Gold Standard for the Global Goals

TEMPLATE

MONITORING REPORT

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VERSION **v. 1.1**

RELATED SUPPORT **- TEMPLATE GUIDE Monitoring Report v. 1.1**

This document contains the following Sections

KEY PROJECT INFORMATION

GS ID of Programme	GS10789
Title of the programme	ECOA_BURN multi-country Clean Cooking Programme
Version of POA-DD applicable to this monitoring report	4.1
Name and GS ID of fully Validated CPA/VPAs (i.e. non compliance check)	GS10789 VPA1: Efficient and Clean Cooking for households in Somalia v4.0 GS ID: GS10790

Key Project Information

GS ID (s) of Project (s)	GS 11671
Title of the project (s) covered by monitoring report	GS10789 GS11673 VPA 61: Efficient and Clean Cooking for households in Nigeria
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	4
Version number of the monitoring report	6.0
Completion date of the monitoring report	21/02/2024
Date of project design certification	12/12/2023
Date of Last Annual Report	NA
Monitoring period number	1
Duration of this monitoring period	13/12/2021-08/06/2023 (Both days included)
Project Representative	BURN Manufacturing Co.
Host Country	Federal Republic of Nigeria
Activity Requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC); Version 3.1.0

Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A

Table 1 – Sustainable Development Contributions Achieved

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units/ Products
13 Climate Action (mandatory)	Emission Reductions	590,015	VERs – t/CO2e
SDG 1 End poverty in all its forms everywhere	Monetary savings related to the purchase of charcoal	51%	Equivalent monetary savings in %
4. (Quality Education) Ensure equal access for all women and men to affordable and quality technical, vocational, and tertiary education, including university	Number of people receiving skill development training	93	Number of people who participated in project training
SDG 5 (Gender Equality) Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household	Average time saving associated with cooking in the project scenario	79	Average time saved cooking for women in the project scenario (measured in minutes reported by end-user)
3 Ensure healthy lives and promote well-being for all at all ages	Perceived air quality	94.30%	Households in % perceiving improved air quality
7. Ensure access to affordable, reliable, sustainable, and modern energy for all	Number of sold/distributed	118,787	Number of sold/ distributed ICS in use

8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment and decent work for all	No. of jobs created	304	Number of local jobs created
15. (Life on land) Promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	Total non-renewable biomass saved	558,452.78	Tons of non-renewable biomass saved in the project scenario from continued use of project technologies

Table 2 – Product Vintages

		Amount Achieved
Start Dates	**End Dates**	**VERs**
13/12/2021	31/12/2021	20,645
01/01/2022	31/12/2022	396,603
01/01/2023	08/06/2023	172,767
TOTAL		**590,015**

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

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This VPA deploys efficient improved charcoal cookstoves (ICS), known as 'Jikokoas' reducing woody biomass consumption for urban and peri-urban households in the Federal Republic of Nigeria.

The VPA is implemented by BURN Manufacturing Co. (in the following 'BURN'), at the same time Coordinating and Managing Entity (CME) of the PoA, the biggest manufacturer of efficient improved cookstoves in Sub-Saharan Africa producing all its stoves in the first and only modern cookstove manufacturing facility in Kenya.

The scenario existing prior to the implementation of the project is the use of inefficient traditional cookstoves, consuming non-renewable charcoal and firewood. The high biomass consumption has negative impacts on the environment leading to deforestation and land degradation, Greenhouse Gas Emissions (GHG) emissions, loss of soil fertility and soils' reduced ability of water retention. Further, indoor air pollution through health-damaging pollutants while combusting firewood and charcoal result in diseases like e.g., pneumonia, stroke, ischaemic heart diseases, chronic obstructive pulmonary diseases and lung cancer.
Inefficient and unstainable charcoal production in Nigeria is a grave concern to the forest and other biomass stocks in the country. Nigeria ranks the highest in Africa, and second in the world in wood fuel and charcoal production. There has been a steady increase in the annual production of charcoal in Nigeria without a corresponding increase in its Charcoal exports. This implies that almost all the charcoal produced in the Country is consumed within its borders.

A 2019 report on this dynamic is summarized as follows:

"In Nigeria, there is no controlled supply of charcoal in urban areas, and this contributes to deforestation as an increase in population in these areas results to an increase in demand for charcoal. Also due to the cost of transporting charcoal from the rural areas where it is produced to the urban areas where it is widely consumed there has been a steady increase in its price and this have inhibited the growth of small-scale traders who use wood, such as fish sellers, and has also affected household budgets.

Furthermore, the use of wood presently surpasses the regrowth of forests and reforestation efforts have been very poor[1]"

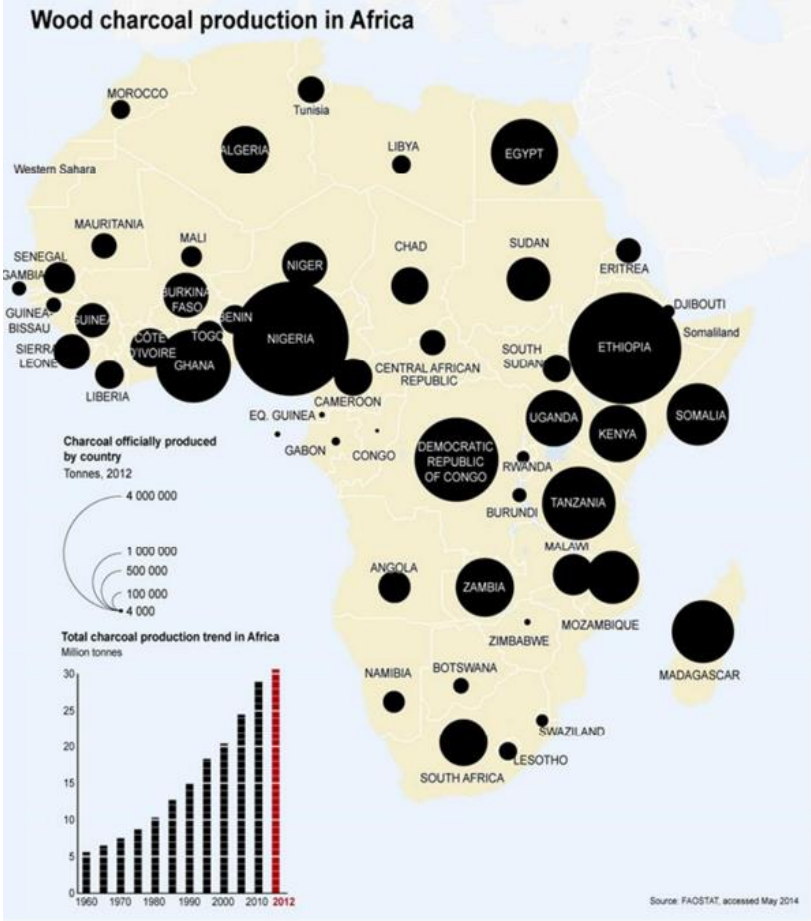

Figure 1: Map of Africa highlighting countries with the highest Charcoal production rates

The government of the Federal Republic of Nigeria, in its updated 2021 NDC, recognizes the importance of clean cooking to the Country. Specifically on the vast and adverse domestic and national socio-economic impacts on lives, forests, and the economy. The NDC doesn't mandate or enforce any directives on improved cook stoves[2].

The key barriers to clean cooking adoption in Nigeria can be summarised thematically as follows[3]:

[1] Odunayo James Rotowa, Zaccheaus Tunde Egbwole, Ayobami Akorede Adeagbo, Oluwasessin Moyinolwa Blessing. Effect of Indiscriminate Charcoal Production on Nigeria Forest Estate. International Journal of Environmental Protection and Policy. Vol. 7, No. 6, 2019, pp. 144-149. doi: 10.11648/j.ijepp.20190706.12

[2] NIGERIA'S FIRST NATIONALLY DETERMINED CONTRIBUTION – 2021 UPDATE

[3] https://thenextier.com/clean-cooking-technologies-3/

Affordability: This is reportedly one of Nigeria's most significant barriers to adopting and using clean cooking. According to the National Bureau of Statistics (NBS), 40.1% of Nigerians are classified as poor.

Awareness Creation: despite noteworthy actions in this area, there is a considerable need to intensify awareness, especially in rural areas. These people barely have access to conventional information channels like tv and social media, which could result in low awareness in these areas.

Supply Constraints: Supply constraints can hinder the adoption of clean cooking technologies by limiting their existence in certain Nigerian markets, leading to fewer options for consumers and a challenge to access these technologies.

As is referenced in this Monitoring Report, BURN has rolled out mechanism to mitigate these technology adoption barriers which have been supported by the carbon financing used to implement the project activity.

Carbon financing has been used to subsidize the project stove costs by up to 56% (a reduction in the stove price from $31 to $14). BURN has also expanded its in-country sales agents' teams to implement targeted distribution country wide to ensure that stove sales are targeted to the households who meet the baseline scenario definition. A robust end user awareness mechanism programme was also implemented in Nigeria to promote project stove usage and to educate potential end users on the personal and communal benefits of the project stoves.

Technologies and/or measures

The VPA deploys an efficient cookstove known as Jikokoa intended for use with charcoal. The technology was designed and developed by BURN. These highly efficient cookstoves translate into considerable charcoal savings when compared to traditional cookstoves. The Jikokoa stove's design considers the local cooking culture in the project area to ensure that improvements in technology and improved standards of living do not come at the expense of cultural traditions. A total of 131,985 stoves have been distributed till the end of current monitoring period.

A.2. Location of project

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Host country: Federal Republic of Nigeria

Nigeria is a federation of 36 states and 1 federal capital territory which are all covered under the existing VPA.

GPS coordinates for the Federal Republic of Nigeria[4]:

Latitude: 9°04'39.90"North

Longitude: 8°40'38.84"East

Figure 2: Map of Federal Republic of Nigeria

A.3. Reference of applied methodology

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Technologies and Practices to Displace Decentralized Thermal Energy Consumption, version 3.1.

Tools applied in this VPA are:

1. CDM. Methodological tool 30: Calculation of the fraction of non-renewable biomass. Version 03.0[5]

[4] https://latitude.to/map/ng/nigeria
[5] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v3.0.pdf

A.4. Crediting period of project

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The crediting period of the project is from 13/12/2021 to 12/12/2026 (both days included). The crediting period for this project is 5 years. The crediting period may be renewed twice in line with the Community Services Activity Requirements.

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

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a) Purpose of the specific-case VPA(s) and the measures taken for GHG emission reductions or net GHG removals by sinks

The purpose of the VPA is to achieve widespread distribution and effective use of efficient cooking technologies in urban and peri-urban households. The widespread use of efficient cooking technologies will result in vastly reduced woody biomass consumption. Reduced woody biomass consumption will result in GHG emission reductions, relative to the applicable non-renewable biomass factor.

b) Description of the technology employed and installed equipment and/or infrastructure, including information requested by the eligibility criteria.

The efficient cook stove relies on two main design principles to achieve a high thermal efficiency, namely improved airflow, and thermal insulation. Improved airflow design allows better fuel-air mixing and regulation of the fuel-air mixture, increasing the rate at which oxygen is delivered to fuel in the combustion chamber. The increased flow rate of oxygen allows the combustion to occur at a higher temperature. The thermal insulation of the efficient cooking stove ensures thermal energy is directed to the cooking surface and is does not become waste heat. The VPA deploys efficient charcoal cooking stoves known as Jikokoa Classic (G3.5) and Jikokoa Xtra (G4), which have been designed and developed by BURN Manufacturing Co.

Please see the technical specifications in the following table:

Stove Manufacturer	BURN

Stove Model	Jikokoa G3.5
Stove Type	Charcoal Stove

Materials

Stove Body	CRCA Carbon Steel painted high gloss black epoxy powder coat
Pot Rest	Stainless-Steel
Burning Chamber	Stainless-steel
Ash Tray	Aluzinc
Feet	Stainless-steel

Measurements

Height	cm	24.4 cm
Diameter (stove top)	cm	26.0 cm
Weight	kg	4 kg
Fuel Chamber Volume	cm^3	954 cm^3
Packaging Dimensions	cm	29.0 L x 28.5 W x 25.1 H

WBT Results

Parameter	**Unit**	**Value**
High power thermal efficiency (average of cold start and hot start)	%	48.1%
Firepower	kW	2.05
Boil Time	minutes	27.72

Lifetime

Warranty	2 years
Estimated Lifetime[3]	7 to 10 years

Stove Manufacturer	BURN
Stove Model	Jikokoa Xtra (G4)
Stove Type	Charcoal Stove

Materials

Stove Body	**1.1 | CRCA Carbon Steel painted high gloss black epoxy** powder coat

Pot Rest	Stainless-Steel & Cast Iron	
Burning Chamber	Stainless-steel	
Ash Tray	Aluzinc	
Feet	Aluzinc	

Height	cm	27.0 cm
Diameter (stove top)	cm	30.2 cm
Weight	kg	5.5 kg
Fuel Chamber Volume	cm^3	1030 cm^3
Packaging Dimensions	cm	30.2 L x 30.5 W x 27.5 H

WBT Results

Parameter	**Unit**	**Value**
High power thermal efficiency (averageof cold start and hot start)	%	44.6%
Firepower	kW	2.21
Boil Time	minutes	27.96

Lifetime

Warranty	2 years
Estimated Lifetime[6]	7 to 10 years

[6] The lifetime of the Jikokoa Xtra may go beyond the indicated lifetime. Hence, depending on the usage rate of the stoves, stoves will be either removed from the database after the end of its lifetime and not credited anymore or remain in the database for crediting until the moment a significant drop in usage rate is observed. As an alternative, worn out ICS may be replaced by newly distributed stoves. Manufacturer's declaration about the ICS lifetime has beensubmitted to the validating VVB.

Stove Manufacturer	BURN
Stove Model	ECOA Char MMJ[7]
Stove Type	Charcoal Stove

Materials

Stove Body	CRCA Carbon Steel, painted Hammertone black epoxy powder coat
Pot Rest	Stainless Steel
Burning Chamber	Stainless Steel
Ash Tray	Aluzinc
Feet	Aluzinc
Handles	Stainless Steel and Polypropylene plastic[8]

Measurements

Height	cm	22.8 cm
Diameter (stove top)	cm	26.7 cm
Weight	kg	3.0 kg
Fuel Chamber Volume	cm^3	1,152 cm^3
Packaging Dimensions	cm	29.5 L x 29.5 W x 24.0 H9

WBT Results

Parameter	**Unit**	**Value**
High power thermal efficiency (average of cold start and hot start)	%	49.29%
Firepower	kW	2.2
Boil Time	minutes	25.13

Lifetime

Warranty	1 year
Estimated Lifetime[9]	7 to 10 years

[7] The name of the stove model is still subject to change.
[8] The name of the stove model is still subject to change.
[9] The lifetime of the Ecoa Char MMJ may go beyond the indicated lifetime. Hence, depending on the usage rate of the stoves, stoves will be either removed from the database after the end of its lifetime and not credited anymore or remain in the database for crediting until the moment a significant drop in usage rate is observed. As an alternative, worn out ICS may be replaced by newly distributed stoves. Manufacturer's declaration about the ICS lifetime has been submitted to the validating VVB.

Figure 3: To the Left to right: Jikokoa Classic, Jikokoa Xtra, ECOA Char MMJ

The project has been implemented as described in the PDD. There are no changes from the project design. till the end of the current monitoring period (from 13/12/2021 to 08/06/2023), 131,985 stoves had been distributed. The below table shows year wise distribution of the stoves for the VPA:

Year of distribution	Total Stoves Distributed
2021	6,289
2022	64,199
2023	61,497
Total	131,985

B.1.1 Forward Action Requests

>> N/A

B.2. Post-Design Certification changes

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B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

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No temporary deviation

B.2.2. Corrections

>>

No Corrections

B.2.3. Changes to start date of crediting period

>>

No Change

B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

>>

No changes

B.2.5. Changes to project design of approved project

>> N/A

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

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Prior to launching sales and distribution efforts in Nigeria, BURN conducted detailed feasibility studies and willingness to pay assessments to ensure that households who received the project stoves were compliant with the baseline scenario in the VPA DD. This targeted-sales approach also ensures that project stoves are purchased primarily by low-income families at a subsidised cost.

In its early expansion into Nigeria, BURN worked with different local distributors to sell project stoves to households in areas that had already been screened from the Feasibility Studies. This was BURN's B2B approach towards stove distribution. Soon thereafter, however, BURN opted to optimize its sales strategy. Rather than rely on distributors, BURN employed its B2C strategy, focusing on a direct relationship and interface between the company and its end users.

In the B2C approach, BURN employs a three-tier product-market fit assessment. Feasibility studies are first conducted to ensure that sales agents are assigned to locations in the Country that have biomass consumption trends that align with the end user characteristics established in the Baseline Scenario. Once the feasibility studies are conducted, the sales agents then conduct end user prospecting assignments at end user households or marketplaces. These prospecting exercises offer an interactive engagement where households are educated on the project stove and benefits. Once prospecting exercises are complete, sales agents register end user data at the point of delivery, allowing BURN to develop a database of end users who can be reached for annual monitoring exercises or the numerous end user engagement activities BURN routinely engages in.

All BURN stoves have a unique serial number to enable tracking and ensure no double counting.

Accordingly, the VPA database generation process adopts the mechanism specified in the flow chart below:

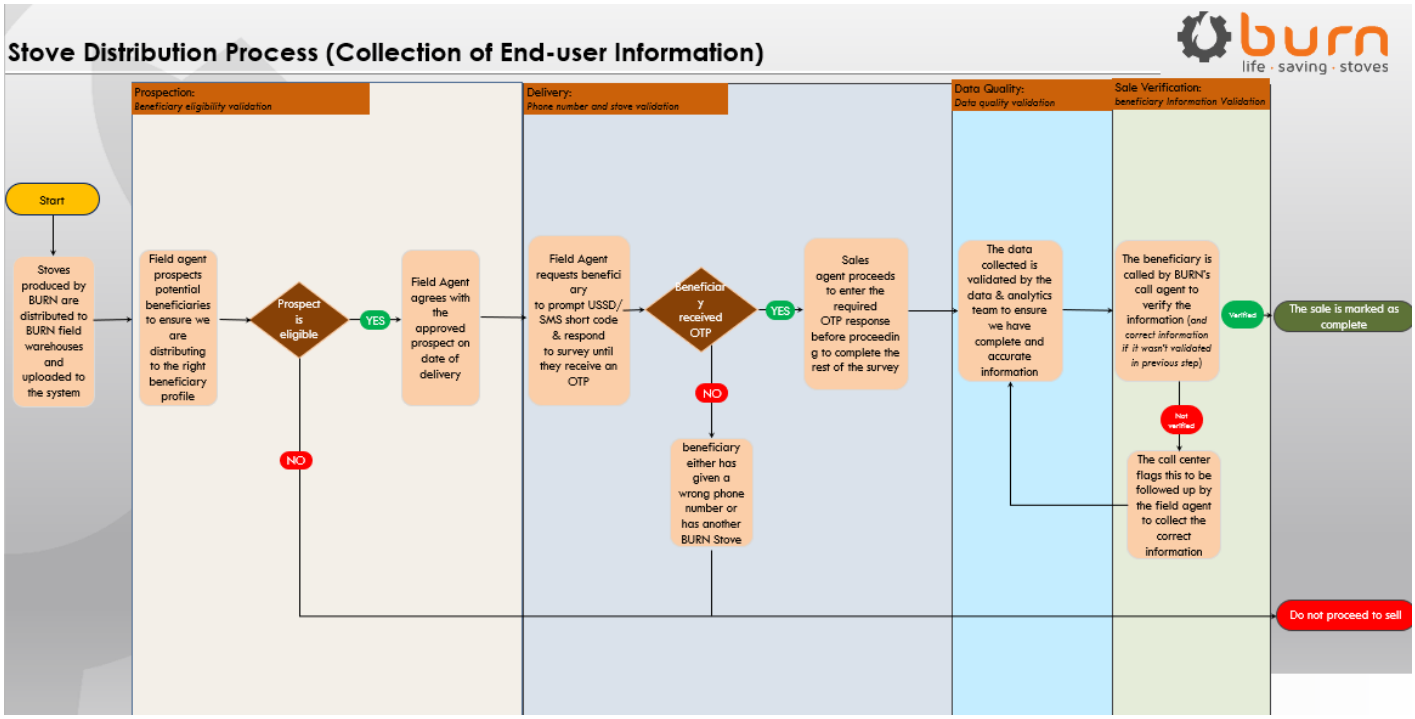

Figure 4: VPA Sales / Distribution Process

The CME operates and manages an electronic data management system that stores information on and track all efficient cooking technologies under the VPA. As a minimum the following information will be recorded through a cloud-based web platform (KoboCollect) in the database:

- Unique serial number (USN) of the ICS
- Date of shipment to distributor/retailer
- Name of distributor/retailer
- Quantity of ICS distributed
- Geographic area (state) of distributor/retailer
- Model type of the ICS

Besides, the distribution database will contain end-user contact details (name, state, mobile number, or national ID number) of at least 10 times the survey and field test sample size (including usage surveys for each age of product), to ensure an adequate end-user pool to which random sampling can be applied. To claim the ICS warranty,

end-users have to register their end-user details at the point of sale, or through SMS and/or phone calls.

In accordance with the management system described in the PoA DD, this VPA has a unique database that tracks and records the following information:

- Name and ID of the VPA
- Technology deployed (Name of the device model)
- Name and contact details of the registered end-users or distributors/installers for the VPA
- Date of registration of the end user
- Serial numbers of the device belonging to the VPA and corresponding information required for monitoring
- Start of VPA crediting period

The monitoring system in effect for the VPA as implemented is as illustrated below:

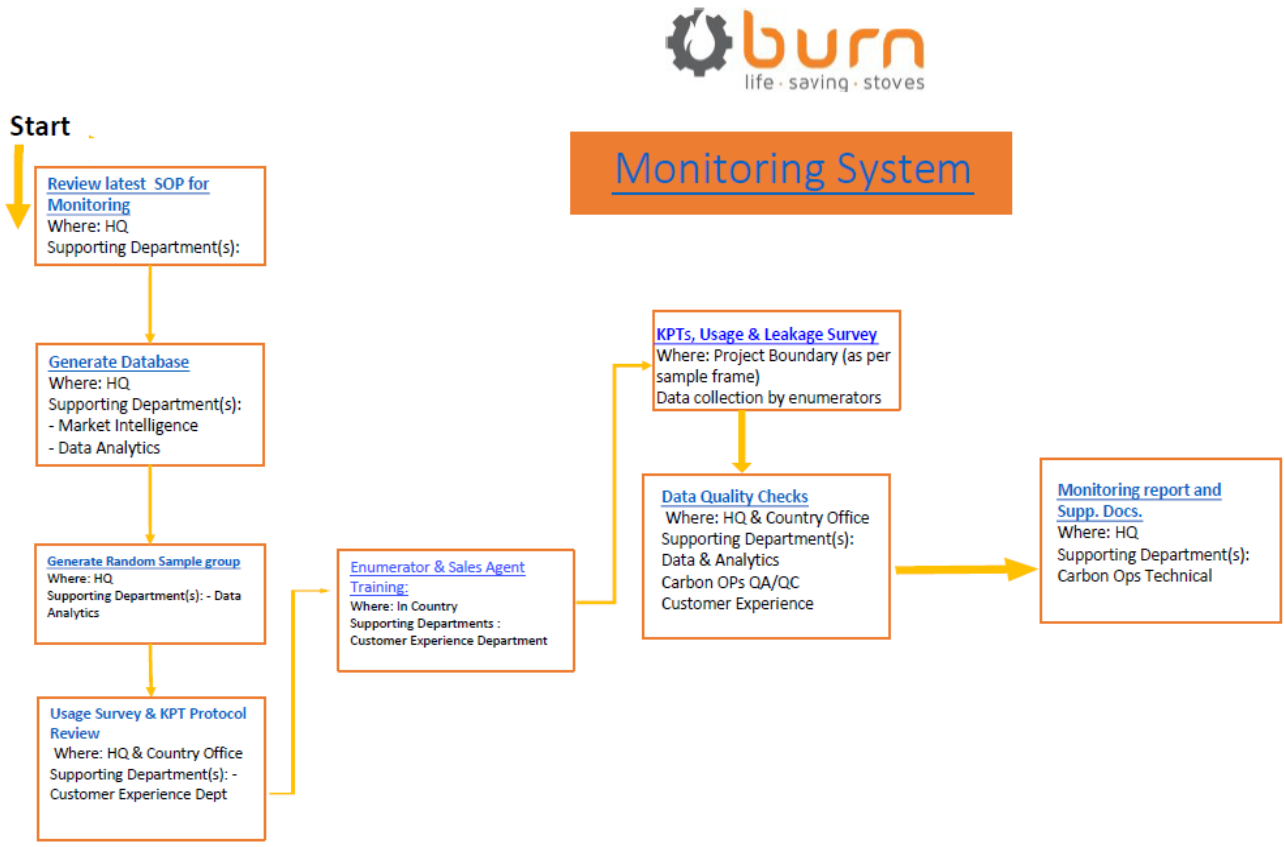

Figure: VPA 61 Monitoring System Flow Chart

A detailed description of the usage survey and KPTs employed in this monitoring period is detailed in Section D.4 of this MR.

Mechanism to avoid double counting:

The Unique Serial Number ("USN") of each ICS entered into the sales database will be linked to a sales date (recorded during distribution) or shipment date. Thus, for any monitoring period it is possible to calculate the period of time for which the stoves included in the emissions reduction calculations are deemed operating. If for e.g. a stove has been operating for 180 days, then the full-year operating fraction is 0.493 (=180/365 days stove will be counted as operational (= start crediting) from the next day following the stove distribution or after a conservatively calculated period of the date of shipment. The sum of the operating fractions of all appliances determines the equivalent full-time appliances for the monitoring period.

The USN has the following format comprising of 9 digits[31]:

1st digit	2nd digit	3rd	4th	5th	6th	7th	8th	9th
Product ID	100000th	10000th	1000th	100th	10th	Random	Random	1st
ID	**S1**	**S2**	**S3**	**S4**	**S5**	**R1**	**R2**	**S6**

Each section on the USN will identify the product as follows:

- Product type: the first digit identifies the stove type (Jikokoa)
- # Production number: S1 to S6 are digit slots for a sequential numbering ordered by time of production, allowing for 1 million unique serial numbers.For instance, the first stove off the line would have "000000" for its S1-S6digits.
- Random digits: R1 and R2 are 2 random digits placed in slots 7 & 8, to make the USN unpredictable to outside parties

Example for USN: 105097338

- "1" stands for Jikokoa product ID
- "050978" for S1-S6, meaning it was the 50,979th Jikokoa produced

- "33" for R1-R2, the random digits

The data for the system will be updated and modified as required to allow for optimal performance of each VPA implementation and monitoring. All data will be stored for at least two (2) years after the expiry of the crediting period.
BURN has adopted a new system of representing the USN to an alphanumeric code replacing the 9-digit USN number system with a 6-character alphanumeric serial number.

SECTION D. DATA AND PARAMETERS

D.1. Data and parameters fixed ex ante or at renewal of crediting period
>>
SDG13

Data/parameter	$EF_{b,wood,CO2}$
Unit	tCO2/TJ
Description	CO2 emission factor arising from use of fuel wood in baseline scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 2, chapter 2 (Table 2.5)
Value(s) applied	112
Choice of data or Measurement methods and procedures	Default IPCC value for fuel wood is applied
Purpose of data	Calculation of baseline emissions
Additional comment	If EF is in units of tCO2/t_fuel, remove NCV term from emission calculations. Term can include a combination of emission factors from fuel production, transport, and use.

Data/parameter	$EF_{b,wood,non-CO2}$
Unit	tCO2e/TJ

Description	Non-CO2 emission factor arising from use of fuel wood in baseline scenario
Source of data	IPCC Default value
Value(s) applied	9.46
Choice of data or Measurement methods and procedures	IPCC Default value
Purpose of data	Non-CO2 Emission calculation in baseline
Additional comment	The non-CO2 emission factor is based on the AR5 GWP values.

Data/parameter	$EF_{p,wood,CO2}$
Unit	tCO2/TJ
Description	CO2 emission factor arising from use of fuel wood in project scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 2, chapter 2 (Table 2.5)
Value(s) applied	112
Choice of data or Measurement methods and procedures	Default IPCC value for fuel wood is applied.
Purpose of data	CO_2 emission calculation in project scenario
Additional comment	

Data/parameter	$EF_{p,wood,non-CO2}$
Unit	tCO_2e/TJ
Description	Non-CO2 emission factor arising from use of fuel wood in project scenario

Source of data	IPCC Default value
Value(s) applied	9.46
Choice of data or Measurement methods and procedures	IPCC Default value
Purpose of data	Non-CO_2 emission calculation in project scenario
Additional comment	The non-CO2 emission factor is based on the AR5 GWP values.

Data/parameter	NCVb
Unit	TJ/ton of fuel wood
Description	Net calorific value of the fuel wood used in baseline
Source of data	IPCC default 2006, volume 2, chapter 1 (Table 1.2)
Value(s) applied	0.0156
Choice of data or Measurement methods and procedures	Default IPCC value for fuel wood is applied.
Purpose of data	CO_2 emission calculation in baseline scenario
Additional comment	-

Data/parameter	NCVp
Unit	TJ/ton of fuel wood
Description	Net calorific value of the fuel wood used in project scenario
Source of data	IPCC default 2006, volume 2, chapter 1 (Table 1.2)
Value(s) applied	0.0156

Choice of data or Measurement methods and procedures	Default IPCC value for fuel wood is applied.
Purpose of data	CO_2 emission calculation in project scenario
Additional comment	-

Data/parameter	$f_{NRBi,y}$
Unit	fraction
Description	Non-renewability status of woody biomass fuel in scenario i during year y
Source of data	fNRB Report for Nigeria by C4ECOSOLUTIONS
Value(s) applied	0.93
Choice of data or Measurement methods and procedures	fNRB assessment based on CDM fNRB tool, Tool 30, version 03.0
Purpose of data	Emission Reduction calculation
Additional comment	The fNRB value will remain fixed during the crediting period

Data/parameter	$P_{b,y}$
Unit	t/household/year
Description	Quantity of charcoal that is consumed in baseline scenario b during year y
Source of data	Baseline Survey
Value(s) applied	1.41
Choice of data or Measurement methods and procedures	This value is based on baseline KPTs carried out with 120 households in the project boundary. The baseline KPT has followed the procedures as outlined in the methodology in section 7 and Annex 4. For more details see section B.4. of the VPA-DD.

Purpose of data	Used to calculate the fuel savings
Additional comment	The baseline will remain by-default fixed during the crediting period since the project activity targets non-industrial applications (see page 6 of TPDDTEC)

Data/parameter	Wood-to-charcoal conversion factor
Unit	kg firewood / kg charcoal
Description	Conversion factor for transforming fuel wood into charcoal
Source of data	IPCC default value https://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf (page 1.45)
Value(s) applied	6
Choice of data or Measurement methods and procedures	The methodology TPDDTEC 3.1 as per section 7. Performance Field Tests and Calculation of Emission Reductions, refers to use of IPCC, credible published literature, project-relevant measurement reports, or project-specific monitoring to get a wood-to-charcoal conversion ratio.
Purpose of data	Used to calculate fuel savings in fuel wood equivalent
Additional comment	Fixed ex-ante at VPA level

Data/parameter	NCV_{LPG}
Unit	TJ/ton
Description	Net calorific value of the LPG used in project scenario
Source of data	IPCC default 2006, volume 2, chapter 1 (Table 1.2)
Value(s) applied	0.0473

Choice of data or Measurement methods and procedures	Default IPCC value for LPG is applied.
Purpose of data	CO_2 emission calculation in project scenario
Additional comment	-

Data/parameter	$EF_{b,LPG,CO2}$
Unit	tCO2/TJ
Description	CO2 emission factor arising from use of LPG in project scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 2, chapter 2 (Table 2.5)
Value(s) applied	63.1
Choice of data or Measurement methods and procedures	Default IPCC value for LPG is applied.
Purpose of data	CO_2 emission calculation in project scenario
Additional comment	-

D.2 Data and parameters monitored

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Data / Parameter	$N_{p,y}$
Unit	Number of project cookstove credited (units)
Description	Cookstoves in the project database for project scenario p through year y
Source of data	Distribution database

Value(s) applied	118,787
Measurement methods and procedures	BURN keeps records of all distributed ICS in an electronic database. As a minimum the following information will be recorded through KoboCollect in the database: • Unique serial number (USN) of the ICS • Date of shipment to distributor/retailer • Name of distributor/retailer • Quantity of ICS distributed • Geographic area (state) of distributor/retailer • Model type of the ICS Besides, the distribution database will contain end-user contact details (name, state, mobile number, or national ID number) of at least 10 times the survey and field test sample size (including usage surveys for each age of product), to ensure an adequate end-user pool to which random sampling can be applied. To claim the ICS warranty, end-users must register their end-user details through SMS or call.
Monitoring frequency	Continuously
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	Estimation of CO_2e emission reductions
Additional comment	The total distribution record is divided based on project scenario to create the project database.

Data / Parameter	$P_{p,y}$
Unit	t/household/year
Description	Quantity of fuel that is consumed in project scenario p during year y
Source of data	Project KPT
Value(s) applied	0.56
Measurement methods and procedures	KPT measurements Digital Moisture Detector- Wood moisture Wood range- 4-75% Accuracy- ± 0.5%

	Weighing scale Hook type with temperature 50 kgs
Monitoring frequency	Updated every two years
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	Calculation of project emission reductions
Additional comment	A single project fuel consumption parameter is weighed to be representative of the quantity of project technologies of each age being credited in a given project scenario.

Data / Parameter	$U_{p,y}$
Unit	Percentage
Description	Usage rate in project scenario p during year y
Source of data	Annual Usage Survey
Value(s) applied	90% (Weighted average usage rate) (cap for value good practice as per "Usage Rate Monitoring Requirements and Guidelines")
Measurement methods and procedures	Calculated
Monitoring frequency	Annual
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	To calculate the Usage rate in project scenario p during year y.
Additional comment	A single usage parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario. The mandatory and Good Practice level as per the 'GS Requirements and Guidelines: Usage rate Monitoring' is being followed. A detailed description of the end user awareness campaigns employed by BURN and applicability of mandatory and Good Practice level of usage rate, is provided in Section D.4. of this Monitoring Report.

Data / Parameter	$LE_{p,y}$
Unit	tCO_2e per year
Description	Leakage in project scenario p during year y
Source of data	Leakage survey
Value(s) applied	0
Measurement methods and procedures	-
Monitoring frequency	Every two years
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	Used to calculate leakage emissions
Additional comment	Aggregate leakage can be assessed for multiple project scenarios, if appropriate

SDG 1

Data / Parameter	Monetary savings related to the purchase of charcoal
Unit	%
Description	Monetary savings related to the purchase of charcoal
Source of data	Usage/monitoring survey
Value(s) applied	51%
Measurement methods and procedures	Measured and calculated
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	Reporting on SDG 1
Additional comment	This parameter is measured qualitatively, but not quantitatively.

SDG 3

Data / Parameter	Perceived air quality
Unit	-
Description	Smoke levels, itchy eyes and breathing problems
Source of data	Usage/monitoring survey
Value(s) applied	94.30 %
Measurement methods and procedures	Carrying out usage surveys (either site visits or telephone surveys) to check on the pollution-related inconveniences (such as smoke levels, itchy eyes and breathing problems) in the project scenario
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	-
Purpose of data	Reporting on SDG 3
Additional comment	This parameter is measured qualitatively, but not quantitatively.

SDG 4

Data / Parameter	Number of people trained/ year
Unit	Number
Description	Number of people who participated in project trainings
Source of data	Training records and participation lists
Value(s) applied	93
Measurement methods and procedures	Training records and participation lists
Monitoring frequency	Annual

QA/QC procedures	Transparent data analysis and reporting
Purpose of data	Reporting on sustainable development of the project
Additional comment	

SDG 5

Data / Parameter	Average number of minutes saved while cooking in project scenario (user estimate of comparative cooking time in baseline to project scenario)
Unit	Minutes/day
Description	Number of minutes spent on average for cooking in the project scenario
Source of data	Project monitoring survey
Value(s) applied	79
Measurement methods and procedures	Statistical average of the end-user reported difference between the number of minutes spent cooking in the project scenario compared to baseline conditions for similar meals
Monitoring frequency	Annual
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	Reporting on sustainable development of the project
Additional comment	

SDG 7

Data / Parameter	Number of sold/distributed ICS in use
Unit	Number of units in use
Description	Number of sold/distributed ICS in use
Source of data	Project database & supporting files

Value(s) applied	118,787 The usage rate is 90%
Measurement methods and procedures	Calculated: Total stoves Distributed * Weighted Average Usage rate
Monitoring frequency	Annual
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	Reporting on sustainable development of the project
Additional comment	This value is calculated by Multiplying the Total Number of stoves assumed to be distributed in the Project over the Crediting Period by the Usage rate per year

SDG 8

Data / Parameter	Average hourly earnings of female and male employees, by occupation, age and persons with disabilities
Unit	Number
Description	Number of people directly employed by the project
Source of data	Project records
Value(s) applied	304
Measurement methods and procedures	Direct measurement based on employment numbers of those employed directly by the project
Monitoring frequency	Annually
QA/QC procedures	Employee list can be cross-checked with contracts/payment slips or others
Purpose of data	Reporting on SDG 8
Additional comment	-

SDG 15

Data / Parameter	Total amount of non-renewable fuel savings due to displacement or energy efficiency improvements of baseline technology
Unit	Tons
Description	Reduced non-renewable biomass consumption attributed to charcoal savings
Source of data	Project database, Monitoring & Usage Surveys
Value(s) applied	558,452.78
Measurement methods and procedures	Computed as a function of specific fuel savings for an individual technology multiplied by the total number of operational technologies (discounted for usage rate in the monitoring period) and the non-renewable Biomass fraction in Nigeria.
Monitoring frequency	Annually
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	Reporting on sustainable development of the project
Additional comment	-

D.3. Comparison of monitored parameters with last monitoring period

Data/Parameter	Value obtained in this monitoring period	Value obtained last monitoring period
$P_{b,y}$	1.41	N/A
$P_{p,y}$	0.56	N/A
$U_{p,y}$	90%	N/A
$N_{p,y}$	118,787	N/A
$LE_{p,y}$	0	N/A
Perceived Air quality (SDG 3)	94.30%	N/A
Equivalent monetary savings (SDG 1)	51%	N/A
Total Jobs (SDG 8)	304 people employed	N/A

Number of people/households with access to the energy efficient cook stoves and the usage rates of efficient cook stoves. (SDG 7)	118,787 units active Usage rate- 90%	N/A
Number of People trained (SDG 4)	93	N/A
Average time saved cooking for women in the project scenario (measured in minutes per day per household reported by end-user) (SDG 5)	79	N/A
Tons of non-renewable biomass saved in the project scenario from continued use of project technologies	558,452.78	N/A

D.4. Implementation of sampling plan

>>

Monitoring/Usage Surveys and Project KPTs

Methodology Followed

Data collection for usage/monitoring survey was conducted from 8th June 2023 to 14th August 2023. A team of37 Enumerators were trained for the data collection by BURN team to ensure understanding of usage/monitoring requirements, Kitchen performance test and data collection procedures.

The leading team in Nigeria consisting of team leaders and project managers, were trained by the Carbon Project Manager from BURN. This team thereafter trained a local team of 35 surveyors who were well versed with the local culture and language. The training was adequately tailored to usage surveys and Kitchen performance tests and included an interactive discussion of questions with surveyors, going through the questions of the usage survey questionnaire and KPTs (data collection form), role plays as well as interview techniques.

The usage Kitchen Performance Test households were visited on 3 consecutive days, avoiding weekends or any holiday. The first day was used to make introductions to the project and conduct in person interviews and observations, while the next 3 days were used for weighing all fuel types used on all cooking devices in the household during the duration of the visit. The charcoal, firewood, LPG, kerosene, and electricity consumption was measured over 3 days. The scales were brand-new to ensure the highest level of accuracy in taking fuel measurements. The sample selection for the KPTs was randomly generated to eliminate potential bias in end-user profiles. The CME provided fuel to the households to eliminate the potential for biased consumption in the fuel measurement campaign.

Monitored Parameters related to SDG 13

1. Up,y - Usage rate in project scenario p during year y
2. Pp,y – Project fuel consumption per household per year (t/hh/year)
3. Np,y - Project technologies credited (units)
4. LEp,y - Leakage in project scenario p during year y

Sampling frame

The sampling frame for the usage/monitoring survey, and KPTs consisted of households registered with end-user details (like location, phone number etc) in BURN´s sales database.

Sampling Method

Simple random sampling approach was used per page 16/17 of TPDDTEC v3.1. Registered households were randomly selected by using a random generator. With random numbers generated, the matching stoves were then selected from the database and their details were identified and contacted via telephone to make bookings for availability for physical visits.

Sample Size

The total sample sizes for Usage Monitoring surveys was 218 surveys i.e. 158 for Usage Monitoring surveys, and 60 Project KPTs.

In person Surveys

In person surveys were conducted for the purpose of the usage monitoring survey. Data was collected by trained enumerators who spoke the local language. All households visited had the following evidence:

i. GPS coordinates
ii. Photographs showing general kitchen area

Usage Rate Applied

In accordance with section 2 of the Gold Standard requirements and guidelines: Usage rate monitoring v2.0, PD has claimed Good Practice level of Usage rate as the claimable maximum usage rate. This is based on the CME complying with the Gold Standard requirements of Mandatory and Good Practice Level:

1. Mandatory Requirements

1.1 Define Use and Non Use

As per the registered VPA DD, Use is defined as Use of the project stove for minimum of 7 times in a week. In compliance with this, the PD has counted as users only households in the usage monitoring surveys who use the stove a minimum of 7 times in a week. This can be seen in Column *AW* of the *Ex Post ER calculation spreadsheet* in tab labelled *"KOBO Usage Survey Results".* All usage survey respondents who use the Jikokoa/Jikokoa Xtra stove less than 7 times in a week are counted as non users. A total of 4 households were therefore counted as non users for not meeting this requirement. PD also defines non use based on "Last day of use" of the project ICS in that if the ICS was last used more than 7 days ago from the day of the usage survey visit, they are counted as non users. This can be seen in column AO of the Ex post ER calculations spread sheet in tab labelled "KOBO Usage Survey Results". In this Monitoring period, 1 household was counted as a non user for failure to comply with this definition of a user (the household last used the household More than 1 month ago from the day of the Usage survey visit – This household has already been counted as a non user also on the basis of them not using the stove 7 times per week or more).

1.2 In person Household Usage Survey

PD carried out in person usage surveys for all 158 households randomly selected for Usage monitoring survey to determine project technology use. The following activities were part of the In person household visits during this Monitoring campaign:

1.2.1 Kitchen Observation:

The enumerators visited each household and gathered key information to support the usage survey findings. The enumerator investigated signs of Use of the Project ICS by recording observations as to whether the ICS was warm to touch, whether there were ashes or embers on the ICS, and any other observations on signs of use. Since the interviewer was observing the signs of use of the ICS, there was no survey bias from the respondent answering questions in a way that they think the interviewer wants to hear, as is the risk with remote surveys. This can be seen in the questions on column AN of the *KOBO Usage Survey Results* tab where households were asked the following question and confirmed that there were observable signs of use:

Does the JIKOKOA/JIKOKOA XTRA show any of the following signs of use? (Select all that apply)

1.2.2. Interview with the Primary cook

The enumerators only interviewed Primary cooks of the household to gather information on the ICS use patterns, including information on duration and frequency of use, as well as information on multiple stove use and seasonal trends. This can be seen in the question on column I of the KOBO Usage Survey results tab where households were asked *"Are you the primary cook for your household?".* 100% of respondents interviewed for the usage monitoring survey campaign were Primary cooks in their households.

1.2.3 Photos of Cooking Areas

The enumerators took photographs of the project technology to gather visual data on the status of the project technology. These photos show the whole kitchen area including all stoves in use at the time of the survey in the household. These photos served as evidence that the households were indeed visited for the Usage monitoring survey. All households gave consent to have photo of their kitchen areas to be taken.

1.2.4 GPS coordinates

All households visited had GPS coordinated to provide further evidence that the Household was visited. Evidence of this can be found in column EC and ED in the tab "*KOBO Usage Survey Results*" of the Ex Post ER calculations Excel File.

1.3 Verification of Accuracy of results

At the conclusion of the data collection, the project developer randomly called 6% of the surveyed households to verify that the homes were visited by the enumerators and the recorded responses were correct. A total of 10 randomly selected households were taken through this verification process. All responses from the verification audits were captured via audio recordings of the phone calls with the households. All households taken through this confirmed to have been visited for the in-person usage survey and the responses provided during the usage surveys was confirmed to be correct during this verification exercise.

Based on the information provided from 1.1 to 1.3 above PD has met the requirements of the Mandatory usage requirements.

2.0 Good Practice Monitoring requirements

BURN is claiming up to a maximum 90% usage rate following the below monitoring requirements, in addition to the mandatory requirements described above.

2.1 Field team training and supervision

BURN provided training and supervision to field enumerators to ensure field teams were equipped with the capacity needed to carry out successful usage monitoring surveys. The purpose of the trainings was to ensure that each enumerator collected complete and accurate information. Both Male and female enumerators were selected as enumerators. The training workshops were conducted immediately before the commencement of the field work. The first training workshop was conducted on 30th May 2023 where 5 Call center agents who would be booking appointments with households for the Usage monitoring and KPT visits. The second training was held on 2nd June 2023 where 30 people were trained for In person usage surveys (3 supervisors, 4 Quality control Officers and 23 enumerators). The essence of Usage Monitoring survey was communicated to enumerators to ensure data collection, data management, field trouble shooting protocols were well understood. Field teams were supervised by BURN

staff to ensure accuracy of process is maintained throughout the data collection process. Daily supervision was conducted in the following ways:

i. WhatsApp Group: The purpose of the WhatsApp group was to ensure that all questions coming in from the field were addressed in real time as they were happening.

ii. Direct Observation: The Project Manager ensured to accompany surveyors in the first days of the data collection exercise to ensure that correct procedures were being followed as per training given to the teams.

iii. Data Review: The survey data was reviewed daily in team meetings with the project manager, and the field team supervisors. The surveys were created in such a way that as soon as the enumerator finished his/her survey, they would sync the data and it would immediately be received in the BURN database. In that way, the data analysis report could be generated daily, and errors flagged. The Project manager and team leaders would then call enumerators to seek clarifications and provide additional guidance where a clear lack of understanding of survey questionnaire or survey protocols were addressed.

2.2 End User Training and Follow Up Visits

BURN Manufacturing provides end-user training on the Jikokoa stove use through organized demonstrations and in some cases, home follow-up visits. The purpose is to ensure sensitization of end users towards correct and sustained use of the project stove.

i. End User Follow Up:

In a bid to encourage ensure correct and sustained use of the project stove, BURN engages its sales agents to conduct post-purchase visits with a random sample of households who purchase the Jikokoa stoves. The in-person visits provide a useful interface through which BURN can provide personalized messaging on stove use and to understand any concerns that end users might have on stove-use, repairs, or warranty information.

Figure 5:Sample of in person household visits with stove end users

During this monitoring period, BURN conducted household visits to some of the end users to check on the use of stove and retrain the proper use to the stove where needed.

As an extension of these household visits, BURN has a dedicated customer experience team in Nigeria that also conducts verification and registration checks where the household experience is vetted, and a further opportunity is provided to walk customers through any stove use, warranty or repair issues they might have.

ii. Warranty Booklet

Warranty booklets are distributed with the Stove to show how to use the Jikokoa stove properly.

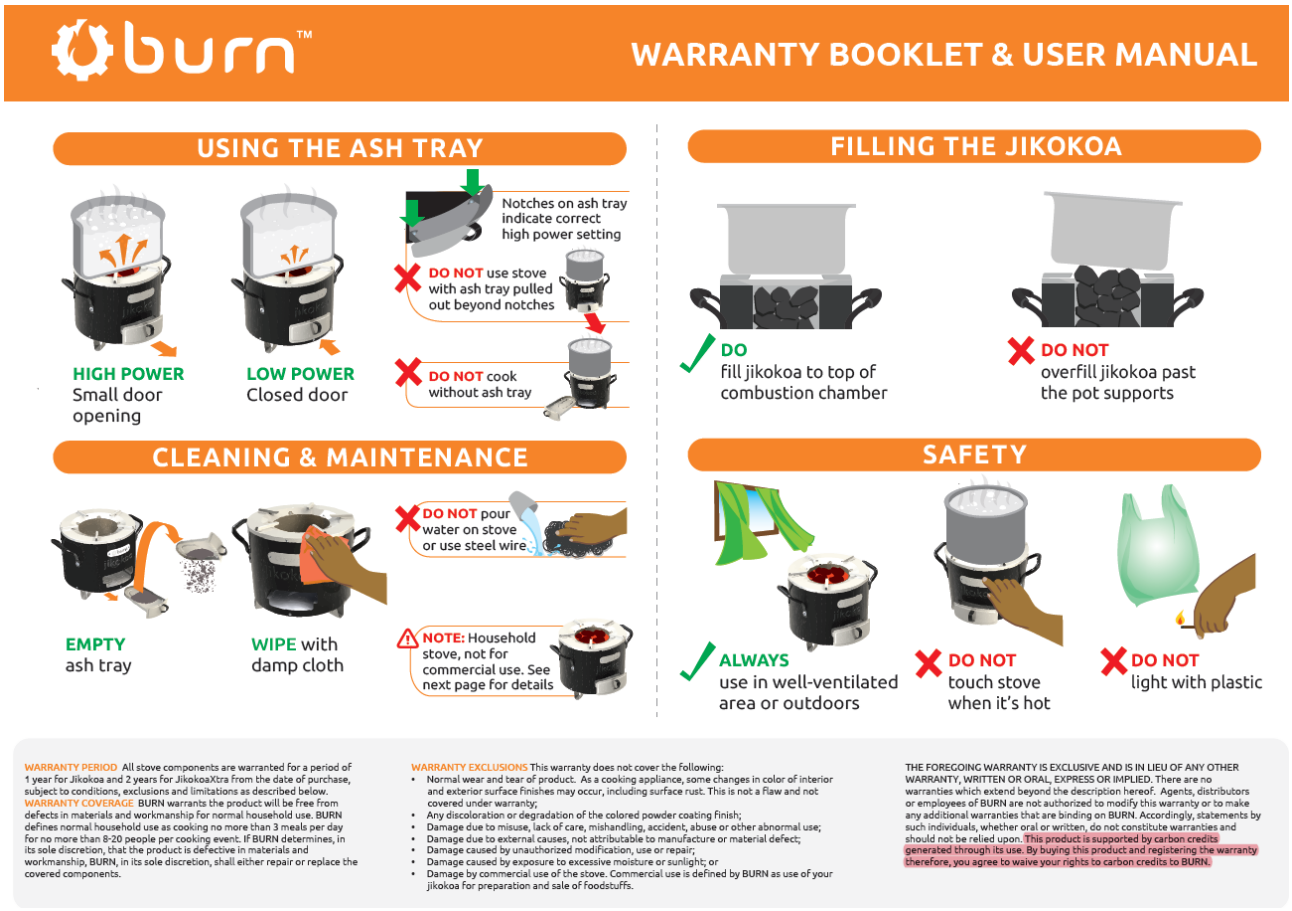


Figure 6: Photo showing Snippet of warranty booklet stove manual demonstrating proper use of a Jikokoa

2.3 Awareness Campaigns

In this Monitoring period, BURN has carried out awareness campaigns to make sure end users of the Jikokoa stoves are educated on the continuous use of the ICS and the key benefits of the stove. These campaigns are multi-faceted and are carried out during sales promotions as well as continuously during the monitoring period e.g., during end user household training visits.

Within the monitoring period, BURN rolled out its awareness campaigns through the following mediums:

1. Market Activations

Market activations are organized as a combined promotional activity as well as an opportunity to demonstrate the use of the stoves to potential end users as well as an

opportunity to show case the benefits of the use of the Jikokoa in comparison to traditional stoves. These market activations are a particularly useful medium because they are conducted in the local language and allow for an interface where trained sales agents can communicate stove use in an interactive setting. Market activations are conducted in all regions in which BURN distributes stoves in Nigeria and are conducted 3 to 5 times a month.

Figure 7: Sample market activations in Nigeria

BURN trains its team of sales agents prior to the market activations to ensure that the correct end user messaging is provided. As with all training and employment, BURN ensures that the sales agents recruited have an equal number of men and women in participation.

Figure 8: Sales agent training workshops in Nigeria

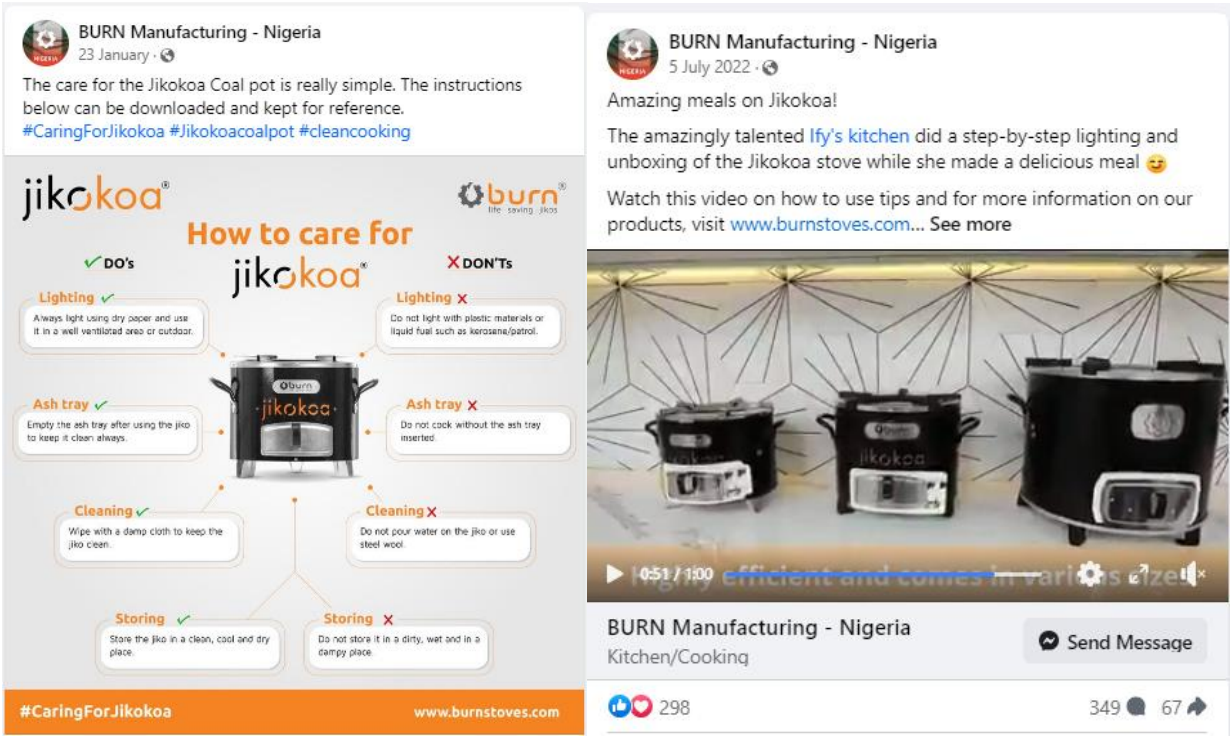
2. Media

To further amplify end user awareness, BURN engages different mass media communication channels to communicate stove use and benefits. Within this monitoring period, BURN employed posters, billboards, to promote the use of the Jikokoa.

Figure 9: Sample billboard placements in urban locations in Nigeria

To further augment end user awareness, BURN engages different mass media communication channels to communicate stove use and benefits. Within this monitoring period, BURN rolled out radio advertisements in both English and Pidgin English. These radio spots emphasized the benefits, ease of use and environmental attributes from the use of the project stoves.

The use of social media promotion (Facebook & YouTube) represents an evolution in the communication channels used to reach out to a wider audience of potential end users in Nigeria. The messaging here retains the traditional focus on stove use, access and benefits but also allows for a visual medium that provides real time end user testimonials and contact information for end-users to contact BURN offices in Nigeria.



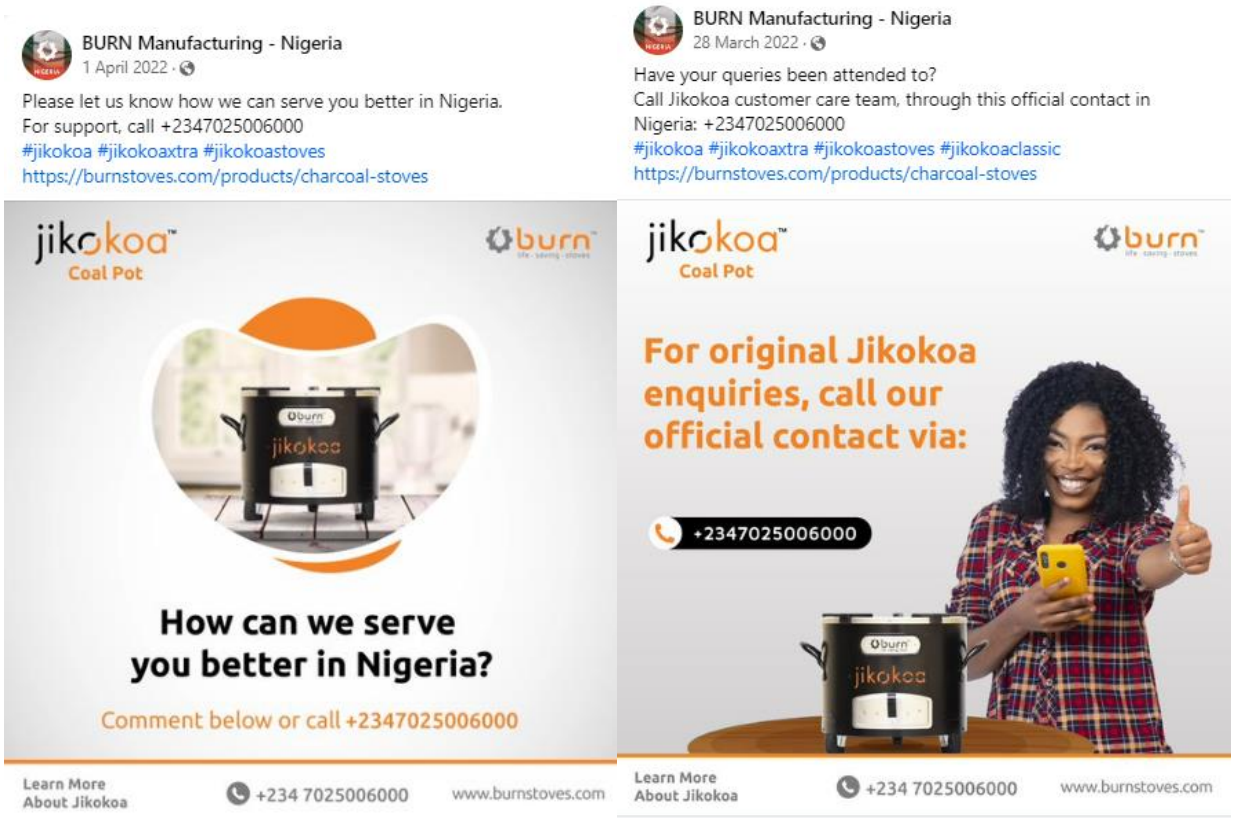


Figure 10: Sample Facebook messaging promoting proper stove usage and contact information for end users

3. Leaflets accompanying the stove.

To ensure that the end-user has a written record on stove use, a leaflet is provided with full stove use instructions and contact information that households can use to reach and engage BURN.

Figure 11: Sample project stove leaflets

The efficacy of these end user awareness mechanisms is evident from the usage survey results, column "DT" of the "Kobo Usage Survey Results" where 100% if respondents confirmed they felt they were adequately informed on the benefits of the Jikokoa stove as well as how to use the stove.

How did you learn about how to use the JIKOKOA/JIKOKOA XTRA?	Usage Survey Count of Respondents by End User Awareness Mechanism

Cooking demonstration	8
Household visit	13
Informed at point-of-sale	14
Informed by salesperson	56
Leaflets	9
Media like radio TV newspaper	3
Other (specify)	24
Sales promotion (e.g., market activations)	31
Total Respondents	**158**

Results

Usage survey

Type of survey	Period ofsurvey	Actual number ofsamples conducted	Achieved precision
Usage/monitoring survey	8th June 2023 to 14th August 2023	158	Not applicable. Minimum sample size of 100

Usage Survey Results:

Age Cohort	**Sample Size**	**Achieved Usage Rate**	**Usage Rate Applied – "Good Practice"**
Entire Sample	154	97.47%[10]	**90%**
Age Group – 0 - 1	125	97.66%	90%
Age Group – 1 – 2	29	96.67%	90%

[10] Weighted average of the achieved usage rates from both stove cohorts, weighted by sample sizes.

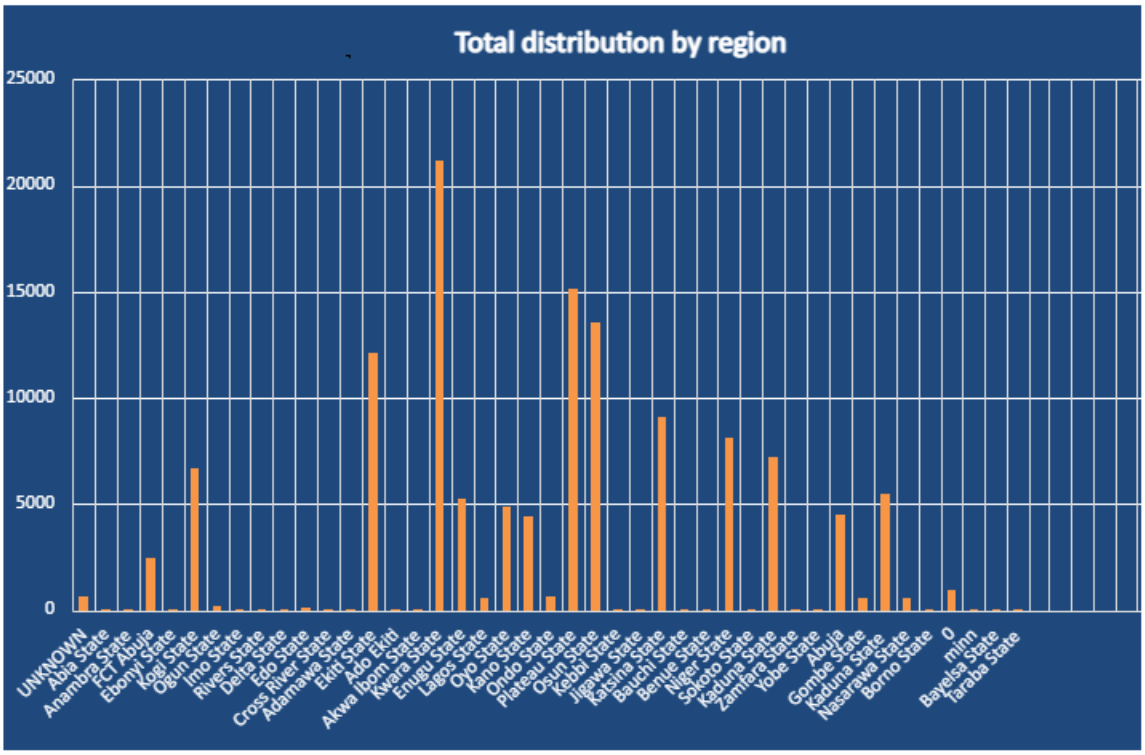


Figure 12: Geographical distribution of project stoves VPA 61 - Nigeria

The resulting distribution shows that the project has end users in 17 out of the 36 states included in the project boundary. The geographical distribution of the project stoves is also representative of the geographical location of households in the usage survey.

State	Number of Usage Survey Samples per State
Abuja	5
Anambra	2
Edo State	1
Ekiti	13
Enugu	3
Federal Capital Territory (FCT) Abuja	4
Idah	1
Imo	1
Kaduna	10
Kano State	2
Katsina	4
Kogi	7
Kwara State	48
Nasarawa	5
Niger	5
Ondo	1
Osun state	15

Oyo State	3
Plateau	25

Kitchen Performance Test

Type of survey	Period ofsurvey	Total number of samples conducted	Achieved precision
Kitchen Performance Test	13th June 2023 to 17th July 2023	60	7%

The Kitchen Performance Test was designed to capture the entire quantum of fuels used by households. Using the Gold Standard TPDDTEC Multifuel KPT result analyzer template, all fuel consumption readings were assessed with the following results:

Fuel Type	Metric Applied	Result	Unit
Charcoal	Mean value	0.564	ton/hh/year
Firewood	Upper bound	0.00	ton/hh/year
LPG	Upper bound	0.004	ton/hh/year
Kerosene	Upper bound	0.00	ton/hh/year

Where a precision level attained was higher than 10%, the upper bound values were applied to be conservative. Following the multi fuel analyzer template, outliers in fuel consumption were identified using the calculated upper and lower bound values. As such, outliers were identified automatically as values that lies outside most of the other values in set of data.

Sequentially, outlier identification follows the below steps:

- Calculate the 1st and 3rd quartiles.
- Calculates the interquartile range.
- Calculate the upper and lower bound of our data range.
- Using the upper and lower bounds to identify the outlying data points.

This approach is evident in the Project Multi Fuel KPT sheet in the "Outlier Identification" in columns G through J.

SECTION E. CALCULATION OF SDG IMPACTS

E.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

>>SDG 13:

The transparent ex-ante calculations of the outcomes of SDG 13 (i.e. CO_2e reductions) are provided in a separate excel spreadsheet uploaded to GS registry for the performance certification review.

The methodology directly provides the following equation for emission reductions; without separate baseline, project or leakage emission reduction equations.

$$ERy = \Sigma_{b,p} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,fuel} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,nonCO2})) - \Sigma LE_{p,y}$$

Equation (1)

Baseline Emissions is calculated by:

$$ER_y = \Sigma_{b,p} (N_{p,y} * U_{p,y} * \underline{B_{,b,y}} * NCV_{b,fuel} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel,nonCO2})) - \Sigma LE_{p,y}$$

Equation (1)

Emission reductions achieved in this Monitoring period:

Stoves Distributed in 2021:

ER_y	74,928	Emission reduction per year (tCO_2e/year)
$N_{p,y}$	9,305	Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	90%	Cumulative usage rate for technologies in project scenario p, in year y, based on cumulative adoption rate and drop off rate revealed byusage surveys (fraction)
$P_{p,b,y}$	0.84	Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/year, as derived from the statistical analysis of the data collected from the fieldtests

$f_{NRB,b,y}$	0.93	Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$NCV_{b,fuel}$	0.0156	Net calorific value of the fuel that is substituted or reduced. (IPCC default for wood fuel, 0.0156 TJ/ton)
$EF_{fuel,CO2}$	112	CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 112 tCO_2/TJ)
$EF_{fuel,nonCO2}$	9.46	Non-CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 9.46 tCO_2/TJ)
$LE_{p,y}$	0.00	Leakage for project scenario p, in year y (tCO_2e/yr)

Stoves Distributed in 2022:

ER_y	417,874	Emission reduction per year (tCO_2e/year)
$N_{p,y}$	51,892	Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	90%	Cumulative usage rate for technologies in project scenario p, in year y, based on cumulative adoption rate and drop off rate revealed byusage surveys (fraction)
$P_{p,b,y}$	0.84	Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/year, as derived from the statistical analysis of the data collected from the fieldtests
$f_{NRB,b,y}$	0.93	Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$NCV_{b,fuel}$	0.0156	Net calorific value of the fuel that is substituted or reduced. (IPCC default for wood fuel, 0.0156 TJ/ton)
$EF_{fuel,CO2}$	112	CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 112 tCO_2/TJ)
$EF_{fuel,nonCO2}$	9.46	Non-CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 9.46 tCO_2/TJ)
$LE_{p,y}$	0.00	Leakage for project scenario p, in year y (tCO_2e/yr)

Stoves Distributed in 2023:

ER_y	97,213	Emission reduction per year (tCO_2e/year)
$N_{p,y}$	12,072	Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	90%	Cumulative usage rate for technologies in project scenario p, in year y, based on cumulative adoption rate and drop off rate revealed byusage surveys (fraction)
$P_{p,b,y}$	0.84	Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/year, as derived from the statistical analysis of the data collected from the fieldtests
$f_{NRB,b,y}$	0.93	Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$NCV_{b,fuel}$	0.0156	Net calorific value of the fuel that is substituted or reduced. (IPCC default for wood fuel, 0.0156 TJ/ton)
$EF_{fuel,CO2}$	112	CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 112 tCO_2/TJ)
$EF_{fuel,nonCO2}$	9.46	Non-CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 9.46 tCO_2/TJ)
$LE_{p,y}$	0.00	Leakage for project scenario p, in year y (tCO_2e/yr)

SDG 1

In the baseline scenario, it is estimated that households spend 100% in charcoal fuel, i.e. that there are no savings. The savings are a result of the implementation of the project activity.

SDG 3

In the baseline scenario, it is estimated that 100% of the households suffer pollution-related inconveniences (such as smoke levels, itchy eyes and breathing problems). Improved air quality is a result of the implementation of the project activity.

SDG 4

In the baseline scenario, it is estimated that no trainings are held in the absence of the Project, and therefore baseline value of 0 is applied for the baseline.

SDG 5

In the baseline scenario, there are no time savings related to use of an ICS. Through the Usage monitoring surveys households were asked how much time is taken in minutes per day to prepare typical meals before and after using the project ICS.

SDG 7

In the baseline scenario, it is estimated that no improved cookstoves are implemented, hence the baseline value is zero. The distribution of improvedcookstoves is a result of the implementation of the carbon project activity.

SDG 8

In the baseline scenario, it is estimated that no jobs are being generated. Job creation is a result of the implementation of the carbon project activity.

SDG 15

In the baseline scenario, 932,567.70 tons of nonrenewable biomass are consumed.
This is a calculated value which is a function of:
Number of ICS * Weighted average Usage rate*Baseline Fuel consumption* FNRB

E.2. Calculation of project value or estimation of project situation of each SDG Impact

>>

SDG 13:

The transparent ex-post calculations of the outcomes of SDG 13 (i.e. CO_2e reductions) are provided in a separate excel spreadsheet uploaded to GS registry for the performance certification review.

The methodology directly provides the following equation for emission reductions; without separate baseline, project or leakage emission reduction equations.

$$ER_y = \sum_{b,p} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,\,fuel} * (f_{NRB,b,\,y} * EF_{fuel,\,CO2} + EF_{fuel,\,nonCO2})) - \sum LE_{p,y}$$

Emission reductions achieved in this Monitoring period:

Stoves Distributed in 2021:

ER_y	74,928	Emission reduction per year (tCO_2e/year)
$N_{p,y}$	9,305	Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	90%	Cumulative usage rate for technologies in project scenario p, in year y, based on cumulative adoption rate and drop off rate revealed byusage surveys (fraction)
$P_{p,b,y}$	0.84	Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/year, as derived from the statistical analysis of the data collected from the fieldtests
$f_{NRB,b,y}$	0.93	Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$NCV_{b,fuel}$	0.0156	Net calorific value of the fuel that is substituted or reduced. (IPCC default for wood fuel, 0.0156 TJ/ton)
$EF_{fuel,CO2}$	112	CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 112 tCO_2/TJ)
$EF_{fuel,nonCO2}$	9.46	Non-CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 9.46 tCO_2/TJ)
$LE_{p,y}$	0.00	Leakage for project scenario p, in year y (tCO_2e/yr)

Stoves Distributed in 2022:

ER_y	417,874	Emission reduction per year (tCO_2e/year)
$N_{p,y}$	51,892	Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	90%	Cumulative usage rate for technologies in project scenario p, in year y, based on cumulative adoption rate and drop off rate revealed byusage surveys (fraction)
$P_{p,b,y}$	0.84	Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/year, as derived from the statistical analysis of the data collected from the fieldtests

$f_{NRB,b,y}$	0.93	Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$NCV_{b,fuel}$	0.0156	Net calorific value of the fuel that is substituted or reduced. (IPCC default for wood fuel, 0.0156 TJ/ton)
$EF_{fuel,CO2}$	112	CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 112 tCO_2/TJ)
$EF_{fuel,nonCO2}$	9.46	Non-CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 9.46 tCO_2/TJ)
$LE_{p,y}$	0.00	Leakage for project scenario p in year y (tCO_2e/yr)

Stoves Distributed in 2023:

ERy	97,213	Emission reduction per year (tCO_2e/year)
$N_{p,y}$	12,072	Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y
$U_{p,y}$	90%	Cumulative usage rate for technologies in project scenario p, in year y, based on cumulative adoption rate and drop off rate revealed byusage surveys (fraction)
$P_{p,b,y}$	0.84	Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/year, as derived from the statistical analysis of the data collected from the fieldtests
$f_{NRB,b,y}$	0.93	Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass
$NCV_{b,fuel}$	0.0156	Net calorific value of the fuel that is substituted or reduced. (IPCC default for wood fuel, 0.0156 TJ/ton)
$EF_{fuel,CO2}$	112	CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 112 tCO_2/TJ)
$EF_{fuel,nonCO2}$	9.46	Non-CO_2 emission factor of the fuel that is reduced. (IPCC default for wood fuel, 9.46 tCO_2/TJ)
$LE_{p,y}$	0.00	Leakage for project scenario p, in year y (tCO_2e/yr)

Results from this monitoring period shows that in MPI, the project has achieved 590,015 tCO_2e emission reductions.

SDG 1

The monitoring of SDG 1 has been made through a qualitative evaluation of a sample of households during the usage/monitoring survey (either site visits or telephone surveys) to check on the money spent for purchasing charcoal in the project scenario compared to the baseline scenario. Results from this monitoring period show that in average the monetary savings are 51% related to the purchase of charcoal in the project scenario.

Financial savings attributable to fuel reductions were independently assessed in a third-party Randomized Control Trial ("RCT") using the same project stove in Kenya. The results of the RCT which demonstrate the impact of financial savings in a domestic setting, with the report illuminating an annualized internal rate of return of 300 percent for end users in Kenya[11]. Specifically, the RCT notes:

Savings constitute an average internal rate of return (IRR) of 24.7% per month, or 296% per year. This is larger than almost all available alternatives. The IRR on the energy-efficient cookstove is an order of magnitude larger the IRR of most relevant alternative investments that are available to respondents in the domains of enterprise, agriculture, and education.

The project impacts on financial savings in Nigeria as summarized in this monitoring report validate the causation between reduced fuel consumption and improved domestic financial savings.

SDG 3

The monitoring of SDG 3 has been made through a qualitative evaluation of a sample of households during the usage/monitoring survey to check on the pollution-related inconveniences (such as smoke levels, itchyeyes and breathing problems) in the project scenario compared to the baseline scenario. Results from this monitoring period show that 94.30% of respondents perceive air quality improvements at their homes since purchasing and cooking with the project stove as compared to the baseline.

[11] Credit and attention in the adoption of profitable energy efficient technologies in Kenya. Susanna B. Berkouwer Joshua T. Dean November 2019: E-47415-KEN-2.

SDG 4

The number of people trained in this monitoring period has been determined for the respective years of the monitoring period. In total, 89 members of staff have been trained. Participant lists have been provided as support documents.

SDG 5

The time savings achieved in relation to cooking time between the project and baseline scenario was calculated based on results from the Usage monitoring survey. Households reported on average time savings of 79 minutes per day.

SDG 7

The parameter 'project technologies in use' has been calculated as part of the outcome calculation for SDG 13 and is provided in the separate ER calculation excel spreadsheet. The eligible project technology days are multiplied with the usage rate ($U_{p,y}$) to determine the 'project technologies in use'. In this monitoring period, the project technologies in use has been calculated as 118,787.

SDG 8

The number of created jobs has been determined for the respective years of the monitoring period. Both Casual and Contract employees have been considered for this parameter. An employee list has been provided as a supporting document.304 employees have been employed in the project in MPI.

SDG 15

The tons of non-renewable biomass saved in the project scenario from continued use of project technologies was achieved as by calculation of baseline Tons of NRB and Project NRB. 558,452.78tons of non renewable biomass have been saved in MPI.

E.3. Calculation of leakage

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The value applied for Leakage is 0 tCO2 (Source: Leakage survey in MPI).

E.4. Calculation of net benefits or direct calculation for each SDG Impact

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
SDG 13	Climate Action	N/A	N/A	590,015
SDG 1	End poverty in all its forms everywhere	0%	51%	51%
SDG 3	Ensure healthy lives and promote well-being for all at all ages	0%	94.30%	94.30%
SDG 4	Ensure equal access for all women and men to affordable and quality technical, vocational, and tertiary education, including university	0	93	93
SDG 5	Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household	0	79	79
SDG 7	Ensure access to affordable, reliable, sustainable and	0	118,787	118,787

	modern energy for all			
SDG 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	0	304	304
SDG 15	Promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	932,567.70	374,114.91	558,452.78

E.5. Comparison of actual SDG Impacts with estimates in approved PDD

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values[12] achieved during this monitoring period
SDG 1: End poverty in all its forms everywhere	51%	51%
SDG 3: Ensure healthy lives and promote well-being for all at all ages	94.30%	94.30%
SDG 4: Ensure equal access for all women and men to affordable and quality technical, vocational, and tertiary education, including university	93	93
SDG 5: Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household	79	79
SDG 7: Ensure access to affordable, reliable,	220,070	118,787

[12] Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values[12] achieved during this monitoring period
sustainable and modern energy for all		
SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	304	304
SDG 13: Climate actions	1,932,780	590,015
SDG 15: Promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	1,012,881.00	558,452.78

E.5.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

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The SDG achieved is less than the ex-ante estimated (see SDG 13 SDG 15 and SDG 7). For SDG 1, 3, 4, 5, and 8 the values achieved in MPI are equal to what was estimated in the ex ante scenario.

E.6. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

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None of the SDG values in the Ex Post are greater than what was estimated in the ex ante scenario.

SECTION F. SAFEGUARDS REPORTING

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No stakeholder mitigation actions were identified during the Design Certification of the project. Therefore, not applicable.

SECTION G. STAKEHOLDER INPUTS AND LEGAL DISPUTES

G.1. List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses/mitigations.

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N/A: No grievances and complaints have been received during this Monitoring period

G.2 Report on any stakeholder mitigations that were agreed to be monitored.

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Not applicable

G.3 Provide details of any legal contest that has arisen with the project during the monitoring period

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No legal contests have arisen with the project during the monitoring period.

Revision History

Version	Date	Remarks
1.1	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Section for POA monitoring Forward action request section Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on safeguard reporting Clarity on design changes Leakage section added for VER/CER projects Addition of Comparison of monitored parameters with last monitoring period Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.0	10 July 2017	Initial adoption