

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

A - Description of project

B - Implementation of project

C - Description of monitoring system applied by the project

D - Data and parameters

E - Calculation of SDG Impacts

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KEY PROJECT INFORMATION

Programme of Activity Information

GS ID of Programme	GS10884
Title of Programme	KOKO Kenya - Ethanol Cookstoves Program
Version of POA-DD applicable to this monitoring report	Version 5.0 dated 31/03/2022
Name and GS ID of fully Validated CPA/VPAs (i.e. non compliance check)	GS10884 - KOKO Kenya - Ethanol Cookstoves Program - CPA-0002 ID: GS11440

Key Project Information

GS ID (s) of Project (s)	GS11440
Title of the project (s) covered by monitoring report	GS10884 - KOKO Kenya - Ethanol Cookstoves Program - CPA-0002
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	Version 5.0 dated 25/09/2022
Version number of the monitoring report	Version 3.0
Completion date of the monitoring report	20/01/2025
Date of project design certification	25/08/2022
Date of Last Annual Report	N/A
Monitoring period number	07
Duration of this monitoring period	01/01/2024 to 30/04/2024 (both days included)
Project Representative	KOKO Networks Limited
Host Country	Kenya
Activity Requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	SDG 13: GS VERS

Product Requirements applied	issued with use of AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user, Version 09.0
	☒ 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
SDG 13 Climate Action (mandatory)	GHG Emissions Reductions	1,947,548	tCO2e
SDG 3 Ensure healthy lives and promote well-being for all at all ages	Number of KOKO Users /households experiencing reduction in the indoor air pollution in their kitchen	1,008,560	Households
SDG 5 Gender Equality	Number of women in managerial positions	37	Women Managers
SDG 7 Access to Clean Energy	Proportion of population or number of households with primary reliance on clean fuels and technology	1,182,931	Households

Table 2 – Product Vintages

Start Dates	End Dates	Amount Achieved		
		CDM-CERs	GS-VERs	
01/01/2024	30/04/2024	0	1,947,548	
Total			1,947,548	

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

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This small-scale Programme of Activities (PoA) is promoting widespread use of bioethanol in Kenya as clean cooking fuel by effective use of efficient cooking technologies in low-income households. The operations of the PoA has resulted in reduction of carbon-dioxide emissions to the atmosphere caused by consumption of non-renewable fuelwood and charcoal and prevention of associated deforestation, thereby contributing towards climate change mitigation.

A.2. Location of project

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The project boundary for this VPA is the complete geographical region of Republic of Kenya including all counties, cities, towns, villages and communities within the geographical boundary of Republic of Kenya.



Fig 1: Political map of Kenya

Geo-Coordinates of Kenya

Southern-most point of Kenya	4°38'47.4"S 39°12'31.6"E
Western-most point of Kenya	0°06'58.9"N 33°57'35.3"E
Eastern-most point of Kenya	3°55'51.6"N 41°51'59.9"E

Northern-most point of Kenya	4°28'42.5"N 35°52'31.8"E
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By the end of this monitoring period i.e., MP07, KOKO Networks was operational in 9 regions, namely – Nairobi, Mombasa, Kisumu, Nakuru, Eldoret, Kakamega, Homabay Kisii, Lower Mt. Kenya and Machakos. These 9 regions are serving almost all reasonably inhabited regions of Kenya.

A.3. Reference of applied methodology

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Approved small scale methodology AMS-I.E 'Switch from non-renewable biomass for thermal application by the user' version 09.0

<http://cdm.unfccc.int/methodologies/DB/IO5FJLJFWT91R6B8SO5BC7TXSK27I2>

Reference Tools & Methodology:

- Tool 19: Demonstration of additionality of microscale project activities, Version 08.0
- Tool 30: Calculation of the fraction of non-renewable biomass, Version 1.0
- TOOL 03: Tool to calculate project or leakage CO2 emissions from fossil fuel combustion, Version 3
- TOOL 16: Project and leakage emissions from biomass, Version 4
- TOOL 05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, Version 3.0
- TOOL 12: Project and leakage emissions from transportation of freight, Version 1.1.0

A.4. Crediting period of project

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28/08/2020 - 27/08/2025

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

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The project implementation includes procurement, distribution, installation and maintenance of clean fuel bioethanol modern cookers. KOKO provides a digital platform to consumers by leveraging an agent network to provide convenient and affordable access to cooker kits and bio-ethanol fuel.

"KOKO Cooker" stove kit consists of a two-burner stove and a pair of durable 'smart' canister equipped with an NFC chip that enables tracking of customer fuel purchases. To create affordable and reliable access to bioethanol as clean cooking fuel, KOKO has developed first-of-its-kind technology to lower distribution costs by launching a network of cloud- connected "KOKOpoint" i.e., ICT enabled fully automatic fuel dispensing machines; work as a fuel ATMs across Kenya, which enable customers to refill their smart canisters in local retail corner stores. Customers can buy their KOKO Cookers through ordering on the KOKOpoint tablet screen, via the myKOKO mobile app, or from a network of field sales promoters.

The procurement of the cookers for the PoA complies with the national regulation on ethanol cookers – "Ethanol Fuelled Cooking Appliances Specifications"¹. The project has currently included model "KOKO Cooker" in its distribution chain and may further introduce new cookstove models based on customer's needs. The detailed specification of KOKO Cooker are as follows:

Description	2-burner Bio-ethanol stove
Model Name	KOKO Cooker
Fuel Denatured	Bio-ethanol Cooking Fuel
Firepower	2100 Watts on MAX flame setting
Overall Efficiency	60% (energy content of fuel transferred to contents of pot; as defined by ISO WBT methodology)
Fuel Capacity	2.4 Litres fuel capacity within stove
Expected Service Life	10 years with routine annual maintenance

The implementation the project is rapidly expanded to almost all parts of Kenya namely Nairobi, Mombasa, Kisumu, Nakuru, Eldoret, Kakamega, Homabay Kisii, Lower Mt. Kenya and Machakos. A total of 100,776 Koko cookers were distributed during the current monitoring period (i.e., between 01/01/2024 to 30/04/2024). The table below

¹ Kenya Standard: Ethanol fueled cooking appliances – Specification (KS 2759:2018 – ICS 97.040.20)
 *Climate Security and Sustainable Development*

provides a breakdown of the cumulative number of cookers distributed to users at the end of each monitoring period.

Monitoring Period Number	Monitoring Period	Total cooker sales during the monitoring period	Cumulative Number of KOKO cookers Installed
01	23/10/2019 to 31/12/2019	-	0
02	01/01/2020 to 31/12/2020	27,919	27,919
03	01/01/2021 to 31/03/2022	336,642	364,561
04	01/04/2022 to 31/08/2022	172,602	537163
05	01/09/2022 to 31/12/2022	188,891	726,054
06	01/01/2023 to 31/12/2023	378,890	1,104,944
07	01/01/2024 to 30/04/2024	100,776	1,205,720

The total of 2675 KOKO points were found operational at the end of the monitoring period, thereby ensuring smooth supply of fuel to all the registered users. There was no interruption in the operations of the project during the monitoring period.

Pine Tree Carbon LLC has provided for all implementation costs for the VPA-0002. The funds have been utilized to make the KOKO Cooker affordable to low-income households, as well as for the operation & maintenance costs of the ethanol cookstove supply chain. The funds for implementation of the VPA are managed by the CME who is also the VPA implementer for both the VPAs.

B.1.1 Forward Action Requests

>> Forward action request raised during previous verification and CME justification for the same has been described below:

The verifying VVB shall if the CME has addressed the following issues during next monitoring period:

1) The project developer/representative shall make a declaration in writing in the monitoring report submitted to Gold Standard that (applicable to CDM CPAs) - CPAs has/will not issue both a CER/other compliance unit under Paris Agreement and a GSVER for the same vintage. VVB to check this declaration at each verification.

CME Justification: CME has included required declaration in the Section C of the MR as "Declaration of Safeguarding against double issuance of credits".

2) In the next monitoring periods onwards, the PD to document the total quantity of ethanol sold in litres for each VPAs and determine the average household consumption which should be compared with baseline annual consumption of 194.88 litres. Alternatively, sampled households whose stoves has been in operation for 1 year can be sampled and used instead of whole VPA. The CME to review the findings and should there be a significant deviation observed from the design value, CME would develop and propose a robust system to address such deviations to guard on over estimation of ER.

CME Justification: The monitoring system collects the usage data from the survey complying with 95/10 confidence-precision level and the fuel consumption data from the fuel refill records of the micro-tankers which are used for fuel transportation to KOKO points. The average of fuel consumption obtained from both the above methods is compared with the baseline minimum threshold after adjusting it for the continuation of baseline appliance. The detailed comparison is provided in the ER Calculation Sheet (Fuel cross-check tab).

3) PD shall demonstrate the compliance of the requirements of DEV-247.

CME Justification: CME has demonstrated compliance with the DEV-247 requirement in section B.2.1 of the MR.

B.2. Post-Design Certification changes

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Not Applicable

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

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DEV_247 was approved which exempts this VPA from complying to small-scale aggregate threshold, thereby allowing it to include unlimited cookstove. The DEV_247 was approved by Gold Standard on 27/04/2022.

The deviation required that the applicability conditions as described in the decision of the Deviation shall be reported in the MR. The justification of each condition is discussed below:

Deviation Condition	Justification
VPAs GS10885 and GS11440 shall not be eligible for the CORSIA scheme.	The projects GS10885 and GS11440 are not tagged as CORSIA eligible projects as can be checked from the project pages on the GS Impact Registry portal. However, CME has recently received an exemption to this condition via official clarification CL-246 dated 31/05/2024. This will allow CORSIA eligibility for the project.

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All the VPAs included under the PoA GS10884 in the future shall comply with the requirements of GS4GG including the small-scale threshold.	There is no new VPA included in the PoA GS 10884. The CME will ensure that the new VPAs comply with all the GS4GG requirements.
The compliance with the above-mentioned requirement shall be checked at each PoA verification by the PD and VVB and shall be recorded in the relevant monitoring report and verification report.	The requirements of the Deviation are discussed herein and will be duly verified by the VVB.
The deviation request, its implications, and GS' decision shall be documented in the appropriate section of the GS VPADD of all the VPAs and Monitoring Report (for the relevant MP).	All the requirements are documented in the MR for each monitoring period.

B.2.2. Corrections

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Not Applicable

B.2.3. Changes to start date of crediting period

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Not Applicable.

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

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Not Applicable.

B.2.5. Changes to project design of approved project

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Not Applicable.

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

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The monitoring system, applied by the PoA, involves a number of key elements that ensure that the CME has high-quality, unbiased and reliable data and information for emission reductions (VERs) estimation based on the methodology AMS I.E version 9.0. The monitoring system for the PoA is designed in accordance with the requirements of the applied methodology – AMS-I.E. Version 9. The fixed and the monitoring parameters of the VPA for this monitoring period are discussed in section E.1 and E.2 respectively. The below flow-chart illustrates the data collection and quality control processes followed during the implementation of the VPA for emission reduction monitoring. All processes are directly controlled by the CME.

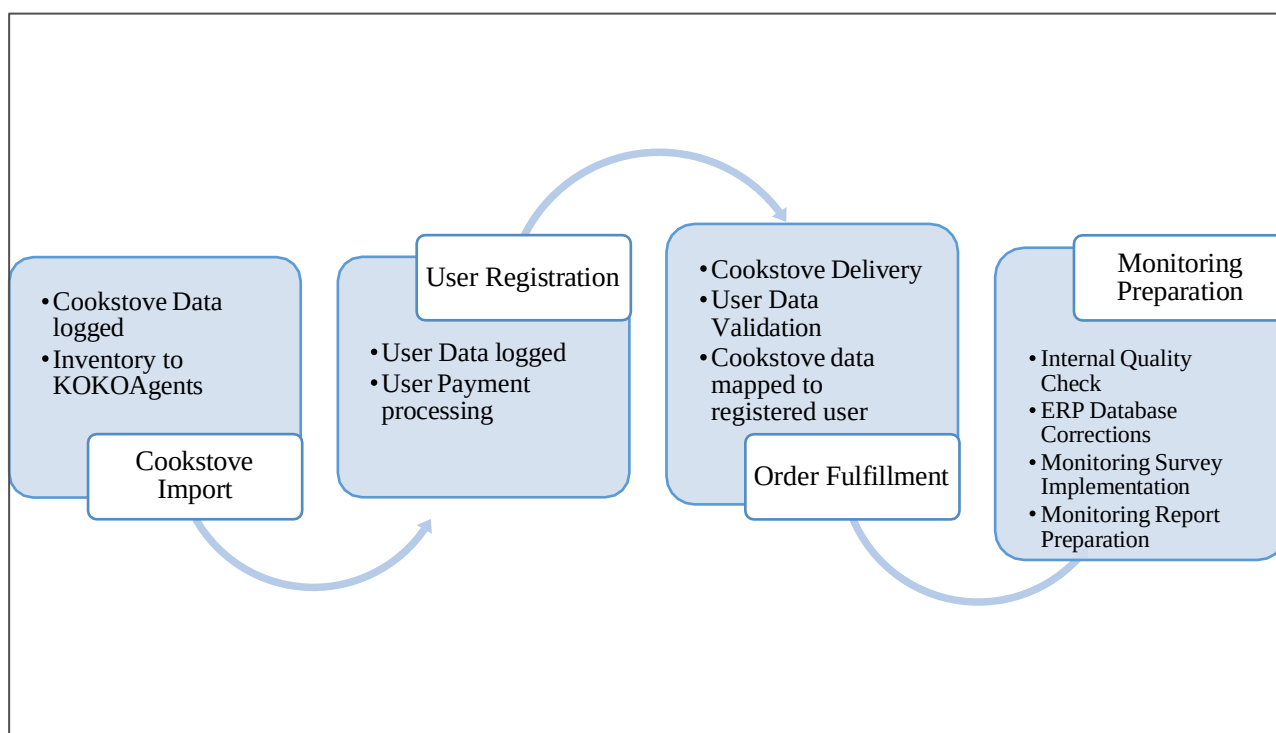


Fig 1: GS Monitoring System implemented by KOKO Networks

Cookstove Import: The cookers (KOKO Cooker) are manufactured in India and imported in Kenya for distribution under the PoA. Then, the cookstove information, including manufacturing details, serial numbers of all components and Near Field Communication (NFC) tracking IDs are imported in the Enterprise Resource Planning (ERP) database maintained by the CME. After validation of import consignment, the cookstove inventory is distributed to KOKOAgents for delivery to users.

User Registration: The user information is collected through online registration via KOKO mobile app. The collected user information is automatically transferred to ERP Database. Once the complete payment for cookstove kit is processed by the user, then order fulfillment instructions are released by the CME.

Order Fulfillment: The cookstove kit is delivered to the user from the nearby KOKO Agent. The customer care team of the CME conducts data validation of the user information and relays it to the CME operation team. On successful order fulfillment and data validation, the ERP System is updated to map the user credentials with the cookstove data.

Monitoring Preparation: The CME Carbon Team conducts the quality checks of the processes implemented and the data collected for the purposed of GS monitoring. In case of any discrepancy identified in the database, corrective actions are taken to remove discrepancy. Based on the ERP database, CME conducts the sampling-based monitoring survey to collect monitoring data related to operations of the cookers. The survey is conducted in accordance with relevant GS guidelines related to sampling and surveys. The details of survey conducted for this monitoring period are included below. Based on the ERP database and survey results, ER calculations are performed, followed by GS monitoring report preparation for initiating GS verification.

Declaration of Safeguarding against double issuance of credits

KOKO Networks, as the VPA implementer for VPA-0002 (GS-11440) would like to declare the following:

- VPA-0002 (GS 11440 - [GS10884 - KOKO Kenya - Ethanol Cookstoves Program - CPA-0002](#)) has applied for GS-VERs for the current monitoring period as identified in the above section "Key Project Information"
- This VPA (VPA-0002 GS11440) has not applied for credit issuance under any other standard like CDM or compliance mechanism under Paris Agreement and commit to not apply for any kind of credit request issuance under such mechanisms for the same vintage.

SECTION D. DATA AND PARAMETERS

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

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SDG 13

Parameter 1

Data/Parameter	$f_{NRB,y}$ or f_{NRB}
Unit	Fraction or %
Description	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass
Source of data	The value of the parameter is determined in accordance with CDM Tool 30.
Value(s) applied	0.9268
Choice of data or measurement methods and procedures	The appropriateness of value has been demonstrated by applying Tool 30: Calculation of the fraction of non-renewable biomass.
Purpose of data/parameter	Used for calculation of baseline emissions
Additional comments	None

Parameter 2

Data/Parameter	$NCV_{biomass}$
Unit	TJ/tonne
Description	Net calorific value of biomass displaced by the project activity
Source of data	The net calorific value of wood & charcoal is as given in 2006 IPCC Guidelines Reference: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2: http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html
Value(s) applied	Wood: 0.0156 Charcoal: 0.0295
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Used for calculation of baseline emissions
Additional comments	None

Parameter 3

Data/Parameter	$EF_{projected}$
Unit	Tonnes CO ₂ / TJ
Description	Emission factor for the substitution of non-renewable woody biomass by similar consumers
Source of data	AMS-I.E. Version 9, equation (1)
Value(s) applied	63.7

Choice of data or measurement methods and procedures	Default value as per applied methodology
Purpose of data/parameter	Used for calculation of baseline emissions
Additional comments	None

Parameter 4

Data/Parameter	LAF_y
Unit	Fraction
Description	Leakage Adjustment Factor
Source of data	AMS-I.E. Version 9, equation (1)
Value(s) applied	0.95
Choice of data or measurement methods and procedures	Default value as per paragraph (24) of applied methodology
Purpose of data/parameter	Used for calculation of baseline emissions
Additional comments	None

Parameter 5

Data/Parameter	$BC_{BL,PP,y}$
Unit	tonnes/person/year
Description	Average annual consumption of woody biomass per person before the start of the project activity
Source of data	The average annual consumption is determined ex ante the following option (as provisioned in PoA-DD) and remains fixed during the crediting period: (a) Calculated based on historical data or published reports from reputed sources The household fuel consumption data for Kenya is extracted from publicly available report "Kenya Household Cooking Sector Study", 2019 (Figure 36: Monthly consumption of polluting fuels by Households). The complete calculations for the parameter are provided in Excel-sheet "CPA2_ER Calculation Sheet_V-2".
Value(s) applied	VPA-0002: 1.71
Choice of data or measurement methods and procedures	A baseline national average value of woody biomass consumption per person is estimated using the above source of data.
Purpose of data/parameter	Used for Calculation of baseline emissions
Additional comments	None

Parameter 6

Data/Parameter	$N_{p,HH}$
Unit	Persons per household
Description	Average number of persons served per household prior to the project Implementation

Source of data	Average household size in Kenya in 2019 sourced from Official Report "Kenya Integrate Household Budget Survey 2015/16"
Value(s) applied	4.0
Choice of data or measurement methods and procedures	As per registered GS VPA-DD
Purpose of data/parameter	Used for calculation of baseline emissions
Additional comments	None

Parameter 7

Data/Parameter	EF_{bioethanol_production}
Unit	g CO ₂ /Litre of Bioethanol
Description	Project Emission Factor for production of bioethanol
Source of data	Published Life Cycle Assessment Report "Lifecycle Greenhouse Gas Emissions and Energy Balances of Sugarcane Molasses-Based Bioethanol in Kenya" ²
Value(s) applied	8.73
Choice of data or measurement methods and procedures	The emissions associated with production of bioethanol which can be attributed to bioethanol are accounted in this emission factor.
Purpose of data/parameter	Calculation of project emissions due to bioethanol production
Additional comments	None

Parameter 8

Data/Parameter	η_{Eth}
Unit	%
Description	Efficiency of bioethanol KOKO Cooker
Source of data	Manufacturer's Specification of Cookstove
Value(s) applied	60
Choice of data or measurement methods and procedures	Efficiency of KOKO Cooker as per the standard tests protocols for cookstove efficiency.
Purpose of data/parameter	This parameter is not used in the ER calculation but has been retained for consistency across different VPAs.
Additional comments	No comments

² Detailed calculations presented in Excel-sheet "ER Calculation Sheet – CPA0001"

Parameter 9

Data/Parameter	$EF_{EF,j,y}$
Unit	t CO ₂ /MWh
Description	Emission factor for electricity generation for source j in year y
Source of data	Option A.2 (a) of tool 5: Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation Version 03.0
Value(s) applied	1.3
Choice of data or measurement methods and procedures	As per point (i) of Option A.2 of tool 5: Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation Version 03.0, the default value for Emission Factor can be applied to project and/or leakage electricity consumption sources but not to baseline electricity consumption sources. Therefore, the default value is used to calculate project emissions associated with electricity consumption at KOKOpoints in the PoA.
Purpose of data/parameter	Calculation of Project Emissions
Additional comments	None

Parameter 10

Data/Parameter	$TDL_{j,y}$
Unit	%
Description	Average technical transmission and distribution losses for providing electricity to source j in year y
Source of data	Tool 5: Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation Version 03.0
Value(s) applied	20
Choice of data or measurement methods and procedures	The default value is applied in accordance with the provisions under Data/Parameter Table 3 of Tool 5: Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation Version 03.0. The default value for Emission Factor can be applied to project and/or leakage electricity consumption sources but not to baseline electricity consumption sources. Therefore, the default value is used to calculate project emissions associated with electricity consumption at KOKOpoints in the PoA.
Purpose of data/parameter	Calculation of Project Emissions
Additional comments	None

Parameter 11

Data/Parameter	$\eta_{old,i}$
Unit	%
Description	Efficiency of baseline appliance being replaced
Source of data	Default value as per the applicable methodology
Value(s) applied	20

Choice of data or measurement methods and procedures	Efficiency of pre - project device is calculated by the following approach: (i) Default Approach: Efficiency of 0.1 will be used for 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; For all other types of devices, a default value of 0.2 will be used. As per applied methodology, weighted-average values (taking the amount of woody biomass consumed by each device as the weighting factor) will be used if more than one type of device is being replaced in a household
Purpose of data/parameter	This parameter is not used in the ER calculation but has been retained for consistency across different VPAs.
Additional comments	No comments

Parameter 12

Data/Parameter	EF_{CO₂,f}
Unit	g CO ₂ /t km
Description	Default CO ₂ emission factor for freight transportation activity f
Source of data	Tool 12 "Methodological tool: Project and leakage emissions from transportation of freight"
Value(s) applied	Light Vehicle: 245 Heavy Vehicle: 145
Choice of data or measurement methods and procedures	The type of vehicle used for transportation will be recorded and appropriate emission factor for the vehicle type will be applied.
Purpose of data/parameter	Calculation of transportation emissions
Additional comments	In case of unavailability of the vehicle category, conservative emission factor of Light Vehicle will be used.

Parameter 13

Data/Parameter	D_{Ethanol}
Unit	Tonnes/kL
Description	Density of Bioethanol
Source of data	https://www.chemicalbook.com/CASEN_64-17-5.htm#ChemicalProperties
Value(s) applied	0.789
Choice of data or measurement methods and procedures	Standard chemical property of Ethanol
Purpose of data/parameter	Calculation of Project Emissions due to bioethanol production
Additional comments	-

Parameter 14

Data/Parameter	CF
Unit	Unitless
Description	Wood-to-Charcoal Conversion Factor
Source of data	pg 1.44, https://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf
Value(s) applied	6.0
Choice of data or measurement methods and procedures	IPCC reports that values for estimating the amount of carbon released through charcoal production and consumption, the wood-to-charcoal factor, are stated to be between 4 and 8. Hence, 6 kg of wood input per kg of charcoal is used as default.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

SDG 3, SDG 5 & SDG 7

There are no ex-ante parameters required for the calculation of SDG 3, SDG 5 and SDG 7 outcomes.

D.2 Data and parameters monitored

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SDG 13

Parameter 1

Data/Parameter	D_i, Date of commissioning of project device i
Unit	Date
Description	Actual date of commissioning of project device
Measured/calculated / Default	Measured
Source of data	Sales Database
Value(s) of monitored parameter	Month-wise summary of cookstove distribution is provided in "DB Summary" worksheet of ER calculations. The complete sales database for all customers is provided to verification team.
Monitoring equipment	Digital Logs
Measuring/reading/recording frequency	Recorded at the time of selling of project devices
Calculation method (if applicable)	Each sale is recorded in sales database along with the name of recipient, usage type, location of household (Neighborhood, district etc)

QA/QC procedures	The information is recorded electronically through a robust registration process and archived on cloud system. Periodic backup of the complete database is automatically taken by the system.
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Purpose of data/parameter	Used for calculating $\text{Stove}_{\text{year}}(i)$, fraction of year(s) the cookstove i was operational during the monitoring period which is applied for baseline emission calculation $\text{Stove}_{\text{year}}(i) = \text{Minimum of } \{(\text{End-Date of Monitoring Period} - D_i, \text{Date of Commissioning of Project Device}) \text{ AND } (\text{End-Date of Monitoring Period} - \text{Start-Date of Monitoring Period})\} / 365$
Additional comments	The database has recorded the commissioning date as the date of fulfilment.

Parameter 2

Data/Parameter	N_{HH}
Unit	Number
Description	Number of project devices in households of type i and batch j operating during year y
Measured/calculated / Default	Measured
Source of data	Sales database and monitoring survey
Value(s) of monitored parameter	1,182,931 (after adjusting the total household cookers for the operating factor and rounding down to nearest integer)
Monitoring equipment	-
Measuring/reading/recording frequency	At least once every two years (biennial)
Calculation method (if applicable)	CME maintains online database of all stoves sold along with its user. The information will be cross-checked during project monitoring surveys for the sample cookers. The proportion of operating cookers is determined statistically through the monitoring surveys. The number of operating cookers in households are determined by multiplying the total sales of cookers under each type with the proportion of operating cookers of each type estimated through the monitoring survey. Number of operating cookers in households = the total sales of cookers under each type * proportion of operating cookers of each type estimated through the monitoring survey. = 1,205,720 * 98.11% = 1,182,931.0 98.11% of the sample cookers from households were found operational.
	A 95 /10 confidence / margin of error shall be achieved for the

QA/QC procedures	sampling parameter irrespective of annual / biennial monitoring frequency as per para 23 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 09.0 In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of stoves.
Purpose of data/parameter	Used for calculation of baseline emissions for households
Additional comments	Not Applicable

Parameter 3

Data/Parameter	BC_{PJ,PP,y}
Unit	Tonnes/person/year
Description	Average annual consumption of woody biomass in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent in the households.
Measured/calculated / Default	Measured
Source of data	Project Monitoring Survey for households
Value(s) of monitored parameter	0.2337 (Calculated by multiplying baseline value of woody biomass consumption with the percentage of total cooking taking place on baseline appliance as reported in the monitoring survey)

Monitoring equipment	Household Project Survey
Measuring/reading/recording frequency	At least once every two years (biennial)
Calculation method (if applicable)	A 95 /10 confidence / margin of error shall be achieved for the sampling parameter irrespective of annual / biennial monitoring frequency as per para 23 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 09.0. In the case the desired precision is not met, lower bound values shall be used against repeating the survey to determine the operational fraction of stoves. Average annual consumption of woody biomass in the pre-project devices during the project activity = baseline value of woody biomass consumption * percentage of total cooking taking place on baseline appliance as reported in the monitoring survey. = 1.7062 *13.70% =0.2337 tonnes/person/year The mean value from the survey results was found to be having high confidence and reliable precision, hence was accepted.
QA/QC procedures	The Guidelines for Sampling and Surveys will be referred to adopt the best practices for conducting the surveys.
Purpose of data/parameter	Used for calculation of baseline emissions.
Additional comments	NA

Parameter 4

Data/Parameter	$Q_{HH,Eth}$
Unit	Litres/day
Description	Average daily consumption of bioethanol in a project cookstove (KOKO cooker) distributed to Households.
Measured/calculated / Default	Measured
Source of data	Project Survey
Value(s) of monitored parameter	Average daily consumption of bioethanol in project households: 0.504
Monitoring equipment	Project Survey

Measuring/reading/recording frequency	At least once every two years (biennial)
Calculation method (if applicable)	A 95 /10 confidence / margin of error is achieved for the sampling Parameter during the monitoring period: as per Sampling and surveys for CDM project activities and programmes of activities, Version 09.0. In the case the desired precision is not met, lower bound values are used against repeating the survey to determine the operational fraction of stoves. The mean value from the survey results was found to be having high confidence and reliable precision, hence was accepted.
QA/QC procedures	The Guidelines for Sampling and Surveys is referred to adopt the best practices for conducting the surveys.
Purpose of data/parameter	N/A
Additional comments	No Comments

Parameter 5

Data/Parameter	$N_{KP,y}$
Unit	Number
Description	Number of KOKO points operating during year y
Measured/calculated / Default	Measured
Source of data	Database of installed KOKO points under operations

Value(s) of monitored parameter	2675
Monitoring equipment	KOKO point Installation Logbook
Measuring/reading/recording frequency	Continuous
Calculation method (if applicable)	A real-time database is maintained to keep record of all operational KOKO points. All KOKO points are connected to internet and hence will be monitored for operational status online.
QA/QC procedures	The technical team receives continuous feed on the operational status of the KOKO points through online system which ensures that each of the non- operational KOKO point is attended in a timely manner.
Purpose of data/parameter	Calculation of project emissions due to electricity consumption at KOKO points.
Additional comments	No Comments

Parameter 6

Data/Parameter	NCV_{i,biomass}		
Unit	TJ/tonne		
Description	Net calorific value of the fuel type "i" used in project scenario including non- renewable woody biomass, charcoal or renewable bio-ethanol.		
Measured/calculated/Default	Default		
Source of data	IPCC Guidelines for National Greenhouse Gas Inventories 2006 https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf		
Value(s) of monitored parameter	Notation	Fuel Type "i"	Default NCV Value (TJ/tonne)
	NCV _{Wood,Biomass}	Wood Fuel	0.0156
	NCV _{Charcoal,Biomass}	Charcoal	0.0295
	NCV of Bioethanol, NCV _{Bioethanol} : 0.0265 TJ/tonne		
Monitoring equipment	Third Party Testing Agency		
Measuring/reading/recording frequency	Annually once		
Calculation method (if applicable)	Default NCV value for biomass fuels (Charcoal and Fuelwood) utilized in the PoA will be sourced from IPCC Guidelines for National Greenhouse Gas Inventories 2006. GCV of Bioethanol is monitored in the bomb calorimeter at an external laboratory. NCV of the fuel is calculated using standard equations for deduction of heat of vaporization of moisture content from the GCV.		
QA/QC procedures	CME ensures that the NCV of bioethanol determination is performed as per the national/international standards and procedures.		
Purpose of data/parameter	Calculation of Project Emissions		
Additional comments	No Comments		

Parameter 7

TEMPLATE- Monitoring Report

Data/Parameter	$EC_{PJ,j,y}$
Unit	MWh
Description	Quantity of electricity consumed by the project electricity consumption source j in year y

Measured/calculated / Default	Measured
Source of data	Calculated based on rated power of KOKO points
Value(s) of monitored parameter	186.437
Monitoring equipment	Calculated based on rated power of KOKO points
Measuring/reading/recording frequency	Continuous Monitoring
Calculation method (if applicable)	All KOKO points are supplied electricity from regional electricity grid. The electricity consumption is monitored through energy meters which are under regular control and maintenance of the grid authority. However, CME does not have record of electricity consumption as the KOKO points do not have dedicated stand-alone meter. In case of missing data due to meter failure or other reasons for a certain period of time, the following options to estimate electricity consumption are applied in line with the monitoring plan of VPA-DD (provision from VPA-DD). A conservative value based on rated capacity and full Operational hours (8760 hours). In case of the applied monitoring plan, the actual days under monitoring period are considered and hours are calculated on pro-rata basis. Please refer ER calculation spreadsheet.
QA/QC procedures	No QA/QC procedures were applied as the monitoring of the electricity recording could not be performed during the monitoring period.
Purpose of data/parameter	Calculation of Project Emissions due to electricity consumption
Additional comments	Due to unavailability of meter reading, a conservative value based on rated capacity and full Operational hours has been considered.

Parameter 08

Data/Parameter	$D_{f,m}$
Unit	Kilometre
Description	Return trip distance between the origin and destination of freight transportation activity f in monitoring period m
Measured/calculated / default	Measured
Source of data	Records of vehicle operator or records by project participants
Value(s) of monitored parameter	Total Return Trip Distance = 990,684.75 Kms
Monitoring equipment	Mileage Reading
Measuring/reading/recording frequency	Continuous monitoring
Calculation method (if applicable)	Determined for each freight transportation activity f using the vehicle odometer
QA/QC procedures	Daily trips made by the vehicles were monitored for the distance travelled by either resetting the trip meter to 0 or taking the initial and final readings of the mileage meter.
Purpose of data/parameter	Calculation of transportation emissions
Additional comments	No Comments

Parameter 09

Data/Parameter	$FR_{f,m}$
Unit	Tonnes
Description	Total mass of freight transported in freight transportation activity f in monitoring period m
Measured/calculated / Default	Measured
Source of data	Log Book
Value(s) of monitored parameter	56,192.33
Monitoring equipment	Records by project participants or records by truck operators after trip completion
Measuring/reading/recording frequency	Continuous Monitoring
Calculation method (if applicable)	The bioethanol supplied to the KOKOpoints during each trip of the Microtanker is recorded electronically.
QA/QC procedures	The type of vehicle and its total capacity in terms of volume is monitored and appropriate emission factor is applied.
Purpose of data/parameter	Calculation of transport emissions
Additional comments	No Comments

SDG 3

Data/Parameter	Air Quality, $N_{\text{tot},\text{HH}}$
Unit	Number of KOKO Users /households experiencing reduction in the indoor air pollution in their kitchen
Description	Users' perception on smoke reduction and reduction in health symptoms like incidence of coughing, incidence of respiratory illness, Incidence of itchy eyes
Measured/calculated / Default	Measured
Source of data	Customer Database
Value(s) applied	1,008,560
Measurement methods and procedures	Air quality will be assessed through users interviews during the User Survey and on-site observations of the survey team. During the survey, it was determined that 83.65% of the households experienced reduction in the indoor air pollution. The total number of cookers is multiplied with the percentage to arrive on the number of KOKO users experiencing reduction in indoor air pollution.
Monitoring frequency	Annually
Annually QA/QC procedures Purpose of data	Sustainable Development Assessment.
Additional comments	-

SDG 5

Data/Parameter	Number of women managers employed by KOKO Networks Limited, $N_{f,\text{KOKO}}$
Unit	Numbers
Description	Number of women in managerial positions
Source of data	HR Records of the employed staff in all the registered companies owned/operated by KOKO Networks Limited
Value(s) applied	37

Measurement methods and procedures	All women employed by KOKO Networks (group of companies) for more than 6 months period will be accounted for this calculation. Total of 38 women managers were employed by KOKO during this monitoring period. The total number of women managers were apportioned to each VPA based on the number of cookstove years completed by the VPAs.
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	Sustainable Development Assessment
Additional comments	-

SDG 7

Data/Parameter	Access to affordable and improved energy services, N_{HH}
Unit	Numbers
Description	Proportion of population or number of households with primary reliance on clean fuels and technology
Source of data	Monitoring Parameter
Value(s) applied	1,182,931
Measurement methods and procedures	Number of project devices in households of type i and batch j operating during year y
Monitoring frequency	Annually
QA/QC procedures	N/A
Purpose of data	Sustainable Development Assessment
Additional comments	-

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

SDG 13

Data/Parameter	Value obtained in this monitoring period	Value obtained last monitoring period	Remarks
Number of project devices in households of type i and batch j operating during year y	1,182,931	1,084,060	Based on cooker sales
Avg Fraction of year(s) the cookstove is operational in	0.320	0.823	Based on commissioning date

Household during the monitoring period			
Average annual consumption of woody biomass in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent (tons/person/yr)	0.2337	0.2337	N/A
Average daily consumption of bioethanol in Household (ltr/day)	0.504	0.504	N/A
NCV of Bioethanol (TJ/ton)	0.0265	0.0265	N/A
Total Number of KOKOpoints Installed	2675	2410	Based on actual installations of KOKOpoints
Quantity of electricity consumed by the project electricity consumption source (MWh)	186.437	506.678	Based on the monitoring period
Return trip distance between the origin and destination of freight transportation activity (km)	990,684.75	1513321.97	Based on distance recorded for each trip
Total Mass of freight transported in freight transportation activity f in monitoring period m (tons)	56,192.33	138197.2	Based on Fuel Transportation Records

Cumulative Sale of Cookstoves in Households	1,205,720	1,104,944	Based on total sales record
Average Percentage Usage Rate of Baseline Appliance	13.70%	7.18%	Based of annual monitoring survey results

SDG 3

Data/Parameter	Value obtained in this monitoring period	Value obtained last monitoring period	Remarks
Users' perception on smoke reduction	1,008,560	924,263	N/A

SDG 5

Data/Parameter	Value obtained in this monitoring period	Value obtained last monitoring period	Remarks
Number of women employed by KOKO Networks Limited in managerial positions	37	37	N/A

SDG 7

Data/Parameter	Value obtained in this monitoring period	Value obtained last monitoring period	Remarks
Access to affordable and improved energy services	1,182,931	1,084,060	N/A

D.4. Implementation of sampling plan

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Due to the large number of cookers (KOKO cooker) installed under the VPA it was not economically feasible to monitor each individual Cookstove unit, therefore, a representative sampling was undertaken as part of a VPA Sampling Plan. The sampling plan was designed to draw the samples from VPA- 0002. In accordance with the Sampling and Survey Standard version 09.0 (paragraph 23), 95/10 confidence/precision for VPAs was applied for implementing the survey.

The objective of the sampling was to obtain an unbiased and reliable estimate of the proportion or mean value of the following parameters over the course of the monitoring period, and with 95/10 confidence/precision. The survey was designed and implemented in accordance with the provisions of the registered PoA-DD. The survey parameters were chosen based on the sampling methodology provided in VPA-DD which requires following parameters to be monitored:

- Number of project devices distributed in households operating during year y , N_{HH}
- Cumulative sale of cookers in households, $N_{tot,HH}$
- Average annual per-capita consumption of woody biomass in households in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent, $BC_{PJ,PP,Y}^3$
- Average annual bioethanol consumption per household during the operations of

the project activity, $Q_{HH,Eth}$

Since there was no variation in terms of cookstove models (only 1 model type – KOKO Cooker) or any other parameter, a simple random sampling method was deemed appropriate for conducting surveys. Therefore, a simple random sampling were designed for the survey which consist of following monitoring parameters:

Household Survey

S.No.	Monitoring Parameter	Description of Monitoring Parameter
1	N_{HH}	Number of project devices in households of type i and batch j operating during year y
2	$N_{tot,HH}$	Cumulative sale of cookers in households
2	$BC_{PJ,PP,Y}$	Average annual per-capita consumption of woody biomass in the pre-project devices during the project activity
3	$Q_{HH,Eth}$	Average daily consumption of bioethanol in project households
4	S_{smoke}	Users' perception on smoke reduction

³ The survey parameter $BC_{PJ,HH,Y}$ mentioned in the PoA-DD differs from $BC_{PJ,PP,Y}$ only by a constant factor of household size, $N_{p,HH}$ and hence replaced by $BC_{PJ,PP,Y}$ in order to align it with the monitoring requirement of Table I.7.1.3 of PoA-DD

As per the paragraph 27 of General guidelines for SSC CDM methodologies V 23.0 PA/CPAs may apply the result of the surveys for monitoring period up to 12 months after the date of the survey. The monitoring survey was implemented during May 2023. The survey confirmed 98.11% usage of cookstove in households and measured the monitoring parameters as described in the monitoring plan of the registered VPA-DD.

Description of implemented single sampling design

Sampling Design

A representative sampling of the total cookers sold in Kenya has been undertaken as part of a PoA-wide sampling plan. The Sampling is based on 95/10 confidence /precision.

Objectives and Reliability Requirements

The objective was to obtain an unbiased and reliable estimate of the proportion or mean value of the following parameters over the course of the monitoring period, and with 95/10 confidence/precision for annual sampling across VPAs.

Target Population

The target population for the survey is the households' users of KOKO cooker operating in Kenya. A digital database of all cookers sold to households is maintained by the CME.

Sampling Frame

The sampling frame for the survey consists of aggregated data of end-users of the cookers (individually recorded for VPA-0002) in the registered database till 31st March 2023. There was no requirement for further categorization as all other factors were fairly homogenous.

Sampling Method

The sampling for the survey was conducted using simple random sampling technique over the aforesaid sampling frame created. The cookstove population was assigned a sampling serial number. A random sequence of sampling numbers was generated using the random numbers formula on excel sheet. This approach ensured that each cooker listed in the database had an equal chance of being selected.

Sampling Size

The required sample sizes were derived using equation (1) on page 68 and equation (4) on page 70 of the Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 04.0 for proportion based and mean based parameters respectively as follows:

$$n = \frac{z^2 \cdot N \cdot V}{(N-1) \cdot c^2 + z^2 \cdot V}$$

$$V = \left(\frac{SD}{Mean}\right)^2 \text{ for mean parameters}$$

$$V = p \cdot (1-p)/p^2 \text{ for proportion parameters}$$

Where:

n = sample size

N = population size

z = Confidence value constant (1.96 for 95%)

c = Desired precision (10%)

SD = expected standard deviation for mean parameter

$Mean$ = expected mean for mean parameter

p = expected proportion for proportion based parameter

Simplified equation (1) and equation (4) of the Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 04.0 are as follows:

Equation (1) for Proportion Parameters

$$n > \frac{(1.96)^2 \times N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.96^2 \times p(1-p)} \quad (\text{Equation 1})$$

Equation (4) for Mean Parameters

$$n > \frac{(1.96)^2 \times N \times V}{(N-1) \times 0.1^2 \times p^2 + 1.96^2 \times V} \quad (\text{Equation 4})$$

$$V = (SD/\text{Mean})^2$$

Refer worksheet 'Sampling' for more details on calculation of sample size for each parameter. The expected parameter values (mean, standard deviation and proportion) have been determined based on project developer's knowledge and experience as per para 13(b) and 13(c) of the "Standard: Sampling and surveys for CDM project activities and programmes of activities", Version 09.0.

Collected data

Data was collected using surveys done by the CME. The questionnaire for the survey was designed in Google Forms and the data was collected in the linked google spreadsheet. This survey form was designed in a way that would allow the surveyor first to check the validity of the records from the VPA Distribution Records, and secondly to collect the necessary information from field visit for the ER calculations.

In order to achieve the 95/10 reliability level for the VPA sampling few additional stoves were sampled from the database than that required (as mentioned in the table above) to cover for possible non-responses, if any. The data collected from the surveys was later compiled into the Excel spreadsheet. The description of data collection method for each parameter is provided below:

- a) Proportion of Operating Cookers in Households – The operational status was checked by confirming the regular usage of KOKO Cooker during the monitoring period for each of the users included in the survey. In case of non-operational status of any KOKO Cooker, the date on which the usage stopped was also recorded by the survey team.
- b) Average annual consumption of woody biomass per household during the monitoring period, $BC_{PJ,PP,Y}$ – The household emission reductions are required to be appropriately adjusted for partial or full operations of the baseline appliances. For this, the annual average per-capita woody biomass consumption in project scenario, $BC_{PJ,PP,Y}$, is determined and deducted from the average annual per-capita baseline woody biomass consumption, $BC_{BL,PP,Y}$.
 $BC_{PJ,PP,Y}$ is calculated by applying the following formula:

$$BC_{PJ,PP,Y} = (1 - \text{Usage_Fraction(KOKO-Cooker)}) \times BC_{BL,PP,Y} \quad (\text{Equation 05})$$

Where

$BC_{PJ,PP,Y}$ – Annual average per-capita woody biomass consumption in project scenario

$BC_{BL,PP,Y}$ – Annual average per-capita baseline woody biomass consumption
 Usage_Fraction(KOKO-Cooker) – Fraction of daily meals cooked on project stove out of total daily meals

The average annual per-capita baseline woody biomass consumption ($BC_{BL,PP,Y}$) for households is 1.71 tonnes/person/annum as per the registered VPA-DD for VPA-0002. The survey collects data on the number of meals cooked on KOKO Cooker (project cookstove) and the total number of meals cooked by the users in a day for determining the Usage_Fraction(KOKO-Cooker). The survey questionnaire had incorporated the relevant questions for collecting the above data.

- c) Average monthly Consumption of Bioethanol in households – Through various prior interactions with users, the market research team at KOKO realized that the users may find it difficult to estimate the quantity of bioethanol consumed in a month as they don't keep track of the quantity. However, the users do keep track of the expense incurred on most of the domestic products including cooking fuel. Hence, survey questionnaire incorporated the question on monthly bioethanol consumption by the user which was relatively easier for users to answer. The quantity of bioethanol consumption was calculated by dividing the monthly bioethanol expenditure by the retail price of Bioethanol.

Survey Results

As per the paragraph 27 of General guidelines for SSC CDM methodologies V 23.0 PA/CPAs may apply the result of the surveys for monitoring period up to 12 months after the date of the survey. As this survey is conducted in May 2023 and hence as per the above requirement PP can apply this result till monitoring period ending by April 2024.

The complete survey results are provided in the Survey Analysis sheet submitted to the verification agency. The reliability test was also conducted for all survey parameters which are used for emission reduction calculations. It was found that the survey results for all parameters were within the precision limit of 10% with 95% confidence level

Summary: Sampling Reliability Test

Parameter	Population	Actual Sample	Mean / Proportion	SD	Standard Error of Mean	Relative Precision
1. Number of project devices in households of type i and batch j operating during year y, N_{HH}	810,926	159.00	98.11%	13.61%	1.1%	0.05%
2. Average annual consumption of woody biomass per person in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent, $BC_{PJ,PP,Y}$	810,926	159.00	0.618	0.19	0.015	2.42%
3. Average daily consumption of bioethanol in a project cookstove (KOKO cooker) distributed to Household, $Q_{HH,Eth}$	810,926	159.00	15.118	4.87	0.386	2.50%

SECTION E. CALCULATION OF SDG IMPACTS

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

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SDG 13: Climate Action

Baseline emissions will be calculated using equation (1) provided in paragraph 20 of the applied methodology. The equation (1) is modified to incorporate methodological and operational parameters which is as given below:

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected} \times Stove_{year} \times LAC \quad \text{Equation (1)}$$

Where:

BE_y	=	Baseline emissions during the year y in t CO ₂ e
B_y	=	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB,y}$	=	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass (fNRB)
$NCV_{biomass}$	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne)
$EF_{projected fossil fuel}$	=	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 63.7 t CO ₂ /TJ ⁴
$Stove_{year}$	=	Fraction of Year(s) the cookstove i was operational during the monitoring period
LAC	=	Leakage Adjustment Factor (Default Value - 0.95)

B_y , quantity of woody biomass that is displaced, will be monitored ex post in accordance with paragraph 21 of the applied methodology. For cookers operational in households, Option (b) is applied to calculate parameter B_y as the product of the number of persons served per household multiplied by the number of households and the estimate of average annual consumption of woody biomass per person that is displaced by the project activity.

$$B_y = B_{HH} = N_{HH} \times N_{p,HH} \times (BC_{BL,PP,y} - BC_{PJ,PP,y}) \quad \text{Equation (2)}$$

4

This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. The value is calculated, based on the global average ratio of cooking fuels (the normalized ratio of kerosene and liquefied petroleum gas (LPG) excluding coal), i.e. 9 per cent for kerosene (71.5 t CO₂/TJ) and 91 per cent for LPG (63.0 t CO₂/TJ).

Where:

N_{HH}	=	Number of households in the project activity, number
$N_{p,H}$	=	Average number of persons served per household, number
$BC_{BL,PP,y}$	=	Average annual consumption of woody biomass per person before the start of the project activity, tonnes/person/year
$BC_{PJ,PP,y}$	=	If it is found that pre-project devices were not completely displaced but continue to be used to some extent, average annual consumption of woody biomass per person in the pre-project devices during the project activity, tonnes/person/year

Parameter Name	Symbol	Value	Unit
Total Cookers operational in Households	$N_{tot,HH}$	1,182,931	Cookers
Avg Fraction of year(s) the cookstove is operational in Household during the monitoring period	$Stove_{year}(HH)$	0.320	Years/cookstove
Average annual consumption of woody biomass per person before the start of the project activity, $BC_{BL,PP,y}$	$BC_{BL,PP,y}$	1.71	tonnes/person/year
Average annual consumption of woody biomass in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent	$BC_{PJ,PP,y}$	0.2337	tonnes/person/Year
Net per capita Woody Biomass displaced by PoA	$BC_{BL,PP,y} - BC_{PJ,PP,y}$	1.47	tonnes/person/year
Fraction of Non-renewable Biomass	$f_{NRB,y}$	0.9268	Fraction, %
Net Calorific Value of Woody Biomass	$NCV_{Biomass}$	0.0156	TJ/Tonne
Emission Factor of Fossil Fuel	$EF_{projected\ fossil\ fuel}$	63.70	Tonnes CO ₂ e/TJ
Leakage Adjustment Factor (LAF)	LAF	0.95	fraction
Per Capita Emission Reductions during the Monitoring Period		0.412	tCO ₂ /person
Baseline Emissions (Households)	BE	1,949,416	tCO₂/yr (Rounded-down)

SDG 3: Health and Well-being

The indicator for SDG 3 is "Number of KOKO Users /households experiencing reduction in the indoor air pollution in their kitchen". Before project intervention (baseline scenario), the households were utilizing traditional biomass cookers leading to lot of smoke in kitchens. The level of smoke from these traditional appliances is considered as the baseline reference, hence the value of indicator (reduction in smoke/PM emissions) is considered as "0" in the baseline scenario.

SDG 5: Gender Equality

The indicator for SDG 5 is “Number of women in managerial positions employed by KOKO Networks Limited”. All women managers employed by KOKO Networks (group of companies) for more than 6 months period will be accounted for this calculation. In the baseline data, the women managers employed is recorded as 0 since the baseline scenario (Use of traditional cookstoves) would not have resulted in any organized/skilled employment.

SDG 7: Affordable and Clean Energy

The indicator for SDG7 is “number of households with primary reliance on clean fuels and technology” in the target households. In the baseline, the target households were not using any clean cooking technology and no KOKO Cookers were distributed to the households. Hence, the access to affordable and clean energy, expressed as a number of households with primary reliance on clean fuels & technology is recorded as 0.

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

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SDG 13: Climate Action

Project emissions comprise of emissions associated with the regular operations of the project activity, namely, production of bioethanol, consumption of electricity for running of KOKOpoints, and consumption of fossil fuel by the vehicles required for transportation of bioethanol. Project emissions due to continued use of non-renewable biomass during the operation of the project activity is already factored into the baseline emission calculation. Since the project activity does not involve production of bioethanol, the other project emissions identified in the applied methodology are not applicable.

Project Emission Calculation Approach			
A.	Project Emissions due to Bioethanol Production	-	-
	Para 22, AMS-I.E	$PE_{bioeth-prod}$ =	$Q_{Eth} \times EF(bioethanol\ production)$
B.	Project Emissions due to Electricity Consumption		

		$PE_{EC,y} =$	$N_{KP} \times EC_{PJ,j,y} \times EF_{EF,j,y} \times (1+TDL_{j,y})$
C.	Project Emissions due to Transport		
		$PE_{TR,m} =$	$\sum D_{f,m} \times FR_{f,m} \times EF_{CO2,f} \times 10^{-6}$
	Project Emission Calculation		
	Project Emissions due to Bioethanol Production	tCO ₂ e	590.66
	Project Emissions due to Electricity Consumption	tCO ₂ e	241.71
	Project Emissions due to Transport	tCO ₂ e	1,035.08
	Total Project Emissions (rounded up)	tCO₂e	1,868

SDG 3: Good Health and Well Being

The indicator for SDG 3 is "Number of KOKO Users /households experiencing reduction in the indoor air pollution in their kitchen". The project value of SDG 3 Impact is calculated by multiplying the percentage of households confirming reduced smoke due to the usage of KOKO Cooker in the annual monitoring survey with the total number of KOKO Cookers distributed. The calculation of the project value for the current monitoring period is provided in the ER Calculation Sheet (Tab – SDG Outcomes) and the summary of the same is provided below:

Particulars	Unit	Value
Proportion of Samples experiencing reduction in smoke	%	83.65%
Number of Households with KOKO Cooker	Households	1,205,720
Project Value SDG 3 Impact	Households	83.65% * 1,205,720 = 1,008,560

SDG 5: Gender Equality

The indicator for SDG 5 is "Number of women in managerial positions employed by KOKO Networks Limited". All women managers employed by KOKO Networks (group of companies) for more than 6 months period will be accounted for this calculation. Total of 40 women managers were employed by KOKO during this monitoring period. The total number of women managers were apportioned to each VPA based on the number of cookers sold in each VPA. The apportioning calculations are provided in the ER Calculation Sheet (Tab – SDG Outcomes) and the summary of the same is provided below:

Particulars	Total	VPA-0001	VPA-0002
Cookers Distributed	1,245,289	39,569	1,205,720
Women Managers per VPA	38	1	37

SDG 7: Affordable and Clean Energy

The indicator for SDG7 is “number of households with primary reliance on clean fuels and technology” in the target households. The project value is reported as the number of households with operational KOKO cookers which is calculated by multiplying the total number of KOKO cookers distributed with the percentage of households found with operational KOKO cookers out of total samples in the annual monitoring survey. The calculation of the project value for the current monitoring period is provided in the ER Calculation Sheet (Tab – SDG Outcomes) and the summary of the same is provided below:

Particulars	Unit	Value
Percentage of Sample households found with operational KOKO Cooker	%	98.11%
Number of Households with KOKO Cooker	Households	1,205,720
Project Value SDG 3 Impact	Households	1,205,720* 98.11% = 1,182,931

E.3. Calculation of leakage

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The leakage due to the use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources has been considered in the emission reduction calculation. In accordance with paragraph 24 of the applied methodology, a default net to gross adjustment factor of 0.95 to account for this leakage is applied.

A.1. Calculation of emission reductions or net anthropogenic removals

GS VPA ID	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	Emission Reductions (t CO ₂ e)
GS 11440	1,949,416	1,868	0	1,947,548

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

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	GHG Emission Reduction	1,949,416	1,868	1,947,548
3	Number of KOKO Users /households experiencing reduction in the indoor air pollution in their kitchen	N/A	N/A	1,008,560
5	Number of women in managerial positions	N/A	N/A	37
7	Proportion of population or number of households with primary reliance on clean fuels and technology	N/A	N/A	1,182,931

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 ⁵ achieved during this monitoring period
13	2,156,279	1,947,548
3	899,768	1,008,560
5	90	37
7	1,199,691	1,182,931

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

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⁵ Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

The annual ex-ante estimation of GHG emission reductions reported in the VPA-DD is 1,081,893 tons CO₂e. As the VPA-DD determined ex-ante emission reductions based on the planned KOKO Cooker distribution 200,000 units. However, the actual cookers distributed till the end of this monitoring period are 1,205,720. Hence the amount of ex ante GHG emission reductions for this monitoring period is calculated as the product of annual ex ante GHG emission reductions (reported in the VPA-DD), the fraction of year covered by the monitoring period (0.331 Year) and the ratio of actual cooker sales to the ex- ante value of sales considered in VPA-DD ($1,205,720/200,000=6.03$). The calculations for the same is provided below:

Particulars	Unit	Value
Annual Ex-ante GHG Emission Reductions reported in VPA-DD	tCO ₂ /year	1,081,893
Number of Cookers Reported in VPA-DD	Units	200,000
Actual number of cookers reported in MR	Units	1,205,720
Length of the monitoring period	year	0.331
Adjusted ex-ante GHG emission reductions for this monitoring period	tCO ₂	$1,081,893 * (1,205,720/200,000) * 0.331$ = 2,156,279

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

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There is no increase in the actual emission reductions achieved during the current monitoring period as compared to the estimated value in the approved VPA-DD for comparable period.

The ex-ante calculations of emission reduction (1,081,893 tCO₂e/yr) provided in the VPA-DD is based on 1 year time-period and a planned distribution of 200,000 KOKO cookers. Hence, for reasonable comparison, the ex-ante emission reductions are adjusted for the length of the monitoring period and the actual number of KOKO cookers, which results in the value of 2,156,279 tCO₂ (calculations presented above). The adjusted ex-ante emission reductions (2,162,187 tCO₂) are greater than the actual emission reductions achieved during the current monitoring period. The ex-ante estimation calculations and comparison with the achieved values for each SDG impact are provided in ER calculation sheet (Tab: SDG Outcomes).

The increase in the distributed cookers does not pose any risk as the same has been allowed by Gold Standard under the Deviation DEV_247.

SECTION F. SAFEGUARDS REPORTING

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Principles	Mitigation Measures	CME Monitoring	Monitoring Results
Principle 7.1 Emissions	Monitoring of Co2 emission will be done annually.	The CO ₂ emission associated with the project is calculated based on the CDM-approved applicable methodology and tools.	The total emissions associated with the project were 1,868 tCO ₂ e for the complete monitoring period.
Principle 6.1 Labour Rights	Annual HSE Audits to ensure occupational safety of workers	HSE Internal Audits were conducted on half-yearly basis to check the effectiveness of the HSE management system. Audit Dates: Q2 Audit – May 2023 Q4 Audit – Nov 2023	The HSE management system was effectively implemented and HSE Performance was found satisfactory. All the audit findings were recorded and incorporated in the risk mitigation implementation plan.

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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All complaints/grievances are managed by the dedicated customer care team of 200 staff members. Customers can submit complaints via phone, WhatsApp, or messaging. Customer complaint cum repair maintenance records for the grievances registered via customer care team has been separately submitted to the VVB. In addition to the customer care department, a grievance register is maintained at the central office reception for non-technical complaints. However, no formal complaints of this nature were received during the current monitoring period. Grievance registers for the same has been submitted to the GS-VVB.

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

>>No such action was required.

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

>>No legal contest has 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