



**Verified Carbon
Standard**

FUEL EFFICIENT COOKING IN SOUTH AFRICA



Document Prepared by TASC SA (Pty) Ltd.

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1 PROJECT DETAILS

1.1 Summary Description of the Project

Fuel Efficient Cooking in South Africa by TASC is a voluntary Grouped Project (“GP”) aimed at distributing fuel efficient improved cookstoves (ICS) to local communities in South Africa. The Coordinating/Managing Entity (CME) of the GP is TASC SA (Pty) Ltd. (“TASC”) and the ICS will be distributed by Project Instance (“PI”) Implementers, contracted by TASC specifically for this purpose. PI Implementers will be selected by TASC for their ability to handle the logistics of ICS distribution (storage, transportation, management etc.), but also for their ability to engage with local communities and identify suitable ICS recipients. Communities and individual recipients will be identified via an ongoing series of community sensitization meetings, which will introduce (amongst other things) the GP, the technology, and their impact.

The distribution of cookstoves is not mandated by South African law and the GP is a voluntary initiative.

Recipients will voluntarily participate in the GP and the relevant PI, and confirm this via agreeing to an End User Agreement, which also confirms that any emissions reductions generated under the GP/PI are owned by TASC. Certain data (“Distribution Data”) will be collected from ICS recipients using a dedicated smartphone app and cloud-based data management system, which allows TASC to uniquely identify each ICS and this will include (where possible): GPS locations of households, contact details, stove serial numbers, data of distribution etc.

Household cooking practices in South Africa include the use of electric stoves (electricity generated through coal combustion), gas, paraffin, coal and wood¹. Through this project, ICS will be distributed to communities within South Africa identified as relying on baseline open-fire wood-fueled cooking methods.

Summary description of the technologies and measures to be implemented by the project.

The ICS design has a stainless-steel insulated combustion chamber, small chimney and air inlets, which allows constant air inflow and improves combustion efficiency. Thermal transfer from the stove to the cooking pot is increased and GHG emissions are reduced. This highly effective stove uses less biomass fuel, emits less smoke, and can boil 5 liters of water in 15

¹ Makonese, T., Ifegbesan, A.P., Rampedi, I.T. 2017. Household cooking fuel use patterns and determinants across southern Africa: Evidence from the demographic and health survey data. *Energy and Environment*. 29(1):29-48. doi.org/10.1177/0958305X17739475

minutes using 250g wood. The convection-fueled air duct allows the further burning of smoke and dangerous particulate matter in the combustion process. The stoves distributed in this project have a specified high-power thermal efficiency of more than 25%, as determined by a Water Boil Test (WBT) as required by the VMR0006 methodology. The reduced wood-fuel demand from ICS use will also reduce habitat loss and decrease the pressure on the biodiversity in the region.

Project location

Under the GP, the PI implementers will distribute ICS to communities identified in several regions within South Africa. The PIs will occur in geographically defined regions within South Africa. The details of the GP and PI locations are provided in Section 1.12.

An explanation of how the project is expected to generate GHG emission reductions or removals.

This GP will follow the VCS Methodology from Sectoral Scope 3 – *VMR0006 Methodology for Installation of High Efficiency Firewood Cookstoves* v1.1.

The technologies employed in each PI will reduce GHG emissions by demonstrably reducing the usage of non-renewable biomass at the household level.

A brief description of the scenario existing prior to the implementation of the project.

The continuation of the baseline scenario would see:

1. an increase in wood-fuel use and degradation of biodiversity in the region.
2. Increased walking distance and time for mainly women and children to harvest wood for cooking.
3. continued wood cutting practices and use of non-renewable wood-fuel by the target population to meet the thermal energy needs for cooking.

An estimate of annual average and total GHG emission reductions and removals.

The average annual and total GHG emission reduction from the project is expected to be 527,543 and 5,275,433 tCO₂e, respectively.

The first PI under the Fuel Efficient Cooking in South Africa GP, entitled “Project Instance 1 – Kruger to Canyons” (PI1-K2C) is estimated to generate a total of 5,275,433 tCO₂e and an annual average of 527,543 tCO₂ emission reductions over the crediting period of 10 years (20 August 2021 to 19 August 2031).

1.2 Sectoral Scope and Project Type

Grouped Project and Project Instances

The project is categorized as following:

- a) Sectoral Scope 03 – Energy demand
- b) Type II – Energy efficiency improvement projects

The project is designed as a Grouped Project that includes several Project Instances of the same project activity into one Project Description. New instances can be introduced after the initial start of the project with a PI defined as: Distribution of efficient cookstoves to a local community within a specific geographic and climatic region in the GP Project Boundary.

1.3 Project Eligibility

Grouped Project and Project Activity Instances

The GP falls within the scope of the VCS Program as it is in line with the VCS Standard 2.1.1.3 *Project activities supported by a methodology approved under the VCS Program through the methodology approval process*. The project does not fall under the category of excluded projects in Table 1 of the VCS Standard v4.1 and is therefore eligible under the scope of the VCS Program:

Excluded Activity	Applicability
Activities that reduce hydrofluorocarbon-23 (HFC-23) emissions	N/A: The GP reduces GHG emissions associated with the combustion of cooking fuels
Grid-connected electricity generation using hydro-power plants/units	N/A: The GP activities are energy efficiency measures and do not generate electricity from hydro-power plants/units.
Grid-connected electricity generation using wind, geothermal, or solar power plants/units	N/A: The GP activities are energy efficiency measures and do not generate electricity from wind, geothermal, or solar power plants/units.
Utilization of recovered waste heat for, <i>inter alia</i> combined cycle electricity generation and the provision of heat for residential, commercial or industrial use	N/A: The GP activities are energy efficiency measures and do not utilize recovered waste heat for any purposes.
Generation of electricity and/or thermal energy using biomass. This does not include efficiency improvements in thermal applications (e.g, cookstoves)	N/A: The GP activities are energy efficiency measures and do not generate electricity using biomass. The GP includes energy efficiency improvements in thermal applications, i.e. cookstoves.

Generation of electricity and/or thermal energy using fossil fuels, including activities that involve switching from a higher carbon content fuel to a lower carbon content fuel	N/A: The GP activities do not include the generation of electricity and/or thermal energy using fossil fuels, including activities that involve switching from a higher carbon content fuel to a lower carbon content fuel.
Replacement of electric lighting with more energy efficient electric lighting such as the replacement of incandescent electrical bulbs with CFLs or LEDs	N/A: The GP activities do not include the replacement of electric lighting.
Installation and/or replacement of electricity transmission lines and/or energy efficient transformers	N/A: The GP activities do not include the installation and/or replacement of electricity transmission lines and/or energy efficient transformers.

Table 1: Excluded project activities under the VCS Program

1.4 Project Design

The project is a Grouped Project.

Eligibility Criteria

For the inclusion of new PIs, the project proponent shall ensure that it meets the eligibility criteria set out in section 3.5.15 and 3.5.16 of the VCS Standard v4.1 as described below (Table 2).

Table 2. Set of eligibility criteria for new project activity instances

No	Eligibility Criterion	Required condition of Project Instances	Evidence Provided and Applicability to PI1-K2C
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.	PI1-K2C is compliant with the applicability conditions set out in the applied VMR0006 methodology as demonstrated in Section 3.2 of this project description.
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	The manufacturer's technology description. The Rocket Works Zama Zama rocket stove, to be distributed in

		equivalent to the baseline appliance.	PI1-K2C, delivers a level of service at least equivalent to the baseline appliance as evidenced in the technology description. ²
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 to be distributed in PI1-K2C. b) End users will be asked to state their source of energy and baseline appliance at the point of distribution and during the project monitoring. c) 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 in this Project Description.	a) 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. b) PI1-K2C is subject to the same baseline scenario described in Section 3.4 in this Project Description as identified by a baseline survey.
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	1. There is no government mandated programme or policy in South Africa ensuring the distribution of new project activity instances or fuel efficient cookstoves.

² Stove thermal efficiency test report. April 2015. Biomass Energy Certification & Testing Center (BECT). Fundação Universitária - Universidade Eduardo Mondlane - Maputo / Mozambique

		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 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.	2. PI1-K2C complies with the positive list in the methodology and satisfies criterion 1 as it meets all the applicability conditions of the methodology. 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”.³ 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).⁴ The CME confirms that PI1-K2C 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	The VMR0006 methodology does not contain a capacity limit.	A capacity limit does not apply under the VMR0006 methodology..

³ End User Agreement for PI1-K2C

⁴ Redacted term sheet for project funding evidence

	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 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	a) The geographic boundary of PI1-K2C is demonstrated to be within South Africa and defined in section 3.3 of this document. b) The GPS/location data captured from each end user demonstrating the location of the

		demonstrate the location of the project and of each PI.	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.	PI1-K2C complies with the full set of eligibility criteria for the inclusion of new project activity instances as described in this Table 2.
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 stakeholder engagements, baseline surveys⁵ and applicable provisions will be included when submitting for PI validation at verification.	The evidences relevant to PI1-K2C for the local stakeholder engagements, baseline surveys and applicable provisions is submitted alongside this PDD. Monitoring data for PI1-K2C will be provided to the VVB at verification.

⁵ 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.

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.	PI1-K2C conforms to the eligibility criteria set out in this 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 this document, is applicable to all PIs included in this GP.	Project ownership of PI1-K2C, from the start date of the project is demonstrated in section 1.7 of this document.
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 PI1-K2C, evidenced as the sale of the first device in the database will be the same as the start date of the GP as per section 1.8 of this document.
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	PI1-K2C is eligible for crediting from the start date of the instance until the end of the project crediting period.

		the instance through to the end date of the project crediting period on 19 August 2031.	
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1.5 Project Proponent

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

1.6 Other Entities Involved in the Project

TASC SA Ltd. is the sole entity involved in the project.

1.7 Ownership

Grouped Project

TASC SA (Pty) Ltd is the Project Proponent and retains the ownership rights of the carbon assets generated under the project. During the distribution of the ICS, participating households will sign an End User Agreement to confirm that the ownership rights of the carbon assets generated from this project lie with the project proponent.

Each ICS will have a unique serial number embossed or printed onto it that identifies each stove as being unique. End users are informed that they will receive the ICS free of charge as part of an emissions reduction project and that TASC SA (Pty) Ltd retains the rights to the emissions reductions generated through its use. A how-to guide is distributed with each ICS that confirms TASC's ownership of the emissions reductions by stating "In order to cover the costs of the stove, TASC SA (Pty) Ltd will collect personal information and the GPS location of the stove. TASC SA (Pty) Ltd will monitor the stove over its lifetime and claim the CO2 emission reduction from the stove and sell these as carbon credits." End users will then sign a confirmation that they have understood this (the "End User Agreement") and records of this will be retained by the Project Proponent in the project monitoring database.

PI1-K2C 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 the VCS Standard, Section 3.6.1, the End User Agreement is:

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.

Project Instance - PI1-K2C

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 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.”

1.8 Project Start Date

Grouped Project and Project Instance - PI1-K2C

The start date of the GP, and first PI, is the date when the first stove is distributed under the GP/PI1.

This date is: 20th August 2021

This is evidenced by the first stove entry in the monitoring database.

T tasc ▶ K2C ▶ K2C SA stove distribution data collection

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Submission time	Surname	First Name	Cellphone	Identification	ID Num	Is the in	Cluste	Village	Photo of	Primary Fuel	Enter	Prima	Enter	Does the	Secor	Enter Sec	Secor	Stove L	Enter Serial Number
datetime	string	string	string	categorical	string	categoric	categc	categoric	Image	categorical	string	categc	string	categoric	categc	string	categc	geofield	string
Aug 20, 2021			08254...	SA ID N...	830...	Yes					n...		n...	No		null		-24...	002511
Aug 20, 2021			071449...	SA ID N...	530...	Yes					n...		n...	No		null		-24...	002461

1.9 Project Crediting Period

Grouped Project and Project Instance - PI1-K2C

Crediting Period: Fixed

Total number of years: 10 years

Start and End Date: 20 August 2021 to 19 August 2031

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

GHG Emissions Reductions (ERs) are calculated from estimated parameter values derived from PI1-K2C. Based on the initial number of ICS planned for PI1-K2C and taking the expected 5-year operational lifetime of the ICS into account, the GP's ex-ante ERs were modelled to represent a conservative approximation. Although the expected lifetime of the technology is 5 years, it is assumed that some of the devices will still be operational after the 5-year period. For ex-ante estimations, a decreasing operation rate of stoves ("drop off rate") of 2.5% per year was incorporated into the ER calculation for the 10-year crediting period.

The actual operation of stoves is monitored via parameter $N_{y,i,j}$ 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. Further investment into the GP would envisage additional ICS distribution and ERs over the crediting period.

Project Scale	
Project	
Large project	X

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 1	429,959
Year 2	878,910
Year 3	809,789
Year 4	725,899
Year 5	632,588
Year 6	535,491
Year 7	439,939
Year 8	350,463
Year 9	270,444
Year 10	201,951
Total estimated ERs	5,275,433

Total number of crediting years	10
Average annual ERs	527 543

1.11 Description of the Project Activity

Project activity description (including the technologies or measures employed) and how it/they will achieve net GHG emission reductions or removals.

The project activity included in this project description is the distribution and installation of high efficiency ICS in project instances within South Africa.

The ICSs will be based on a “rocket stove” design 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 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 models⁶. The time spent foraging for wood fuel is thereby also reduced, saving time for especially women to engage in other economic driven activities.

List of main manufacturing/production technologies arrangements, systems and equipment involved.

Detailed application and information on the ICS technology will be described in the PI inclusion document. The PP will source the best available technologies for distribution under the GP. The ICS model selection at PI level will be based on key attributes such as thermal efficiency, durability, cultural acceptability, and manufacturing quality and warranty. New models will be distributed.

For the first project instance - PI1-K2C, the Rocket Works Zama Zama rocket stove with a thermal efficiency of 38.30%⁷ that is manufactured in KwaZulu-Natal, South Africa is distributed. 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.

The Zama Zama rocket stove (Figure 1.1), made with mainly stainless-steel, is lightweight, portable and designed to fit flat-, round- and 3-legged pots. The interior of the stove is made

⁶ <https://www.engineeringforchange.org/solutions/product/zama-zama/#:~:text=The%20Zama%20Zama%20is%20a,reflective%20grade%20of%20stainless%20steel>

⁷ As tested by the University of Johannesburg SeTAR Centre in February 2013 (see accompanying test report)

of heat resistant 0.5mm stainless steel. The outer material (heat shield) is chromed steel sheet. The pot rest as the same as the stove bottom is made of 1.0mm 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.

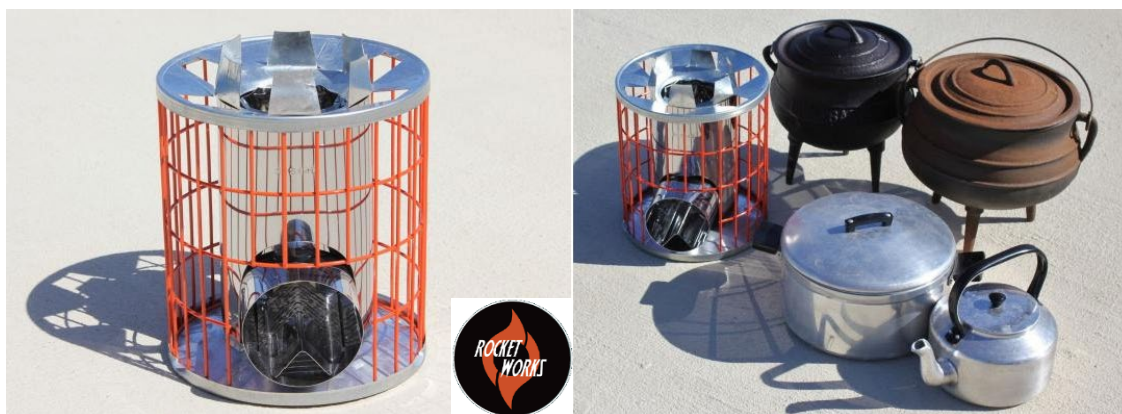


Figure 1.1 The Zama Zama rocketstove manufactured by Rocket Works

List the types and levels of service

Level of Service: Project Instances will provide ICS based on the 'rocket stove' design, delivering a level of service at least equivalent to the baseline appliance (open fire used for household cooking). Each model of ICS distributed under the PI will be specified in the monitoring report.

Type of Service: The ICS technology will deliver a specified high-power thermal efficiency of at least 25% and evidenced by a manufacturer's specification and WBT certificate.

The ICS for PI1-K2C, the Zama Zama rocketstove provides a level of service at least equivalent to the baseline appliance and a thermal efficiency of 38.30%, as demonstrated in the Rocket Works technology description. This is a significant improvement on the baseline open fire thermal efficiency default of 10% (as mentioned in the applied methodology).

List of facilities, systems and equipment in operation under the existing scenario prior to the implementation of the project.

Under the baseline scenario, households use non-renewable woody biomass for their fuel needs. The baseline appliance being replaced by the project is an open fire (typically based on the three-stone concept). No improvement projects are being implemented under the baseline scenario. Wood fuel use has steadily been increasing as economic pressure has

been increasing. The distance to wood harvesting sites increases ever more as fuel demand increase. The wood cutting practices are changing the biodiversity in the region⁸.

1.12 Project Location

Grouped Project

The Project Boundary for both the GP and PIs is defined (as per the AMS II.G methodology) as: the physical, geographical site of the efficient devices that utilize biomass:

The Project Boundary for the Grouped Project is the geographic borders of the Republic of South Africa.

The coordinates of South Africa are:

Latitude: -28.48322

Longitude: 24.676997

The Project Boundary for each Project Instance will be defined within the geographic borders of the Republic of South Africa. The CME has identified several distinct climatic regions within South Africa which will guide the definition of the individual PI Project Boundaries (see Figure 1.2).

PI Project Boundaries will be defined both in terms of the climactic region(s) in which they are located and a specifically described geographical area (kml file or similar).

⁸ Swemmer, A.M., Mashele, M. & Ndhlovu, P.D. 2019. Evidence for ecological sustainability of fuelwood harvesting at a village in South Africa. *Regional Environmental Change* 19:403-413. <https://doi.org/10.1007/s10113-018-1402-y>

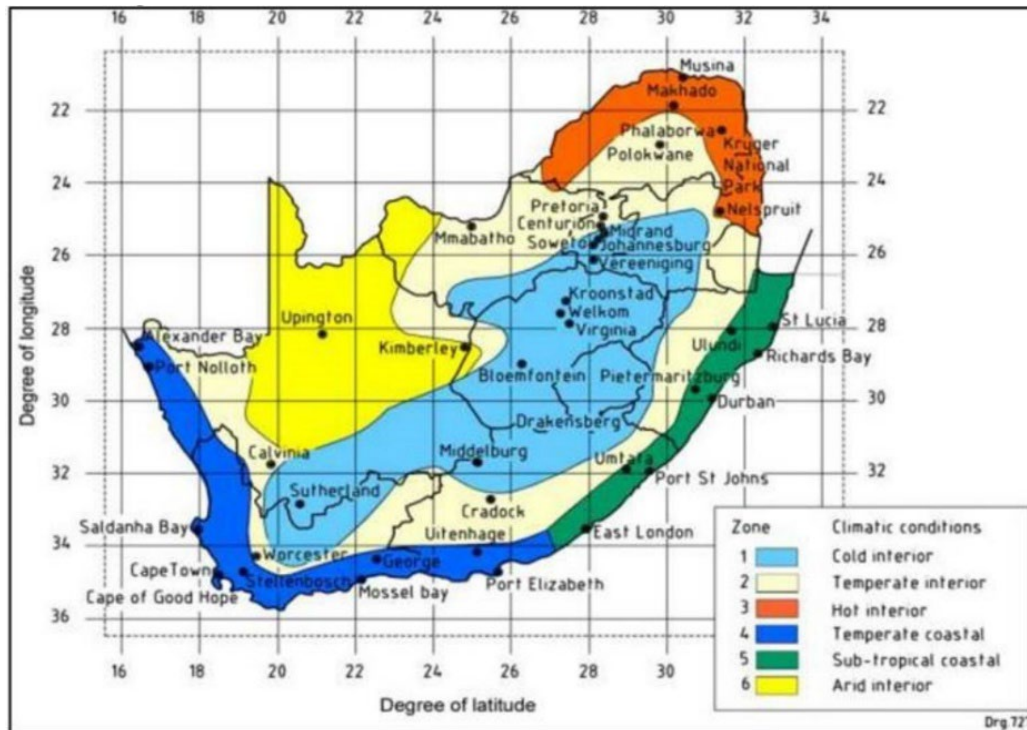


Figure 1.2. Climatic regions identified within the Project Boundary of South Africa.

Project Instance - PI1-K2C

For the first PI, PI1-K2C, the Project Boundary is defined as being:

1. Within the hot- and temperate- interior climatic regions (see Figure 1.2);
2. Within the Limpopo and Mpumalanga Provinces of South Africa;
3. Within the geographic boundaries of the District Municipalities of Mopani, Sekhukhune, and Ehlanzeni (see Figure 1.3 for precise illustration).

Distribution within the PI is located to the North-West, North-East, South-West and South-East of the town of Hoedspruit. This is defined in more detail in Section 3.3 below.

The coordinates of Hoedspruit are:

Latitude: -24.346194

Longitude: 30.973297

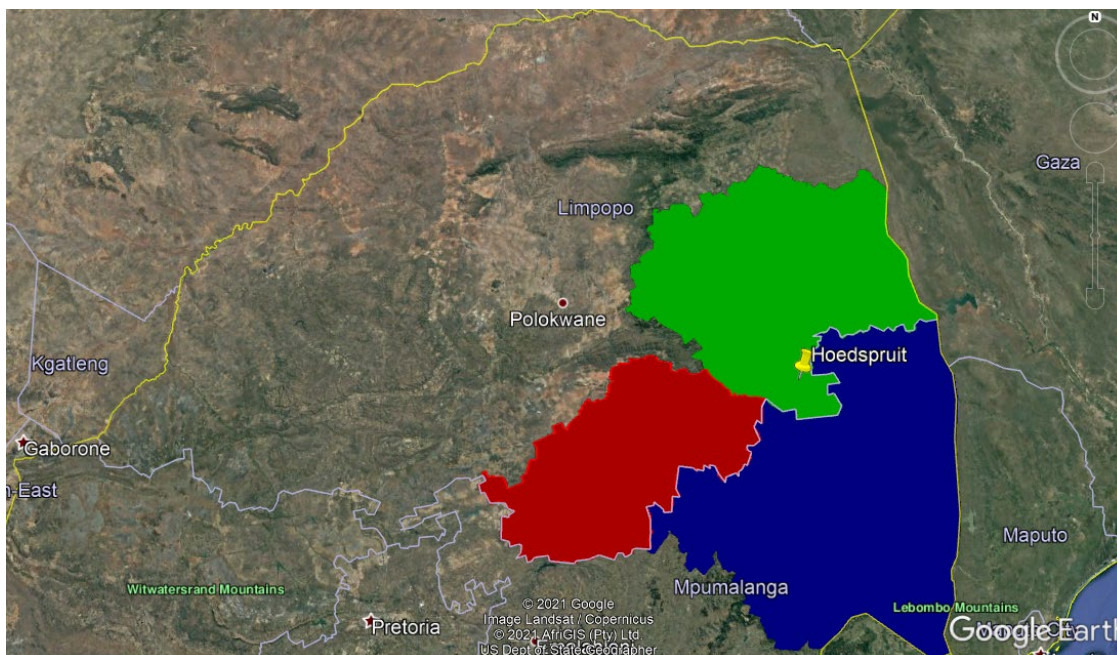


Figure 1.3. The PI1-K2C Project Boundary centered around Hoedspruit, in the Limpopo and Mpumalanga Provinces of South Africa. The Project Boundary is defined as the district municipality borders, highlighted here: Mopani (green), Ehlanzeni (blue) and Sekhukhune (red).

1.13 Conditions Prior to Project Initiation

Grouped Project and Project Instances

The conditions prior to project initiation are the use of non-renewable biomass (wood fuel) to generate thermal energy for cooking. The baseline scenario is the same as the conditions existing prior to the project initiation. See Section 3.2.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

There are no laws or regulations for the use of improved cookstoves in South African households.

1.15 Participation under Other GHG Programs

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

This is a new project and has not been registered or seeking registration under any other GHG programs.

1.15.2 Projects Rejected by Other GHG Programs

This is a new project and has not been rejected by any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

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

1.16.2 Other Forms of Environmental Credit

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

1.17 Additional Information Relevant to the Project

Leakage Management

The project adopts a gross-to-net adjustment factor of 95% on emissions reductions to account for leakage as described under the methodology VMR0006, Section 8.3.

Commercially Sensitive Information

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

Sustainable Development

From the Priorities listed in the Sustainable Development Goals Country Report 2019 – South Africa⁹, 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.

⁹http://www.statssa.gov.za/MDG/SDGs_Country_Report_2019_South_Africa.pdf

- 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.
- 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.

Further Information

Not applicable.

2 SAFEGUARDS

2.1 No Net Harm

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

2.2 Local Stakeholder Consultation

Procedures or methods used for engaging local stakeholders

A plan for local stakeholder consultation amid the Covid-19 pandemic was submitted by the PP and has been approved by Verra.

The proposed plan is included below:

TASC is developing a new Grouped Project in South Africa under the Verra methodology VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves.

The current Covid 19 situation and related regulations in South Africa does not currently allow for physical gatherings of large groups of people. Therefore, TASC is proposing the following measures to engage local stakeholders, while complying with the Verra VCS Standard:

No.	Criterion	Proposed Implementation Plan	<u>PI1-K2C Actual Implementation</u>
Local Stakeholder Consultation			
3.16.2	The project proponent shall conduct a local stakeholder consultation prior to validation as a way to inform the design of the project and maximize participation from stakeholders. Such consultations allow stakeholders to evaluate impacts, raise concerns about potential negative impacts and provide input on the project design.	Local stakeholder consultations (LSCs) will be arranged prior to the project validation to inform stakeholders of the project design, and to maximise participation and input from local stakeholders. These LSCs will be conducted via small gatherings if permitted by and in accordance with national lockdown restrictions. To effectively maximize the number of stakeholders reached, the LSCs will also be conducted via a Zoom video conferencing session. Stakeholders identified as not having access to stable internet connection will be invited to a small, physical LSC meetings. Stakeholders unable to attend the physical or Zoom meetings will be notified about the project via email and their feedback or input requested. Stakeholders will be invited via email, or via physical or telephonic invitation with the help of the on-the-ground implementation partners (IPs). The following information will be included in the LSC meetings and emails: i. Non-technical summary of the project in English and project instance-applicable official local languages;	In light of the COVID-19 pandemic, the CME confirmed an LSC Plan with Verra which was approved on 17/02/2021.¹⁰ The CME implemented the LSC Plan for the first Project Instance and documented the approach in an LSC report, dated 15/06/2021, submitted with this PDD.¹¹ The stakeholder consultations that were conducted prior to implementation are listed as follows: i. Online meeting, 22/01/2021 ii. Webinar, 22/04/2021 iii. Sedawa Municipal Hall, 11/05/2021 iv. Lulekani Municipal Hall, 12/05/2021 v. Brooklyn Nazarene Church, 13/05/2021 vi. Mnisi Tribal Hall, 14/05/2021

¹⁰ See TASC Local Stakeholder Consultation – Covid 19 Interim Proposal, February 2021 (version 2.1)

¹¹ See TASC Local Stakeholder Consultation K2C Report, 15th June 2021

		ii. Monitoring and validation/verification process information; iii. Grievance procedures; iv. Contact details of TASC, and of the IP; v. Feedback form	Stakeholders were invited to give feedback via an online survey forms, which is recorded in the LSC Report.
3.16.3	<i>The project proponent shall establish mechanisms for ongoing communication with local stakeholders to allow stakeholders to raise concerns about potential negative impacts during project implementation.</i>	For each Project Instance, TASC will be partnering with local NGOs or NPOs as IPs. These IPs will have a proven track record of implementing and managing projects in the project instance boundary. Working with the IPs throughout the project lifecycle (from design, to implementation, and to the monitoring, reporting and verification (MRV) cycles), enables constant on-the-ground interaction and communication with local stakeholders. The IPs also have several local employees who live in the target communities, and can receive and communicate feedback from local stakeholders to the IP and to TASC. Each Project Instance will define the way in which each IP communicates about the project with local stakeholders, which will be specific to the operating procedures of each IP. This may include: • Regular community meetings • Field staff visits to End Users • Call centre operations • Radio/press announcements • SMS/WhatsApp/email communications etc. Communication channels and contact details of TASC will also be made available in all	For PI1-K2C, TASC engaged the K2C Biosphere Reserve as the primary NPO supporting the implementation of the PI and facilitating the LSC process. The team from K2C Biosphere Reserve support TASC in identifying local stakeholders and running local meetings to communicate the non-technical description of the project and project information. The accompanying LSC Report describes the outcomes of the consultations prior to implementation. TASC and K2C also conduct community sensitization meetings as part of the distribution process, which are documented in the accompanying PI1-K2C Stakeholder and Sensitisation Meetings report. Communication channels are provided

		communications, training and sensitization sessions, and at any interaction points with local stakeholders for inputs and grievances.	at all meetings and available on the How-To Guide, the meeting invitations and the Non-technical summary.
3.16.4	<i>The project proponent shall take due account of all and any input received during the local stakeholder consultation and through ongoing communications, which means it will need to either update the project design or justify why updates are not appropriate. The project proponent shall demonstrate to the validation/verification body what action it has taken in respect of the local stakeholder consultation as part of the validation, and in respect of ongoing communications as part of each subsequent verification.</i>	A report will be written after each LSC including any input and comments received during the meeting. Action points will be included for each input/comment. Any feedback received from the ongoing communication with local stakeholders will also be reported. These reports will be presented to the validation/verification body as part of the validation and verification processes.	The accompanying LSC Report, as well as the PI1-K2C Stakeholder and Sensitisation Meetings report describes the outcomes of these consultations. The overall feedback received at the meetings was positive. Questions posed were centred around the use and maintenance of the stoves, qualifying recipients and on the expected start of distribution.
Local Stakeholder Identification and Background			
3.16.11	<i>The project proponent shall conduct a thorough assessment of the local stakeholders that will be impacted by the project. The project description shall include information on local stakeholders at the start of the project, including:</i> 1) <i>The process(es) used to identify local stakeholders likely impacted by the project and a list of such stakeholders;</i> 2) <i>Identification of any legal or customary tenure/access rights to territories and resources, including collective and/or conflicting rights,</i>	A thorough assessment of the local stakeholders will be conducted in partnership with each IP and the information listed above will be presented in the project description documents.	A local NGO, K2C Biosphere Reserve supported TASC in the identification of local stakeholders for the consultation. Embedded in the region since 2011, K2C is uniquely positioned to identify, assess and advise on local stakeholder information, including: 1. Identifying stakeholders belonging to categories including a) local people, communities and or representatives

	<i>held by local stakeholders;</i> 3) <i>A description of the social, economic and cultural diversity within local stakeholder groups and the differences and interactions between the stakeholder groups;</i> 4) <i>Any significant changes in the makeup of local stakeholders over time;</i> 5) <i>The expected changes in well-being and other stakeholder characteristics under the baseline scenario, including changes to ecosystem services identified as important to local stakeholders;</i> 6) <i>The location of communities, local stakeholders and areas outside the project area that are predicted to be impacted by the project; and</i> 7) <i>The location of territories and resources which local stakeholders own or to which they have customary access.</i>		directly / indirectly impacted by the project; b) stakeholders with land-tenure rights within or adjacent to the project; c) local policy makers and representatives of local authorities; d) local non-governmental organizations, women groups working on topics relevant to the project; and 2. Identify legal or customary tenure/access rights to territories and resources, including collective and/or conflicting rights, held by local stakeholders; and 3. to advise on the social, economic and cultural diversity within local stakeholder groups and the differences and interactions between the stakeholder groups; as well as on 4. Any significant changes in the makeup of local stakeholders over time, 5. The expected changes in well-being and other stakeholder
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			characteristics under the baseline scenario, including changes to ecosystem services identified as important to local stakeholders; 6. The location of communities, local stakeholders and areas outside the project area that are predicted to be impacted by the project; and 7. The location of territories and resources which local stakeholders own or to which they have customary access.
Risks to Local Stakeholders			
3.16.12	<i>The project proponent shall identify likely natural and human-induced risks to local stakeholder well-being expected during the project lifetime and outline measures needed to mitigate these risks.</i>	No natural and human-induced risks to local stakeholder well-being is expected arising from the project implementation during the project lifecycle.	No natural or human-induced risk to local stakeholder well-being have been identified.
3.16.13	<i>The project proponent shall identify the risks for local stakeholders to participate in the project, including project design and consultation. Risks should include trade-offs with food security, land loss, loss of yields and climate change adaptation. The project shall be designed and implemented to avoid trade-offs and manage the identified risks to local stakeholders.</i>	The project design and implementation does not involve any trade-offs or risks to local stakeholders.	No risks to stakeholders were identified.

3.16.14	<i>The project proponent or any other entity involved in project design or implementation shall not be involved in any form of discrimination or sexual harassment.</i>	This project will not include any form of discrimination or sexual harassment.	No form of discrimination or sexual harassment was identified by stakeholders.
3.16.15	<i>The management teams involved in the project shall have expertise and prior experience implementing land management and carbon projects with community engagement at the project scale. Where relevant experience is lacking, the project proponent shall either demonstrate how they have partnered with other organizations to support the project or have a recruitment strategy to fill the identified gaps.</i>	The TASC team has over 10 years' experience in developing clean cooking carbon programmes in sub-Saharan Africa where significant community engagement is required. TASC's CDM Programme of Activities; Fuel Efficient Stoves in Zambia (developed by a subsidiary – 3 Rocks Ltd.) was registered in 2013 and is also registered under the VCS.	TASC is the CME of the GP and PI1.
Respect for Local Stakeholder Resources			
3.16.16	<i>The project proponent shall avoid negative impacts of project implementation and mitigate impacts when unavoidable, including the following: 1) The project proponent shall recognize, respect and support local stakeholders' property rights and where feasible, take measures to help secure rights. The project shall not encroach on private, stakeholder or government property or relocate people off their lands without consent. The project may affect property rights if free, prior and informed consent is obtained from those concerned and a</i>	This project will not affect stakeholder property rights.	The PI has no impact on local property or land rights.

	<i>transparent agreement is reached that includes provisions for just and fair compensation. In the event there are any ongoing or unresolved conflicts over property rights, usage or resources, the project shall undertake no activity that could exacerbate the conflict or influence the outcome of an unresolved dispute.</i>		
	2) <i>To reduce damage to the ecosystems on which the local stakeholders rely:</i> a) <i>The project shall not introduce any invasive species or allow an invasive species to thrive through project implementation.</i> b) <i>The project shall justify the use of non-native species over native species, explaining the possible adverse effects of non-native species.</i> c) <i>The project shall justify the use of fertilizers, chemical pesticides, biological control agents and other inputs used by the project and their possible adverse effects.</i>	a) This project aims to improve the ecosystems on which local stakeholders rely by reducing the stress of firewood harvesting on the ecosystem. The project will not introduce any invasive species and will possibly aid in the management and/or reduction of existing invasive species; b) Not applicable to this project. c) Not applicable to this project	There are no negative local ecosystem impacts identified. On the contrary the PI has a positive impact on local ecosystems.
Communication and Consultation			
3.16.17	<i>The project proponent shall take all appropriate measures to communicate and consult with local stakeholders in an ongoing process for the life of the project. The project</i>	The information listed above will be communicated to the stakeholders in the meetings and correspondence as set out in 3.16.2 above.	See the LSC Plan, LSC report and non-technical summary.

	<i>proponent shall communicate:</i> <i>1) The project design and implementation, including the results of monitoring.</i> <i>2) The risks, costs and benefits the project may bring to local stakeholders.</i> <i>3) All relevant laws and regulations covering workers' rights in the host country.</i> <i>4) The process of VCS Program validation and verification and the validation/verification body's site visit.</i>		
3.16.18	<i>The project proponent shall develop a grievance redress procedure to address disputes with local stakeholders that may arise during project planning and implementation, including with regard to benefit sharing. The procedure shall include processes for receiving, hearing, responding and attempting to resolve grievances within a reasonable time period, taking into account culturally-appropriate conflict resolution methods. The procedure and documentation of disputes resolved through the procedure shall be made publicly available. The procedure shall have three stages:</i> <i>1) The project proponent shall attempt to amicably resolve all grievances and provide a written response to the grievances in a</i>	A grievance redress mechanism will be developed specifically for each Project Instance and included in the project design documents. Each IP will define a grievance mechanism that is most appropriate to their operations and to the communities within the project boundary.	Stakeholders have been provided with the contact details of K2C and TASC during the stakeholder consultations and at the point of distribution. Grievances may be reported telephonically, via email or in person to K2C or TASC, contact details of which are provided on all project documentation, including the non-technical summary and the 'how to guide' provided to all end users. Grievances will be addressed by the IP or the TASC PI manager and reported. These shall be dealt with as follows: - By responding to the stakeholder in

	<i>manner that is culturally appropriate.</i> 2) <i>Any grievances that are not resolved by amicable negotiations shall be referred to mediation by a neutral third party.</i> 3) <i>Any grievances that are not resolved through mediation shall be referred either to a) arbitration, to the extent allowed by the laws of the relevant jurisdiction or b) competent courts in the relevant jurisdiction, without prejudice to a party's ability to submit the grievance to a competent supranational adjudicatory body, if any.</i>		writing or in person as is most appropriate - By referring to an independent 3rd party mediator - Via arbitration, or other legal means
3.16.19	<i>All communication and consultation shall be performed in a culturally appropriate manner, including language and gender sensitivity, directly with local stakeholders or their legitimate representatives when appropriate. The results of implementation shall be provided in a timely manner and consultation shall be performed prior to design decisions or implementation to allow stakeholders adequate time to respond to the proposed design or action.</i>	All communication and consultation shall take into account the local cultural practices, languages and gender sensitivity. The local IPs will assist in facilitating the communications and consultations with the relevant local stakeholders directly impacted through the project.	As the local IP, K2C continues to assist in taking the local cultural practices, languages and gender sensitivities into account while facilitating the communications and consultations with the relevant stakeholders.

2.3 Environmental Impact

No Listed Activities requiring an environmental impact assessment under the National Environmental Management Act (NEMA, Act 107 of 1998), Environmental Impact

Assessment (EIA) Regulations (2014) have been or will be triggered by the proposed activity under the GP¹²¹³¹⁴

2.4 Public Comments

The GP was available for public comment during the period 12/05/2021 to 11/06/2021.

Public Comments received	Response to Public Comments
Whereas the adoption of fuel efficient cook stoves certainly has clear social and health benefits, there is concern with regard to the calculation of the change in GHG emissions due to the project activity, as well as alignment with South Africa's national policy and natural resource management programs. This is especially pertinent when the project area is set to the whole of South Africa. Estimation of the change in GHG emissions due to the project activity: The adoption of fuel efficient cookstoves has been viewed as a means of addressing unsustainable fuel wood usage and in turn deforestation over time. The estimation of the change in GHG emissions due to the project is therefore closely reliant on estimating the "fraction of woody biomass that can be established as non-renewable biomass".	For the inclusion of PIs under the GP, the project proponent shall ensure that each PI meets the eligibility criteria set out in section 3.5.15 of the VCS Standard, section 4 of the VMR0006 methodology and section 2.2.8 and 2.2.9 of the AMS-II.G. methodology. The GP boundary is set to the geographic boundaries of South Africa to facilitate the possible inclusion of PIs within South Africa. However, each PI will have a unique and defined boundary within the overall GP boundary, as outlined in Section 1.12 above. The commenter states: "<i>A response may be that the project will only focus on certain areas</i>", and this is precisely how the GP is structured. Each PI is defined individually, with its own separate boundary that is drawn at the sub-national level. Furthermore, the CME will define unique baseline data for each PI, as can be seen with PI1-K2C, where PI-specific baseline fuel use surveys and regionalized fNRB studies were completed.

¹² Department of Water and Environmental Affairs (South Africa). 2010. National Environmental Management Act, 1998 (ACT NO. 107 of 1998): Listing Notice 1: List of activities and competent authorities identified in terms of sections 24(2) and 24D. (Notice R.544). *Government Gazette*, 33306:80, 18 June

¹³ Department of Water and Environmental Affairs (South Africa). 2010. National Environmental Management Act, 1998 (ACT NO. 107 of 1998): Listing Notice 3: List of activities and competent authorities identified in terms of sections 24(2) and 24D. (Notice R.546). *Government Gazette*, 33306:116, 18 June

¹⁴ Department of Environmental Affairs and Tourism (South Africa). 2006. National Environmental Management Act, 1998 (ACT NO. 107 of 1998): List of activities and competent authorities identified in terms of sections 24 and 24D of the national environmental management act, 1998. (Notice R.387). *Government Gazette*, 28753:165, 21 April.

Based on national data and reports, I believe it can be safely assumed that biomass utilisation is renewable in South Africa and is not driving deforestation or forest degradation over time. A first reference is South Africa's most recent National GHG Inventory: https://cer.org.za/wp-content/uploads/2020/09/Draft-7th-National-Greenhouse-Gas-Inventory-Report-for-the-Republic-of-South-Africa-for-public-comment.pdf On page 352, one can see that "Forest land remaining Forest land" is a net sink of carbon, even after fuelwood harvesting has been taken into account. A second reference, is that both the mapping of changes in forest cover informing the National GHG Inventory as well as other national analysis published in international peer-reviewed journals (e.g. Skowno et al. 2016; https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.13529); clearly illustrate the expansion of forests over time in South Africa. The extent of current forest cover in South Africa exceeds pre-colonial times.	Therefore, the impact of the stoves will be assessed at the sub-national level in accordance with each PI description, and not at the national level as the commenter suggests. Additionally, the National GHG Inventory, referenced in the public commentary, references studies that were published in 2013 and earlier. The socio-economic situation, the affordability of electricity and population density in rural areas in South Africa has changed considerably in the last eight years and has since also been exacerbated by the global Covid-19 pandemic¹⁵¹⁶¹⁷. According to the Global Forest Watch platform, South Africa lost 1.48 Mha of tree cover from 2001 to 2020, equivalent to a 25% decrease in tree cover since 2000. The Global Forest Watch also reported that in 2020 alone, South Africa lost 30.3kha of natural forest.¹⁸ Although South Africa's forestry sector is well developed, the heavy dependency of the rural poor in South Africa on forest resources is exerting pressure on indigenous forests and woodlands². The unsustainable harvesting of fuelwood has resulted in forest degradation, loss of millions of hectares of forest (deforestation) and desertification. The annual deforestation rate in South Africa is estimated to be 0.2 percent."¹⁹
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¹⁵ https://www.usaid.gov/sites/default/files/documents/ABA-ARISA_Impact_of_COVID_19_on_Womens_Customary_Land_Rights_and_Livelihoods_Dec_2020.pdf

¹⁶ Wiggins, S. 2020. Five ways Covid-19 could affect rural Africa – and what to do about it. <https://odi.org/en/insights/five-ways-covid-19-could-affect-rural-africa-and-what-to-do-about-it/>

¹⁷ Mubangizi, B.C. & Mubangizi, J.C. 2021. COVID-19, Rural Livelihoods and Human Rights: A South African Perspective. <https://doi.org/10.35741/issn.0258-2724.56.3.18>

¹⁸ Global Forest Watch. South Africa. Accessed on 20 August 2021. [Link here](#)

¹⁹ FAO. 2015. Southern Africa's forests and people – Investing in a sustainable future. <http://www.fao.org/3/i4894e/i4894e.pdf>

A response may be that the project will only focus on certain areas, but the project area is currently set to the whole of South Africa. If the PD is revisited and a smaller project area is defined, it would be interesting to see the long-term changes in forest cover and health in the area. Alignment with South Africa's national policy and programmes: At present, the National Government spends R2 Billion per year on the NRM programme, much of which flows into "Working on Water" and "Working on Ecosystems", which are principally aimed at clearing trees across South Africa. Furthermore, land custodians are legally compelled to clear woody alien invasive species from their land and many invest considerable amounts clearing bush encroachment. This work is based on an extensive policy and strategy base aimed at both reducing the extent of bush encroachment and woody alien invasive species e.g.: https://www.arc.agric.za/arc-ppri/weeds/Pages/Legal-Obligations-Regarding-Invasive-Alien-Plants-in-South-Africa.aspx https://www.environment.gov.za/sites/default/files/reports/indigenusbushencroachment_policybrief.pdf. In conclusion, whereas the adoption of fuel efficient cookstoves may have social benefits, their eligibility as a climate change mitigation activity in South Africa may unfortunately not hold.	This disparity between management practices of woody biomass resources and the diverse climatic regions in South Africa will be taken into account when determining the PI boundaries and subsequent baselines of the PIs as described in sections 1.12 and 3.4 in the PD. Therefore, a desktop and/or field baseline survey will be conducted at PI level, which includes a baseline household wood fuel usage survey as well as a fraction of non-renewable biomass study. Each PI will be assessed for compliance with the eligibility criteria listed in Section 1.4 above.
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2.5 AFOLU-Specific Safeguards

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

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

VMR0006: Methodology for installation of High Efficiency Firewood Cookstoves v1.1.²⁰

CDM Guideline: Sampling and surveys for CDM project activities and programmes of activities, v4²¹

CDM Tool 30: Calculation of the fraction of non-renewable biomass, v3²²

3.2 Applicability of Methodology

VMR0006:

	Methodology Applicability Criterion	How the project complies and evidences
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. The manufacturer's technology description. PI1-K2C comprises the distribution of the Rocket Works' "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.

²⁰ <https://verra.org/methodology/vmr0006-methodology-for-installation-of-high-efficiency-firewood-cookstoves/>

²¹ https://cdm.unfccc.int/filestorage/e/x/t/extfile-20151023152925164-Meth_GC48_-ver04.0-.pdf/Meth_GC48_%28ver04.0%29?t=ZGd8cjVhcWxyfDAuGL_dYXvFWmyQOIi3P0Hg

²² <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v3.0.pdf>

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 baseline stove, it shall exclusively use renewable biomass.	The ICS distributed in this project has a thermal efficiency of at least 25%. The manufacturer's specifications will be described in the Project Instance design document. PI1-K2C a) The manufacturer's specification from Rocket Works for the Zama Zama rocketstove indicates a thermal efficiency of 38.3%. 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 GP is defined as a "Large Project" according to the guidelines set out in the VMR0006 methodology and can therefore apply the methodology. The total ERs estimated from PI1-K2C over the crediting period is 5,275,433 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 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 PI1-K2C region since 31 December 1989 as demonstrated below.
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).	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.

	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	
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	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

	providers or others claim credit for emission reductions from the project devices.	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. PI1-K2C is a unique project in the Kruger to Canyons region spanning the Limpopo and Mpumalanga Provinces. A list of projects within or close to the PI boundary is submitted to the VVB with this PDD.
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Evidence that non-renewable biomass has been used in the project area since 1989

Williams (1986) reported that fuelwood is the sole source of energy for less-developed rural and peri-urban areas in South Africa²³. 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)²⁴. 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. In the communal areas of the South African Lowveld, the fuelwood dependence is particularly high, with an average

²³ Williams, A.T., 1986. The potential for the production of energy from biomass in South Africa (Master's dissertation, University of Cape Town).

²⁴ 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

household use of 3-4 tonnes of fuelwood per year (Wessles et al. 2013)²⁵. In sub-Saharan Africa, fuelwood use has steadily increased with population growth (ESMAP, 2020)²⁶. In a study by Swemmer et al. (2019), found that fuelwood supply cannot meet the demand in the project area²⁷. Therefore, it can be concluded that non-renewable biomass have been used in the project region since December 1989.

TOOL30

TOOL Applicability Criterion	How the project complies
DNAs to submit region- or country-specific default f_{NRB} values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or	N/A
Project participants ²⁸ to calculate project- or PoA-specific f_{NRB} values	The tool was used to determine GP Instance-specific f_{NRB} values.

CDM Guideline: Sampling and surveys for CDM project activities and programmes of activities, v4

The guideline is applicable as the GP under VCS is equivalent to a PoA and complies to the applicability of the guideline.

3.3 Project Boundary

The Project Boundary for the Grouped Project and Project Instances are defined as per the VMR0006 methodology:

²⁵ 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

²⁶Energy 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

²⁷ Swemmer, A. M., Mashele, M. and Ndhlovu, P. D. (2019) 'Evidence for ecological sustainability of fuelwood harvesting at a rural village in South Africa', *Regional Environmental Change*, 19(2), p. 403. doi: 10.1007/s10113-018-1402-y

²⁸ In context of this methodological tool, the term project participant also includes coordinating and managing entities for a PoA.

Source		Gas	Included?	Justification/Explanation
Baseline	Emission from use of non-renewable biomass/Fossil fuel	CO ₂	Yes	Major source
		CH ₄	Yes	Major source
		N ₂ O	Yes	Major source
		Other	No	No other source identified
	Production & Transport of Fuel	CO ₂	No	Not applicable. ICS is deployed as energy efficiency measure and not for fuel switch case.
		CH ₄	No	Not applicable. ICS is deployed as energy efficiency measure and not for fuel switch case.
		N ₂ O	No	Not applicable. ICS is deployed as energy efficiency measure and not for fuel switch case.
		Other	No	No other source identified
Project	Emission from use of non-renewable biomass	CO ₂	Yes	Major source
		CH ₄	Yes	Major source
		N ₂ O	Yes	Major source
		Other	No	No other source identified
	Production & Transport of Fuel	CO ₂	No	Not applicable. ICS is deployed as energy efficiency measure and not for fuel switch case.
		CH ₄	No	Not applicable. ICS is deployed as energy efficiency measure and not for fuel switch case.
		N ₂ O	No	Not applicable. ICS is deployed as energy efficiency measure and not for fuel switch case.
		Other	No	No other source identified

The Project Boundary for both the GP and PIs is further defined (as per the AMS II.G methodology) as: the physical, geographical site of the efficient devices that utilize biomass:

Grouped Project

The GP boundary is defined as the geographic boundaries of the Republic of South Africa (see Section 1.12) (Figure 3.1).



Figure 3.1. The GP boundary of South Africa.²⁹

PI1-K2C

For the first PI, PI1-K2C, the project boundary is defined as being:

1. Within the hot- and temperate- interior climatic regions (see Figure 1.2 above);
2. Within the Limpopo and Mpumalanga Provinces of South Africa;
3. Within the geographic boundaries of the District Municipalities of Mopani, Sekhukhune, and Ehlanzeni (see Figure 3.2 for precise illustration).

Distribution within the PI is located to the North-West, North-East, South-West and South-East of the town of Hoedspruit.

The coordinates of Hoedspruit are:

Latitude: -24.346194

Longitude: 30.973297

The project boundary of PI1-K2C is therefore defined as being within 3 district municipality borders in the Limpopo and Mpumalanga Provinces of South Africa. These districts are the Ehlanzeni, Sekhukhune and Mopani Districts which are shown precisely as a kml file in Figure 3.2 below.

²⁹ US Dept of State Geographer. Image Landsat/Copernicus. 2020 AfriGIS (Pty) Ltd. Data SIO, NOAA, U.S. Navy, NGA, GEBCO.

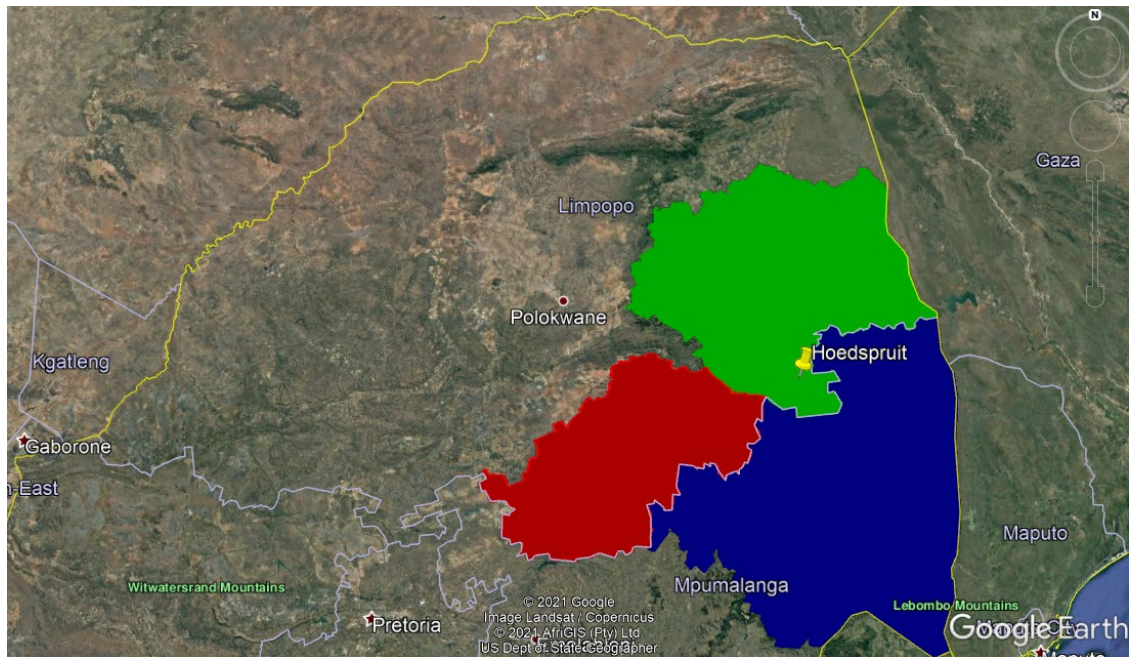


Figure 3.2. The three district municipalities that define the PI1-K2C project boundary

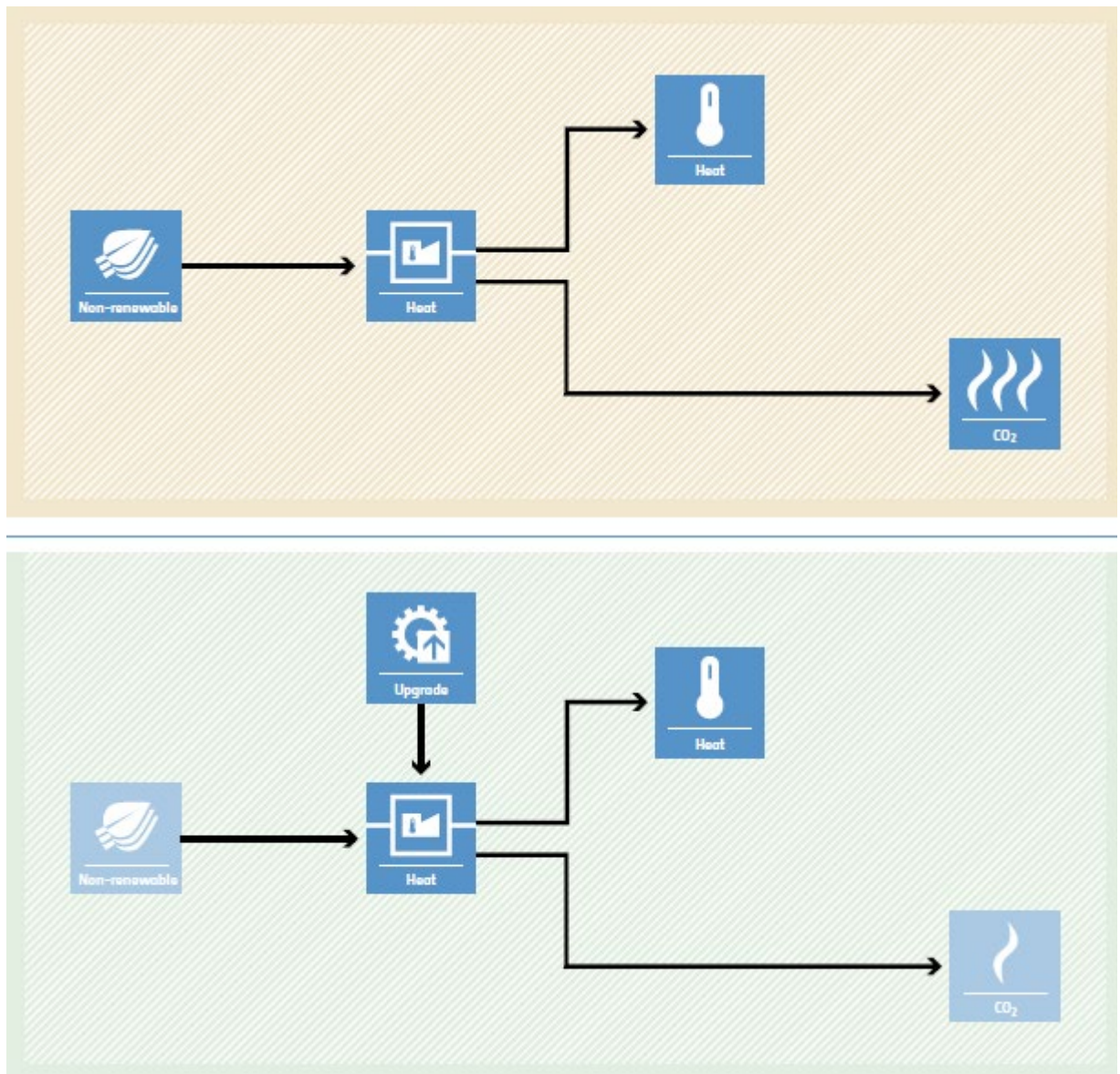


Figure 3.3. The baseline- (top) and project- (bottom) boundaries. Within the project boundary, less biomass burning gases and particulates are emitted.

3.4 Baseline Scenario

Grouped Project

As per the VMR0006 methodology, the baseline scenario is the continued use of non-renewable wood fuel (firewood) by the target population to meet similar thermal energy needs as provided by project ICS in absence of project activity.

Individual baseline emissions calculations will be defined in each Project Instance Document.

PI1-K2C

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 desktop³⁰ and field³¹ baseline wood fuel use survey, as well as a fraction of non-renewable biomass survey³² was carried out in the PI area. The desktop baseline survey concluded that although the available literature sources are eligible for use (as stipulated by the CDM TOOL30), the sources are fairly old, published in 2012 and 2013 respectively, and may not accurately reflect the current conditions. A field baseline survey was therefore recommended and carried out.

The sample size and selection 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. The sample size of 271 was derived based on the total population of 1 211 015, with expected mean of 20, SD of 20, Z-multiplier 1.645 and relative precision of 10 %. A sample of 300 households were selected on a simple random sampling basis across 20 villages in four regions within the K2C region. The Kitchen Performance Test protocol v4.0³³ of the Clean Cooking Alliance was followed and included a qualitative habit survey and daily wood use measurements over four consecutive days.

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. VMR0006 requires the use of the CDM’s TOOL30 “Calculation of the fraction of non-renewable biomass” Version 3.0.³⁴

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 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 K2C

³⁰ Promethium Carbon. 31 March 2021. Desktop Study: Biomass Baseline for Cookstove Project in the Kruger to Canyon and Waterberg Biospheres.

³¹ L Kok. 30 March 2021. Field Baseline Report – Kruger 2 Canyons Fuel Efficient Cooking in South Africa.

³² Promethium Carbon. 31 March 2021. Desktop Study: Biomass Baseline for Cookstove Project in the Kruger to Canyon and Waterberg Biospheres.

AND

2021-03-31 Values for baseline and fNRB calculation v1_Promethium_Field values.xlsx

³³ Bailis, R., Thompson, R., Lam, N., Berrueta, V., Muhwezi, G. & Adams, E. 2018. Kitchen Performance Test (KPT) v4.0. Clean Cooking Alliance. 16p.

³⁴ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v3.0.pdf>

region and then deducting the quantity of renewable biomass (RB) from this value. The calculations are contained in Excel format titled. The fNRB, calculated with the desktop baseline survey results (H) was then updated to include the results of the subsequent field baseline results, as per the recommendations of the report.

The results from the field baseline survey and updated fNRB calculations were:

H = 5.49 t/house/year

fNRB = 0.89

3.5 Additionality

The methodology *VMR0006 v1.1* uses activity method for the demonstration of additionality.

Activity Method

Step 1: Regulatory Surplus

There is no mandated government programme or policy in the host country of this project ensuring distribution of domestic fuel-efficient cookstoves. The project is not mandated by any law, statute or regulatory framework, or for the UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework.

Households may only participate voluntarily in this project. It is hereby confirmed that the proposed project is a voluntary coordinated action by TASC SA (Pty) Ltd.

Step 2: Positive List

The applicability conditions of this methodology represent the positive list. The project meets all of the applicability conditions as described in Section 3.2. The project also meets the following conditions:

1. The project distributes stoves at zero cost to the end-user and has no other source of revenue other than the sale of GHG credits.
2. Project activities are not implemented as part of government schemes nor is the project supported by multilateral funds.

The GP and each PI included are be deemed as meeting both steps of the Method and therefore additional.

3.6 Methodology Deviations

The project did not apply any methodology deviations.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The methodology does not account for baseline emissions separately, but instead quantifies 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.

4.2 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.

4.3 Leakage

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

4.4 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 methodology, for project activities replacing baseline stoves using non-renewable biomass (firewood/charcoal):

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

i	Indices for the situation where more than one type/model of improved cookstove is introduced to replace three stone fire.
j	Indices for the situation where there is more than one batch of improved cookstove of type i.
ER _{y,i,j}	Emission reductions by improved cookstove of type i and batch j during year y in tCO ₂ e.

- i Indices for the situation where more than one type/model of improved cookstove is introduced to replace three stone fire.
- j Indices for the situation where there is more than one batch of improved cookstove of type i.

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

- $B_{y,savings,i,j}$ Quantity of woody biomass that is saved in tonnes per improved cookstove of type i and batch j.
- $NCV_{wood\ fuel}$ Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default: 0.0156TJ/tonne).
- $fNRB_y$ Fraction of woody biomass that can be established as non-renewable biomass.
- EF_{wf,CO_2} CO₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel: 112 tCO₂/TJ).
- $EF_{wf,nonCO_2}$ Non-CO₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel: 26.23 tCO₂/TJ).
- $N_{y,i,j}$ Number of improved cookstoves of type i and batch j operating during year y.
- 0.95 Discount factor to account for leakage.

The quantity of woody biomass saved, $B_{y,savings,i,j}$, due to implementation of improved cookstoves can be estimated by one of the following options set out in Equations 3 and 4:

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

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

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

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

η_p Efficiency of project cookstoves (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 manufacturer's declaration on expected loss in efficiency or through publicly available literature on relevant industry standards. Alternatively default value of 0.99 efficiency loss per year can be considered.

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

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.

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

$B_{old,adjusted}$ 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.

Detailed application of the methodology will be described in the Project Instance PD.

The quantity of firewood consumed in absence of 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

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:

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

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

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)

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.

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

Ex-ante calculations (based on PI1-K2C estimates)

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
Year 1	429,959	0	0	429,959
Year 2	878,910	0	0	878,910
Year 3	809,789	0	0	809,789

Year 4	725,899	0	0	725,899
Year 5	632,588	0	0	632,588
Year 6	535,491	0	0	535,491
Year 7	439,939	0	0	439,939
Year 8	350,463	0	0	350,463
Year 9	270,444	0	0	270,444
Year 10	201,951	0	0	201,951
Total	5,275,433	0	0	5,275,433

Example calculations, data and parameter estimates

Each Project Instance will provide a study of the PI-level baseline scenario, either from public sources (where such data may be available) or field studies.

In order to calculate the ex-ante annual quantity of biomass that would have been used in the absence of project activity to generate useful thermal energy equivalent to that provided by the ICS (B_{old}), the parameters and estimates are used from the first planned PI: PI1-K2C, outlined below.

A PI-level analysis for PI1-K2C, has been provided below for the GP's ex-ante emissions reductions calculations.

For future PIs, additional studies for parameters $B_{old,i}$, $f_{NRB,b,y}$ and η_p will be completed.

EX-ante Parameters	Units	Fixed Project Parameters	Description	Source
E_{wf,CO_2}	tCO ₂ e/TJ	112	CO ₂ emission factor of biomass that is substituted or reduced	VMR0006 default
$E_{wf,non-CO_2}$	tCO ₂ e/TJ	26.23	Non-CO ₂ 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
DF	fraction	0.95	Default leakage adjustment factor	VMR0006 default
B_{old}	tonnes/year	5.49	Quantity of biomass consumed in baseline	Example used: Field baseline survey for first Project Instance

			scenario (tonnes per household per year).	(PI1-K2C). Final figure to be determined for each PI.
$f_{NRB,b,y}$	fraction	0.89	Fraction of biomass used in baseline scenario, which can be established as non-renewable.	Example used: fNRB study for first Project Instance (PI1-K2C). Final figure to be determined for each PI.
η_p	fraction	38.3%	Efficiency of project cookstove (fraction) determined at the start of the project activity.	Example used: Rocket Works' Zama Zama wood stove; South Africa lab efficiency test (stove to be distributed in PI1-K2C). Final figure to be determined for each PI.
DF	fraction	0.99	Default value considered for discount factor to account for efficiency loss of project cookstove per year of operation.	VMR0006 default

To determine the efficiency of project stoves and accounting for efficiency loss of the project stoves, Equation 5 was used.

$$\begin{aligned}
 \eta_{New,y} &= \eta_p \times (DF)^{(y-1)} \times 0.94 \\
 &= 0.383 \times (0.99)^{(1-1)} \times 0.94 \\
 &= 0.360
 \end{aligned}$$

$B_{y,savings,i,j}$ (tonnes per ICS per annum) was then determined via Equation 3:

$$\begin{aligned}
 B_{y,savings,i,j} &= B_{old} \times \left(1 - \frac{\eta_{old}}{\eta_{new,i,j}}\right) \\
 &= 5.490 \times \left(1 - 0.1/0.360\right) \\
 &= 3.965 \text{ t/yr}
 \end{aligned}$$

$ER_{y,i,j}$ (tonnes per ICS per annum) was then determined via Equation 2 for Year 1:

$$\begin{aligned}
 ER_{y,i,j} &= B_{y,savings,i,j} \times NCV_{wood \text{ fuel}} \times fNRB_y \times (EF_{wf,CO_2} + EF_{wf,nonCO_2}) \times N_{y,i,j} \times 0.95 \\
 &= 3.965 \times 0.0156 \times 0.89 \times (112 + 26.23) \times 1 \times 0.95 \\
 &= 7.229 \text{ tCO}_2\text{e}
 \end{aligned}$$

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	B_{old,p}
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 above. Based on Field Baseline survey conducted by TASC for PI1-K2C (see Field Baseline Report K2C_v2).
Value applied	5.49
Justification of choice of data or description of measurement methods and procedures applied	This parameter shall be determined at the Project Instance level, example provided from PI1 for ex-ante calculations
Purpose of Data	Calculation of emission reductions in Equations 3 & 6.
Comments	Parameter B _{old} once determined shall remain fixed for the entire crediting period. Where charcoal is used by the baseline devices, 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}
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 PI1-K2C. See associated report: Biomass Baseline for Cookstove Project in the Kruger to Canyon and Waterberg Biospheres;

	and fNRB calculation sheet: “2021-03-26 Values for baseline and fNRB calculation v1”
Value applied	0.89
Justification of choice of data or description of measurement methods and procedures applied	This parameter shall be determined at the Project Instance level, example provided from PI1 for ex-ante calculations
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: 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.
Comments	

Data / Parameter	EF _{WF,non-CO2}
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: IPCC default for wood fuel
Value applied	26.23

Justification of choice of data or description of measurement methods and procedures applied	
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
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, example provided from PI1 for ex-ante calculations
Purpose of Data	Calculation of $\eta_{new,i,j}$ in Equation 5
Comments	N/A

5.2 Data and Parameters Monitored

Data / Parameter	$N_{y,i,j}$
Data unit	Number
Description	Number of project devices of type i and batch j operating during year y
Source of data	Monitoring survey
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.

	90/10 confidence precision will be followed.
Frequency of monitoring/recording	At least once every two years
Value applied	130,000 (<i>example figure from PI1</i>)
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 emissions 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 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>i</i> and batch <i>j</i> 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 phases¹². - 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. v. 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. Each PI will apply either: - Steps i-iv: measured approach - Step v: (using methodology equation 5) meaning this parameter does not need to be monitored: calculated approach
Frequency of monitoring/recording	Annually
Value applied	38.3% (<i>example figure from PI1</i>)
Monitoring equipment	When measured: as specified in WBT protocol When calculated: none
QA/QC procedures to be applied	Data will be collected annually and applied to the emissions reductions 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 data	Calculation of emission reductions in Equation 3
Calculation method	Equation 5
Comments	-

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>i</i> .
Source of data	Survey
Description of measurement methods and procedures to be applied	Minimum sample size of each type <i>i</i> and batch <i>j</i> 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	Determined in the first year of project implementation
Value applied	-
Monitoring equipment	As specified in KPT protocol
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 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.

Data / Parameter	μy
Data unit	Fraction
Description	<i>Adjustment to account for any continued use of pre-project devices during the year y</i>
Source of data	Monitoring survey
Description of measurement methods and procedures to be applied	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 Bold, adjusted is equal to Bold.

	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 is applied to Bold. 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.³⁵
Frequency of monitoring/recording	At least once every two years
Value applied	0
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 emissions 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 data	Calculation of emission reduction in Equation 6.
Calculation method	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 μy is not required to be computed.
Comments	-
Data / Parameter	η_{old}

³⁵ 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 above 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 or 0.2
Monitoring equipment	-
QA/QC procedures to be applied	The baseline survey for PI1-K2C shows predominant use of woodfuel amongst households in the first PI Project Boundary. PIs will expressly targeted 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
Equations	5
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
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,l,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.

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	-

5.3 Monitoring Plan

5.3.1 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 the sampling plan presented here will apply to assess parameter values in Project Instances to be included in the GP, either individually or in groups.

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 PIs³⁶. 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.

b. Target Population

The target population is the combined unique entries of ICS users by PI in the monitoring database from which the sample is being drawn.

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 the number of samples.

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

The formula used for sampling are as follows:

1. 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)

2. For mean based parameters:

³⁶ That is, the populations of all Project Instances in the group are combined together, the sample size is determined and a single survey is undertaken to collect data.

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

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

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.

5.3.2 Data Recording

Field-based monitoring activities to determine monitored parameter values will be either a field survey, KPT or WBT.

Data shall be recorded for each activity either directly onto a smartphone-based app designed for the purpose, or via paper forms where this is not possible.

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

5.3.3 Organizational Structure

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

Data collection will be conducted by a dedicated monitoring team of trained individuals, either from TASC SA or the Project Instance Implementer. The monitoring team will use a survey questionnaire and instruments required for KPT/WBT measurements on the sampled ICS.

5.3.4 Quality Assurance/Quality Control

In order to minimize sampling errors, such as non-responses and errors, the field team will practice over-sampling from the population to ensure a total number respondents that meets the required level of precision. 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.

5.3.5 Analysis

Completed survey questionnaires and KPT/WBT data will be collected by the monitoring team and delivered to the TASC SA Carbon Project Manager for analysis. These shall be checked through for errors and completeness, and compiled into a monitoring report. Any incomplete or missing data shall be documented clearly. The monitoring report will include:

- Summary of activities undertaken, at which location and on which dates
- Summary of data collected and values
- Calculation of the parameter values to be utilized in emissions reduction calculations

5.3.6 Implementation Plan

The implementation of this monitoring plan will be the responsibility of the TASC SA and its specifically trained monitoring team. This team will comprise local operatives who are conversant in local languages and customs of rural South Africa. Individuals will be selected based on their competence and experience for each monitoring activity, and trained accordingly. Training records will be maintained.

There will be no incentives provided for these individuals for the type of data provided, to prevent any conflict of interest.