WB	PI3-VH
Actual sample size	100	100	100
Sample proportion	0.8600	0.9900	0.8800
Standard error of the proportion	0.0347	0.0099	0.0325
Precision associated with a proportion	0.0571	0.0164	0.0534
Relative precision	6.6%	1.7%	6.1%

For the analysis of the survey to determine μ_y , the survey results met the precision requirements for mean based parameters at 7%, 4.2%, and 6.1% in PI1-K2C, PI2-WB, and PI3-VH, respectively, according to the CDM Survey Sample Calculator v03.1 and shown in the table below. The KPT results indicated the mean average wood usage of 1.82, 2.41, and 1.99 t/household/year in PI1-K2C, PI2-WB, and PI3-VH, respectively.

	PI1-K2C	PI2-WB	PI3-VH
Actual sample size	100	100	100
Sample mean	4.9820	6.6150	5.4420
Sample standard deviation	2.1110	1.6780	2.1910

⁶² <https://www.dummies.com/article/technology/software/microsoft-products/excel/how-to-sample-data-in-excel-152117/>

Standard error of the mean	0.2111	0.1678	0.2189
t-value	1.6604	1.6604	1.6604
Absolute precision	0.3505	0.2786	0.3634
Relative precision	7.0%	4.2%	6.7%

4.3.6 Implementation Plan

The implementation of this monitoring plan is the responsibility of TASC SA and its specifically trained monitoring team. This team comprised local operatives who are conversant in local languages and customs of rural South Africa. Individuals were selected based on their competence and experience for each monitoring activity and trained accordingly.

No incentives were or will be provided for these individuals for the type of data provided, to prevent any conflict of interest.

The Kitchen Performance Test (KPT) Protocol v4 of the Clean Cooking Alliance⁶³ was followed to determine the household wood use and the proportion of cooking need still being met by the baseline device as described in section 5.4 of this document. The KPT is the principal field-based procedure to measure household fuel consumption. The objective of the KPT is to quantify fuel consumption under typical household and stove usage conditions. The protocol is conducted alongside the qualitative habit survey to contextualise fuel consumption and continued baseline stove use practices and to report on the SDG contributions. The KPT measurements, although the best way to understand fuel usage of homes, intrudes on people's daily activities and results have an element of uncertainty as conditions are harder to control in comparison to laboratory-based tests.

Daily fuel consumption is measured through the KPT, which can then be used to determine the daily average fuel and energy consumption per adult equivalent. To facilitate comparison of wood fuel usage across households with different age and gender compositions, the KPT allows for converting household members to adult equivalent units. To minimise interference on the normal household fuel consumption practices, wood was not provided to the households.

The test was performed in the austral autumn and winter between May and July 2023. The Data Capturers (DCs) visited each household to explain the purpose of the test and to request the household members' consent to conduct the test. On the first day of the test,

⁶³ Bailis, R., Thompson, R., Lam, N., Berrueta, V., Muhwezi, G. & Adams, E. 2018. Kitchen Performance Test (KPT) v4.0. Clean Cooking Alliance. 16p.

the initial weight of the wood in each household's firewood stockpile was measured, as well as three moisture measurements of three individual pieces of wood from the stockpile. On the subsequent days, the households were visited at a time as close as possible to the time of visit on the first day. The remaining firewood stockpile was then weighed to determine the wood consumption in a 24-hour period. The moisture content of the wood in the stockpile was also measured during the visits to be correlated with the following 24-hour period's wood consumption.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The methodology does not account for baseline emissions separately, but instead quantifies emission reductions as a function of the reduction in the amount of non-renewable biomass fuel consumption in the efficient project stoves as compared to baseline stoves.

5.2 Project Emissions

The methodology does not account for project emissions separately, but instead quantifies emission reductions as a function of the reduction in the amount of non-renewable biomass fuel consumption in the efficient project stoves as compared to baseline stoves.

5.3 Leakage

Leakage (Ly) shall be considered as default 0.95 in accordance with Section 8.3 of the applied methodology VRM0006 v1.1

5.4 Net GHG Emission Reductions and Removals

Procedure for quantification of net GHG emission reductions and removals

Net GHG emission reductions are calculated by applying Equations 1 and 2 of the VMR0006 v1.1 methodology:

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

where:

i	=	Indices for the situation where more than one type/model of improved 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 CO ₂ e	on 4.2
$ER_{y,i,j}$	=	Emission reductions by improved cook stove of type i and batch j during year y in t CO ₂ e	

and

$$ER_{y,i,j} = B_{y,savings,i,j} \times NCV_{wood\ fuel} \times f_{NRB,y} \times (EF_{wf,CO_2} + EF_{wf,nonCO_2}) \times N_{y,i,j} \times 0.95 \quad \text{Equation (2)}$$

where:

$B_{y,savings,i,j}$	=	Quantity of woody biomass that is saved in tonnes per improved 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 (fNRB)
$NCV_{wood\ fuel}$	=	Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonne)
EF_{wf,CO_2}	=	CO ₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO ₂ /TJ)
$EF_{wf,non\ CO_2}$	=	Non-CO ₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO ₂ /TJ)
$N_{y,i,j}$	=	Number of improved 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, $B_{y,savings,i,j}$, due to the implementation of improved cookstoves can be estimated by one of the following options set out in Equations 3 and 4:

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

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

The efficiency of the project stoves can be estimated using Equation 5:

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

where

η_p	=	Efficiency of project stove (fraction) at the start of project activity.	
$(DF_n)^{y-1}$	=	Discount factor to account for efficiency loss of project cookstove per year of operation (fraction). This value may be based on actual monitoring or based on manufacturer's declaration on expected loss in efficiency or through publicly available literature on relevant industry standards. Alternatively default value of 0.99 efficiency loss per year can be considered.	Equation 4.2
0.94	=	Adjustment factor to account for uncertainty related to project cookstove efficiency test.	

Where project households continue to use baseline cookstoves along with the ICS, B_{old} shall be adjusted ex-post based on the percentage of project households found to continue such practice according to Equation 6. For such cases, the quantity of woody biomass saved, $B_{y,savings,i,j}$ due to implementation of ICS shall be calculated using an adjusted value to account for ex-post use of baseline stoves in addition to improved cookstoves.

$$B_{old,adjusted} = B_{old} \times (1 - \mu_y) \quad \text{Equation 6}$$

where:

$B_{old,adjusted}$	=	Adjusted B_{old} to account the ex post usage of firewood in baseline cookstove(s) by project households in addition to improved cookstove (in tonnes per device)
μ_y	=	Baseline stove usage factor to account for use of baseline cookstoves along with improved cookstoves.

The quantity of firewood consumed in the absence of the project activity (B_{old}) shall be determined using an estimation of average annual consumption of firewood per household which may be derived using any of the following options:

- Historical Data.
- Baseline Survey of Local Usage.
- Minimum Service Level

Option b) applied in this monitoring period.

A net gross leakage factor of 0.95 is applied to $ER_{y,i,j}$.

The equations above assume that a single baseline stove is replaced by a single project stove.

Only 1 project device will be distributed per household in the project, as evidenced by the monitoring database entries, and so the following equations are not relevant to the calculation of ERs in the project and will not be monitored:

$$B_{old,i,j} = B_{old,HH} \div N_{d,HH} \quad \text{Equation (i)}$$

$$B_{old,HH} = B_{old,p} \times N_{p,HH} \quad \text{Equation (ii)}$$

where

$B_{old,HH}$	Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices (tonnes/household/year)	rt: VCS Version 4.2
$N_{d,HH}$	Number of project devices per household	
$B_{old,p}$	Annual quantity of woody biomass that would have been used per person in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices (tonnes/person/year)	
$N_{p,HH}$	Average number of households	

For projects opting for $B_{y=1,new,i,j,survey}$, it shall be demonstrated that the consumption of biomass for individual project stoves can be measured exclusive of one another. $B_{y=1,new,i,j,survey}$ was not applicable in this monitoring period.

Project stoves will be implemented to replace non-renewable woody biomass baseline stoves only, so Equations 7 & 8 are not applicable.

Example calculations:

For each Project Instance a study of the PI-level baseline scenario was provided at validation, either from public sources (where such data may be available) or field studies. The following steps were followed to calculate the ERs.

- Applying Equation 6, the quantity of woody biomass being consumed in the baseline scenario (B_{old}) was adjusted ($B_{old,adjusted}$) with the proportion of continued baseline stove usage (μ_y), as determined through the survey campaign.

As part of the survey campaign, Kitchen performance tests (KPTs) were conducted to measure the household wood fuel consumption. The KPTs were conducted according to the KPT Protocol, version 4⁶⁴. The KPT is the principal field-based procedure to measure household fuel consumption. The primary objective of the KPT is to quantify fuel consumption under typical household and stove usage conditions. This involves a 4-day assessment of overall household fuel use, which automatically accounts for fuel use on all appliances in use in the household. This means that if baseline appliances continue to be used in the project scenario, the usage of fuel on those appliances is

⁶⁴ KPT 4.0 March 2018 (cleancooking.org)

accounted for in the KPT. As noted in the KPT Protocol version 4.0: “Because it occurs in the homes of stove users, this type of testing, when conducted carefully, is the best way to understand the stove’s impact on fuel use and, when complemented with the appropriate surveys, on general household characteristics and behaviors (Lillywhite, 1984; VITA, 1985).” Peer-reviewed literature supports KPTs as an accurate household biomass usage quantification method compared to imprecise household estimates. A recent study by Ventrella et al. (2020), showed good agreement ($R^2 = 0.81$) between the results from the KPT method and in-situ Fuel Use Electronic Logger (FUEL), a sensor-based system that monitors fuel consumption in households. This study found that there were no systematic over- or under-prediction of fuel consumption between the KPT and FUEL.⁶⁵ The KPT is widely used in peer-reviewed literature to determine fuel consumption (including Bailis et al. 2007; Berrueta et al. 2008).⁶⁶

It is important to note that the baseline scenarios for each Project Instance (PI) included in the Grouped Project were assessed by conducting KPTs in non-, or pre-project households. This is how the baseline wood usage parameter (B_{old}) was determined for both PIs in the registered Project Description. Therefore, conducting KPTs to assess fuel use in the project scenario, in project households, is a like-for-like comparison which ensures the highest level of accuracy in the monitored results.

Applying Equation 3, the expected ex-ante household fuel use can be determined in a situation where the baseline open-fire has been completely decommissioned and replaced by the ICS. Through the KPT surveys, the project scenario fuel use is measured encompassing fuel use in all household cooking devices. The difference between the expected project fuel use and the actual project fuel use in each household can therefore be determined. Where a household’s fuel use is in excess of the expected fuel use, the excess is conservatively assumed to be from using the baseline open-fire. The proportion of cooking need still being met by the baseline open-fire is calculated as the excess fuel use ascribed to the baseline device in relation to the total household fuel use. The average proportion is calculated for all the surveyed households to determine μ_y for each PI.

⁶⁵ Ventrella, J., Lefebvre, O. & MacCarty, N. 2020. Techno-economic comparison of the FUEL sensor and Kitchen Performance Test to quantify household fuel consumption with multiple cookstoves and fuels. *Development Engineering*. Volume 5:100047. <https://doi.org/10.1016/j.deveng.2020.100047>.

⁶⁶ Bailis, R., Berrueta, V., Chengappa, C., Dutta, K., Edwards, R., Masera, O., Still, D., & Smith, K.R. 2007. Performance testing for monitoring improved biomass stove interventions: experiences of the Household Energy and Health Project. *Energy for Sustainable Development*, Volume 11, Issue 2, Pages 57-70. [https://doi.org/10.1016/S0973-0826\(08\)60400-7](https://doi.org/10.1016/S0973-0826(08)60400-7).

Berrueta, V.M., Edwards, R.D. & Masera, O.R. 2008. Energy performance of wood-burning cookstoves in Michoacan, Mexico, *Renewable Energy*. Volume 33, Issue 5, Pages 859-870, <https://doi.org/10.1016/j.renene.2007.04.016>.

- ii. The assumed reduction in stove efficiency with age was calculated for stoves younger than 1 year, and between 1 and 2 years old using Equation 5. $B_{y,savings,i,j}$ was subsequently calculated with Equation 3 for each PI and stove age category.
- iii. ER_y per stove was calculated by applying Equation 2 based on one stove per age category in each PI. An $ER_{day,i,j}$ per stove value was then determined by dividing ER_y by 365 days.
- iv. The number of days each stove has been operational since the start of the monitoring period was determined. The sum of the stove days could then be multiplied by the stove usage rate ($N_{y,i,j}$) determined with the Habit Survey for each PI and by $ER_{day,i,j}$ applicable to the stove age category to determine the $\sum ER_{y,i,j}$.
- v. fNRB is calculated according to equations 1 - 4 set out in CDM Tool30. As an example equations 1 – 4 for Vhembe (PI3–VH) is presented below⁶⁷, the values for PI1-K2C and PI2-WB are shared in Table 4 below.

$$\begin{aligned} \text{fNRB} &= \text{NRB}/(\text{NRB}/\text{RB}) \text{ (Equation 1, CDM Tool30)} \\ &= 0.88 \end{aligned}$$

Where:

$$\begin{aligned} \text{NRB} &= \text{Quantity of non-renewable biomass in the country/region or project area (t/yr)} \\ &= 620,655 \end{aligned}$$

$$\begin{aligned} \text{RB} &= \text{Quantity of renewable biomass in the country/region or project area (t/yr)} \\ &= 80,792 \end{aligned}$$

$$\begin{aligned} \text{NRB} &= \text{H} - \text{RB} \text{ (Equation 2, CDM Tool30)} \\ &= 620,655 \end{aligned}$$

Where:

$$\begin{aligned} \text{H} &= \text{Total consumption of woody biomass in the applicable area in the relevant period (tonnes)} \\ &= 701,457 \end{aligned}$$

$$\text{RB} = \text{Quantity of renewable biomass in the country/region or project area (t/yr)}$$

⁶⁷ 2023-10-18 TASC Baseline and fNRB Vhembe_v1.0

$$= 80,792$$

$$H = HW * N + CE + NE \text{ (Equation 3, CDM Tool30)}$$

Monitoring Report: VCS Version 4.2

$$= 701,457$$

Where:

HW = Average consumption of wood fuel per household, including fuelwood and charcoal, in the applicable area in the relevant period (tonnes//household)
= 2.1840⁶⁸

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

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

N = Number of households consuming wood fuel within the applicable area in the relevant period (number)
= 321,180⁶⁹

$$RB = \sum (MAI_{forest,i} \times (F_{forest,i} - P_{forest,i})) + \sum (MAI_{other,i} \times (F_{other,i} - P_{other,i})) \text{ (Equation 4, CDM Tool30)}$$

$$= 80,792$$

Where:

⁶⁸ Average HH size of 5.46 multiplied with FAO default per capita consumption value of 0.4t

⁶⁹ <https://municipalities.co.za/overview/129/vhembe-district-municipality>

$MAI_{forest,i}$ = Mean Annual Increment of woody biomass growth per hectare in subcategory i of forest areas in the relevant period (tonnes/ha/yr)
= 1.00⁷⁰

$MAI_{other,i}$ = Mean Annual Increment of woody biomass growth per hectare in subcategory i of other land areas in the relevant period (tonnes/ha/yr)
= n/a

$F_{forest,i}$ = Extent of forest in sub-category i in the relevant period (ha)
= 112,492⁷¹

$F_{other,i}$ = Extent of other land in sub-category i in the relevant period (ha)
= n/a

$P_{forest,i}$ = Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within forest areas (in subcategory i) in the relevant period (ha)
= 31,700⁷²

$P_{other,i}$ = Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within other land areas (in sub-category i) in the relevant period (ha)
= n/a

As most of the above values used for the fNRB calculations are calculated values, the reference for each value is not explicitly stated here. However, all references to values behind the main calculated values can be found in the fNRB report⁷³ and calculation sheet⁷⁴ for Vhembe.

⁷⁰ Mean value from the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: V4_04_Ch4_Forest_Land Table 4.9, Subtropical mountain forest - Africa

⁷¹ Vhembe, Limpopo, South Africa Interactive Forest Map | GFW (globalforestwatch.org)

⁷² Vhembe, Limpopo, South Africa Interactive Forest Map | GFW (globalforestwatch.org)

⁷³ 2023-10-31 fNRB assessment for Vhembe Municipality clean

⁷⁴ 2023-10-18 TASC Baseline and fNRB Vhembe_v1.0

To calculate the annual quantity of ERs, the fixed parameters and example calculations for all three PIs are outlined below. (Note: The values indicated in the table below are not rounded and only the first four decimals are indicated).

Table 4 Example project parameters

Monitoring Report: VCS Version 4.2

Fixed GP Parameters	Unit	Value		Description		Source
EF_{wf,CO_2}	tCO2e/TJ	112		CO2 emission factor of biomass that is substituted or reduced.		VMR0006 default
$EF_{wf,non-CO_2}$	tCO2e/TJ	26.23		Non-CO2 emission factor of biomass that is substituted or reduced.		VMR0006 default
$NCV_{biomass}$	TJ/tonne of wood	0.0156		Net calorific value of biomass.		VMR0006 default
η_{old}	fraction	0.1		Efficiency of the baseline cookstove being replaced.		VMR0006 default
η_p	fraction	0.383		Efficiency of project cookstove (fraction) determined at the start of the project activity.		Rocket Works' Zama Zama wood stove; South Africa lab efficiency test (stove model distributed in the first two monitoring periods)
L_y	fraction	0.95		Default leakage adjustment factor.		VMR0006 default
Fixed PI Parameters	Unit	PI1-K2C	PI2-WB	PI3-VH	Description	Source
B_{old}	tonnes/year	5.49	5.00	3.98	Quantity of biomass consumed in baseline.	Field baseline KPT surveys for PI1-K2C, PI2-WB, and PI3-VH
$F_{NRB,y}$	fraction	0.89	0.99	0.88	Fraction of biomass used in baseline scenario, which can be established as non-renewable.	fNRB studies for PI1-K2C, PI2-WB, and PI3-VH
Monitored Parameters	Unit	PI1-K2C	PI2-WB	PI3-VH	Description	Source
μ_y	fraction	0.22	0.42	0.41	Baseline stove usage factor to account for use of baseline cookstoves along	Habit surveys for PI1-K2C, PI2-WB, and PI3-VH

					with improved cookstoves	
$n_{y,i,j}$	fraction	0.86	0.99	0.88	Proportion of operational stoves in this monitoring period.	Habit surveys for PI1-K2C, PI2-WB, and PI3-VH

Table 5 Example calculations

For stoves less than 1 year old						
$\eta_{new,y}$	fraction	0.3637	0.3637	0.3637	Efficiency of improved cookstove in year y	Equation 5
$B_{old,adjusted}$	Tonnes/year	4.2657	2.9250	2.3402	Adjusted B_{old} to account the ex-post usage of firewood in baseline cookstoves	Equation 6
$B_{y,savings}$	tonnes/year	3.0927	2.1206	1.6967	The quantity of woody biomass saved in the project scenario.	Equation 3
$ER_{y,i}$	tCO2e/year	5.6387	4.3009	3.0587	ERs generated per stove per year	Equation 2
$ER_{day,i}$	tCO2e/day	0.0154	0.0117	0.0088	ERs generated per stove per day	$=ER_{y,i}/365$
Stove days	days	34,826,762	21,846,657	3,305,805	Total number of operational stove days	Distribution database
ER_y (before usage discount)	tCO2e	538,023.53	257,425.08	27,702.89	Emission reductions during year y	Equation 1
ER_y (after usage discount)	tCO2e	462,700.24	254,850.83	24,378.54	Emission reductions during year y after $n_{y,i,j}$ and baseline stove issue discounts applied	$=ER_y * n_{y,i,j}$
ER_y per stove (after usage discount)	tCO2e/year	4.8493	4.2579	2.6917	Emission reductions per stove per year after baseline stove usage discounts were applied	$= [ER_y \text{ (after discounts)}] / \text{Stove days} * 365$
For stoves more than 1 and less than 2 years old						

$\eta_{\text{new},y}$	fraction	0.3600	0.3600	0.3600	Efficiency of improved cookstove in year y	Equation 5
$B_{\text{old,adjusted}}$	Tonnes/year	4.2657	2.9250	2.3402	Adjusted B_{old} to account the ex-post usage of firewood in baseline cookstoves	Equation 6
$B_{y,\text{savings}}$	tonnes/year	3.0808	2.1125	1.6902	The quantity of woody biomass saved in the project scenario.	Equation 3
$ER_{y,i}$	tCO2e/year	5.6171	4.2844	3.0470	ERs generated per stove per year	Equation 2
$ER_{\text{day},i}$	tCO2e/day	0.0153	0.0117	0.0083	ERs generated per stove per day	$=ER_{y,i}/365$
Stove days	days	24,632,669	11,686,426	0	Total number of operational stove days	Distribution database
ER_y (before usage discount)	tCO2e	379,081.52	137,176.76	-	Emission reductions during year y	Equation 1
ER_y (after usage discount)	tCO2e	326,010.11	135,805.00	-	Emission reductions during year y after $n_{y,i,j}$ and baseline stove issue discounts applied	$=ER_y * n_{y,i,j} * 0.909$

ER_y per stove (after usage discount)	tCO ₂ e/year	4.8307	4.2416	-	Emission reductions per stove per year after baseline stove usage discounts were applied	= [ER _y (after discounts)/Stove days]*365
Total verifiable ERs	tCO ₂ e	788,710.35	390,655.83	24,378.54	Total ERs generated for the operational stoves during the monitoring period.	=ΣER _y (Equation 1)

A summary of the net GHG emission reductions and removals for the third monitoring period is tabulated below:

Table 6 A summary of the net GHG ERs for the GP

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01-February-2023 – 31-July-2023	1,203,743			1,203,743
Total	1,203,743			1,203,743

Table 7 Comparison of the MP1, MP2 and MP3 monitored ERs

	MP1 (20/08/2021-09/02/2022)	MP2 (10/02/2022-31/01/2023)	MP3 (01/02/2023-31/07/2023)	Change (MP2 to MP3)	Justification for the difference
PI1 ERs	77,797	607,604	788,710	30%	48,947 additional stoves were distributed during MP3,

					leading to the increase in associated ERs
PI2 ERs	26,050	310,583	390,655	26%	73,614 additional stoves were distributed during MP2, leading to the increase in associated ERs
PI3-ERs	-	-	24,378	-	All stoves were distributed in MP3 for this instance
Average per-ICS ERs	3.883	3.157	3.479	10.18%	The increase in per-ICS ERs for this MP was expected for the following reasons: 1. Stove adoption rates were expected to increase. Distributed household device projects typically see usage and adoption rates increase in the early stages of project development, as end-users familiarize themselves with the technology and its benefits. The PP has over a decade experience in ICS carbon projects and in a previous CDM PoA, developed by the PP and hosted in Zambia using similar technology and with a similar end user profile, observed the qualitatively surveyed increase in ICS adoption (i.e. usage rates) from the first to second monitoring periods from 58% to 88% (a 67%

					increase)⁷⁵. In this MP, the adoption rate of stoves increased from an average of 82% to 91% (a 10.9% increase) 2. Similarly, the continued baseline stove usage factor decreased from an average of 41.7% to 35%. The PP and PI Implementers deployed community and project support teams in all three PIs. These permanent teams were established specifically to support and encourage the widespread adoption and use of the ICS amongst end-users. Using multiple stakeholder engagement platforms (described in Section 3.1 above) have led to an increase in use of project ICS. In this monitoring period, 10 permanent monitors were employed across the two PIs. The teams presented at 43 community meetings, visited 659 project households, and posted several social media and
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⁷⁵ CDM: Fuel Efficient Stoves in Africa (unfccc.int)

					newsletter posts as described in Section 2.2 and 3.1 above. The combination of the above factors has led to an increase in per-ICS ERs from MP2 to MP3.
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Table 8 Comparison of the ex-ante calculated and monitored ERs for MP3

Ex-ante emission reductions	Achieved emission reductions	Difference	Justification for the difference
1,892,504	1,203,743	-36.39%	Although more stoves were distributed in the project scenario than in the ex-ante calculations (625,926 vs. 382,000) the different discounts applied resulted in the lower achieved emission reductions. 1. the baseline quantity woody biomass was reduced by an average of 36% to account for continued baseline stove usage alongside the ICS in the project scenario. 2. an average 11% reduction was further applied to the ERs to account for project stoves that are not in use.