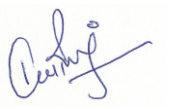
Verification report for GS4GG project activities (Gold Standard for the Global Goals)	
BASIC INFORMATION	
Title of the GS4GG Project Activity	Nairobi River Basin Biogas Project
Reference number of the Project Activity	GS939
Version number of the verification and certification report	02
Completion date of the verification and certification report	06/01/2022
Monitoring period number and duration of this monitoring period	4th monitoring period Duration: 31/12/2018 to 30/12/2020 (inclusive of both days)
Version number of the monitoring report to which this report applies	02 Dated: 11/10/2021
Crediting period of the project activity corresponding to this monitoring period	31/12/2012 to 30/012/2022 (Fixed)
Project representative	atmosfair GmbH
Host Party	Kenya
Applied methodologies and standardized baselines	AMS I.E. (version 04) Switch from Non-Renewable Biomass for Thermal Applications by the User No standardized baseline applied
Activity requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Mandatory sectoral scopes	1: Energy industries (renewable - / non-renewable sources) Conditional Sectoral Scope- 13: Waste handling and disposal
Product requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label

	☐ N/A

Sustainable Development Goals	SDG Impact	Estimated amount of annual average certified SDG impact (as per approved PDD)	Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period	Units/Products
SDG 3	Biogas owners are asked how air quality in the kitchen has changed since using biogas, whether they experienced respiratory problems before using the biogas unit and, if yes, whether they have perceived an improvement as a result of cooking with biogas.	100% (Improvement in Indoor Air Quality)	91% improvement of air quality and 100% improvement of respiratory problems as a result of cooking with biogas	Interview (%)
SDG 7	Biogas users primary rely on biogas which is a clean fuel and technology	2.647	2.641	MW, installed thermal capacity
SDG 8	Number of Jobs generated	40 employments	40	People working for SES in MP
SDG 13	Emission Reduction	7,437	7,419	t CO_2e
SDG 17	Technology transfer of deenbandhu biogas digester model	796 40	796 40	Biogas plants constructed People working for SES in MP

Name of the Gold Standard approved auditor (VVB)	Earthood Services Private Limited

Name, position and signature of the approver of the verification and certification report	 Dr. Kaviraj Singh Managing Director

SECTION A. Executive summary

Description of project activity:
The project is small-scale project activity that aims to set up 10,000 domestic biogas units to produce renewable biogas for cooking and heating purpose. Storage capacity can be $2m^3$ and $3m^3$ each for individual household of at least 2 zero-grazing cows in Nairobi River Basin. The project activity saves greenhouse gas emissions by replacing non-renewable biomass with renewable biogas. The project activity is designed to generate emission reductions by installation of the biogas units in the Kiambu county in Kenya. Dairy farmers and member of rural dairy Saccos (Saving Credit Cooperatives) are the main beneficiaries of this project.
Project has employed “Deenbandhu Model 2000” which is a well-known and widely used technology in India. The technology has been developed by the India based NGO, Action for Food Production (AFPRO) since the 1970s. The lifeline of this biogas place is over 15 years with a fixed dome type construction which assures the durable quality and low cost. Installation of this project will replace the non-renewable biomass like fuel wood and charcoal as well as fossil fuel (LPG and Kerosene).

The basic details of the project activity are mentioned below:

Project title	Nairobi River Basin Biogas Project
GS registration number	GS939
Sectoral scope	Sectoral Scope 1: Energy Industries (renewable/non-renewable sources)
Methodology/ies applied	AMS I.E. (version 04) Switch from Non-Renewable Biomass for Thermal Applications by the User
Project participant	Kenya (host): Sustainable Energy Strategies Ltd. Germany: atmosfair gGmbH
Location of Project Activity	Kenya
Geographical coordinates	1° 14' 45" S and 36° 39' 55" E

Scope of Verification

This verification is an independent and objective review and ex-post determination of the monitored SDG outcomes by the VVB. The verification addresses the implementation and operation of the GS PA and tests the data and assertions set out in the monitoring report based on the following:

(i) The registered GS/CDM PDD and preliminary review feedback/7/
(ii) The approved methodology “AMS I.E. (version 04) Switch from Non-Renewable Biomass for Thermal Applications by the User”/6/
(iii) "Gold Standard for Global Goals Transition Annexure", for the PA/3/
(iv) UNFCCC criteria referred to in the Kyoto Protocol criteria and the CDM modalities and procedures as agreed in the Bonn Agreement and the Marrakech Accords
(v) Latest GS4GG requirements/22//23/
(vi) CDM Validation and Verification Standard (VVS) for project activity/25/
(vii) Principles and Requirements for GS4GG/22/
(viii) Validation and Verification Body requirements, Product requirements and references relevant to the project activity’s reported SDG outcomes

The verification has considered both quantitative and qualitative aspects on stated/reported emission reductions. The monitoring report (all versions) and corresponding supporting documentation were assessed in accordance with the rules defined by UNFCCC and GS for GG, as appropriate to the PA. The verification is not meant to provide any consulting or recommendations to the PP/others. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

Verification Process:
The verification process is conducted as per internal GS Requirements, which includes the following steps;

a) Contract with PP and appointment of verification team and technical review team (refer Section B.1 and B.2 of this report)
b) Desk review (refer Section D.1 of this report) of Monitoring Report and corresponding ER sheet by verification team and planning of onsite audit (including sampling approach (refer Section D.4 of this report) to be applied, if any)
c) On site audit (refer Section D.2 of this report) (physical implementation and interview with relevant stakeholders) by verification team consisting of Team Leader, as a minimum
d) Follow up activities e.g., interviews (refer Section D.3 of this report)
e) Reporting and closure of findings (CARs/CLs/FARs) and preparation of draft verification report (refer Section D.5 of this report)
f) Independent technical review (refer Section B.2 of this report) of the draft verification report and final/revised documentation (e.g., Monitoring Report, corresponding ER sheet and evidences)
g) Reporting and closure of TR comments/findings (refer Section D.5 of this report) (CARs/CLs/FARs) and final approval for the decision made (refer Section G and H of this report).
h) Issuance of final verification report to contracted PP (or authorized representatives) and submission of request for issuance, as appropriate.

Verification Conclusion*:*
Based on the outcome of the verification process of the PA "Nairobi River Basin Biogas Project" for the monitoring period 31/12/2012 to 30/12/2020 (including both dates) we confirm that the implementation of referenced registered PA and is complying with applicable CDM and GS rules and regulations as stated in the final version of the Monitoring Report/8/. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology "AMS I.E. (version 04) Switch from Non-Renewable Biomass for Thermal Applications by the User" and the monitoring plan contained in the registered PDD/1/ and "Gold Standard for Global Goals Transition Annexure" for PA/3/.

Earthood Services Private Limited is able to certify that the emission reductions from the registered PA "Nairobi River Basin Biogas Project" for the monitoring period 31/12/2012 to 30/12/2020 (including both dates) amount to 7,419 tCO_2e. Therefore, this is being submitted for request for issuance, as per Gold standard procedures.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team members

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)	Involvement in			
						Desk/document	On-site inspection	Interviews	Validation findings
1.	Team Leader	IR	Mahala	Deepika	Central Office	Y	N	Y	Y
2.	Verifier	IR	Vatsa	Vaishali	Central Office	Y	N	N	Y
3.	Technical Expert (1.1)	IR	Gautam	Ashok	Central Office	Y	N	N	Y
4.	Technical Expert	EI	Arora	Kalpana	Central Office	Y	N	N	Y

	(13.2)								
5.	Methodology Expert	IR	Mahala	Deepika	Central Office	Y	N	N	Y
6.	Local Expert	EI	Njeri Njata	Virginia	Central Office	Y	Y	Y	Y
7.	Trainee (Verifier)	IR	Bharti	Abhishek	Central Office	Y	N	N	Y

**On-site inspection was conducted by the local expert due to ongoing COVID-19 pandemic. For detailed explanation please refer to Section D.2. on-site inspection.*

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)
1.	Technical reviewer	IR	Guleria	Shifali	Central Office
2.	TA expert to TR(1.1 and 13.2)	IR	Singh	Kaviraj	Central Office
3.	Approver	IR	Singh	Kaviraj	Central Office

SECTION C. Application of materiality in conducting the verification

C.1. Consideration of materiality in planning the verification

Please refer to the Section C.1. of the CDM Final Verification Report/35/ of fourth Monitoring Period.

C.2. Consideration of materiality in conducting the verification

In accordance with CDM VVS for PAs, Version 03.0 /25/para 326 the prescribed thresholds for materiality for CDM PAs are as under;

Emission Reductions (tCO2e)/year	500,000 or more	300,001 to 499,999	300,000 or less	Small Scale CDM PAs	Micro Scale CDM PAs
Materiality Threshold (para 326)	**0.5%**	**1.0%**	**2.0%**	**5.0%**	**10.0%**

The applicable materiality threshold is 5.0 % for this CDM project activity.

Particulars / Monitoring Report	MR Version (Public)	MR Version (Revised/Final)
Emission Reductions Achieved (tCO2e) in this monitoring period	7,437 tCO2e	7,419 tCO2e
Applicable Threshold (%) as per para 326 of CDM VVS for PAs Version 03.0	5%	5%

Monitored Parameter (Symbol / Description)	Reporting Frequency	Number of Discrete Data (Total) Total (100%)	Sample selected for verificat-ion Sample(%)	Type of error identified	Impact on ERs	
					ERs impacted (Sample)	ERs impacted (Population based on extrapolation)

N_y	Continuous monitoring and recording of N_i	796 (100%)	796 (100%)	No error identified	No impact	No impact
DO_y	One monitoring campaign for this monitoring period	56 (7.02%)	11 (19.64%)	No error identified	No impact	No impact

Based on the above table it can be confirmed that the materiality threshold is not breached applicable for the registered PA as per CDM VVS Version 3.0/25/. As no material errors, omissions or misstatements could be found, a reasonable level of assurance is achieved.

SECTION D. Means of verification

D.1. Desk review

The verification is performed primarily as a desk review of the documents submitted at various stages of assessments. The review is performed by assessment team using dedicated protocols (checklists). The assessment team cross checks the information provided in the documents (MR) and information from sources other than those used, if available, and also conducts independent background investigations. Earthood conducted a desk review as under;

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan, the monitoring methodology including applicable tool(s) and, where applicable, the applied standardized baseline, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- A review of calculations and assumptions made in determining the GHG data and emission reductions;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions;

The list of documents reviewed during the verification is provided under appendix 3 of this report.

D.2. On-site inspection

Duration of on-site inspection: 13/09/2021 and 14/09/2021				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening meeting by Team Leader (through video conference call)	Kenya	13/09/2021	Deepika Mahala, Abhishek Bharti, Virginia Njeri Njata (LE)
2.	Implementation and operation of project activity (project boundary, technology, project equipment, monitoring and metering equipment) as per registered PDD/previous verification.	Kenya	13/09/2021	Virginia Njeri Njata
3.	Management and monitoring procedures followed at project site.	Kenya	13/09/2021	Virginia Njeri Njata
4.	Physical inspection of the project activity: Site visit and interview of monitoring personnel and end user of the biogas units	Kenya	13/09/2021	Virginia Njeri Njata
5.	Review of the Monitoring survey forms and relevant documents	Kenya	-	Done through desk review
6.	Compliance of monitoring procedures followed at project site with registered PDD and monitoring methodology.	Kenya	-	Done through desk review
7.	Closing meeting by Team Leader(through video conference call)	Kenya	14/09/2021	Deepika Mahala, Abhishek Bharti, Virginia Njeri Njata

** Local expert conducted the on-site inspection under the guidance of Team Leader and a remote interview of the project personnel was conducted by the Team Leader through video conferencing.*

In the context of verification, the GS4GG principles and requirements version 1.2/22/, para 5.1.26 requires VVB to conduct a site visit including the assessment of the monitoring report and all supporting evidence and documents included by the Project Developer to demonstrate conformity. However, in view of the Covid-19 global pandemic and the Interim measures released by GS/27/, the VVB can apply the interim measures until 31/12/2021 where on-site inspection cannot reasonably be performed due to Covid-19 and travel restrictions.

At the time of verification, the host country, Kenya, was witnessing increasing numbers of COVID-19 infected people in the country. There have been several restrictions regarding interstate travel under such circumstances like RT-PCR test and mandatory quarantine, the verification team has avoided the risk of exposure by not conducting the on-site visit due to outbreak of global pandemic Covid-19, increased risk of exposure and contact due to travel, as the affected cases in the country are spurting.

Therefore, for reasons stated above, and in line with GS4GG Covid-19 interim measures, the assessment team conducted the verification using alternative means as defined in the GS4GG Covid-119 Interim measures/27/.

Alternative means used by DOE:
The alternative means used by DOE for purpose of inspection and verification of project details are listed below:

1. On-site visit by the local expert (with a checklist prepared by the team leader)
2. Remote interviews (telephonic/ video calls) with the PPs to discuss the implementation of PA and monitoring procedures for various parameters.

3. Review of documentary evidence and supporting documents including monitoring survey forms, commissioning certificates, etc/10/. The entire list of documents reviewed for purpose of verification is available in Appendix 3 of this report.

These alternative methods were considered sufficient by the verification team for the current verification.

The objective of the remote assessment is to:

- Confirm the implementation and operation of the project;
- Review the data flow for generating, aggregating and reporting the monitoring parameters;
- Confirm the correct implementation of procedures for operations and data collection;
- Cross-check the information provided in the MR documentation with other sources;
- Check the monitoring equipment against the requirements of the PDD & Transition Annex and the approved methodology, including calibrations, maintenance, etc.;
- Review the calculations and assumptions used to obtain the GHG data and ER;
- Identify if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.
- Confirm the SDG goals/ Sustainable monitoring parameter as per the revised PDD & Transition Annex
- To understand grievance (if any) from the villagers during the monitoring period.
- Local stakeholder interviews.

D.3. Interviews

D.3.1. Interview with PP/Stakeholders

S.No.	Last Name	First Name	Affiliation	Date	Subject	Team Member
1.	Karanja	David	Sustainability Energy Strategies Ltd. (Executive)	13/09/2021-14/09/2021	Project implementation and operation, monitoring procedure, data and information flow, Survey records, Sales/Distribution records	Deepika Mahala, Abhishek Bharti, Virginia Njeri Njata
2.	Ngugi	James	Mason	13/09/2021-14/09/2021	Construction of biogas units, Monitoring, plumbing and payment of dues	Deepika Mahala, Abhishek Bharti, Virginia Njeri Njata
3.	Wangai	Mathew	Mason	13/09/2021-14/09/2021	Construction of biogas units, Monitoring, plumbing and payment of dues	Deepika Mahala, Abhishek Bharti, Virginia Njeri Njata
4.	Njeri	Anastasia	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata
5.	W Mbugua	Annecate	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata
6.	Nyokabi	Beatrice	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata

7.	Warui	Hannah	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata
8.	W Kageni	Jane	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata
9.	Wanjiru	Medline	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata
10.	Mungai	Monicah	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata
11.	Njeri	Rachel	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata
12.	Gathoni	Regina	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata
13.	Wanja	Salome	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata
14.	Mwarangu	Samuel	End-User	13/09/2021-14/09/2021	DOE Sampling	Virginia Njeri Njata

**Since the on-site visit was done by the local expert with a checklist prepared by TL, the technical experts have assessed the project and filled checklist through desk review and shared their comments with the team leader.*

D.4. Sampling approach

Same as CDM verification report.

D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	00	00	00
Compliance of the project implementation and operation with the registered Passport/Transition Annex	CL#01	00	00
Implementation and operation of the management system	00	00	00
Post-registration changes	00	00	00
Compliance of the monitoring plan with the methodologies including applicable tools and standardized baselines	00	CAR#02 CAR#03	00
Compliance of monitoring activities with the registered monitoring plan	00	CAR#01	00
Compliance with the calibration frequency requirements for measuring instruments	00	00	00
Assessment of data and calculation of emission reductions or net removals	00	CAR#04 CAR#05	00
Comparison of actual SDG impacts with estimates in approved PDD	00	00	00
Safeguards Reporting	00	00	00
Stakeholder inputs and legal disputes	00	00	00
Others (please specify)	00	00	00
Total	**01**	**05**	**00**

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	The Gold Standard for Global Goals prescribes a template for MR, Version 1.1. Therefore, PP has used the Gold standards for global goals latest MR template/30/ which has been issued by Gold Standards. In addition, all the GS4GG requirements are included in accordance with the Principles and requirements/30/.
Findings	No finding.
Conclusion	PP has submitted Monitoring Report, version 1.1 and found that all sections are filled appropriately. The final monitoring report/8/ was found to be in compliance with the applicable latest monitoring report form and instructions therein/30/.

E.2. Remaining forward action requests from validation and/or previous verification

This is the 04th verification of the project activity, there was a FAR from verification report/32/. As per the FAR raised in last verification, VVB was requested to check whether there is any training provided in the verified monitoring period. VVV has verified from the training records/16/ that were provided by the PP and the training with proper guidance was provided to ensure the quality of work.

E.3. Compliance of the project implementation and operation with the registered project design document

Means of verification	The project is a small scale project activity that aims to construct 10,000 biogas units of mainly $2m^3$ and $3m^3$ gas storage capacities. The project activity is located in Republic of Kenya, in Nairobi River Basin of Central Province and the administrative border of the project activity is Kiambu country. The coordinates of the first commissioned biogas units, located in Thogoto in the close proximity to Kikuyu town, are used to represent the physical location of the project activity: Latitude: 1° 14' 45'' S Longitude: 36° 39' 55'' E The following districts and all settlements within these districts belong to Kiambu county: Lari Gatundu North Gatundu Thika West Thika East Limuru Githunguri Ruiru Kiambu Kabete **Technology:** Project has employed "Deenbandhu Model 2000" which is a well-known and widely used technology in India. The technology has been developed by the India based NGO, Action for Food Production (AFPRO) since the 1970s. In year 2000 AFPRO improved the fixed dome Deenbandhu model to finally promote Deenbandhu model 2000. The lifeline of this biogas place is over 15 years with a fixed dome type construction which assures the durable quality and low cost. Installation of this project will replace the non-

renewable biomass like fuel wood and charcoal as well as fossil fuel (LPG and Kerosene).

Basic components of the Deenbandhu 2000 biogas model are 22/:

Foundation:

The foundation of the plant is bowl shaped with a collar around the circumference. The construction of the digester dome is done on this collar.

Dome:

The dome of the digester is divided in 2 parts, digester and gas storage.

Digester: The bottom part is called digester. The mixture of dung and water decomposes in this part and produces gas due to bacterial activity.

Gas storage: The upper part of the digester dome is called gas storage. The gas produced by the bacterial activity is stored in this place.

Gas outlet pipe:

A nipple is fitted on the top of the dome, which is connected to a pipe. The gas reaches the kitchen through this pipe. The recovered gas is combusted and used on a biogas burner for cooking in the household.

Inlet:

The pipe through which fresh dung and water enters the plant is called Inlet pipe. This pipe is connected to a small tank for mixing dung and water.

Outlet:

The portion of the plant where the slurry accumulates after coming out of the digester is called outlet tank. It is in two parts. The first bottom part is small and rectangular, which is connected to the dome opening, while the other part of outlet tank is dome shaped. A small slurry discharge hole is provided in the outlet tank.

Plant size (Gas storage)	Dung to be fed into the digester (kg)	Water to be fed into the digester (liter)	Number of cows per household	Number of eaters per household
2 m^3	50	50	Min. 2	5-8
3 m^3	75	75	Min. 3	9-15

The project has followed the given timeline as per co-operation agreement atmosfair and Sustainable Energy Strategies limited (SES)/36/:

The first biogas plant was commissioned on 09/10/2010 and according to the sales record till the end of fourth monitoring period total of 796 units were constructed and commissioned.

The details and number of all the biogas units were found to be consistent with the data provided by the PP. 11 samples were checked by the verification team to confirm the implementation status of the PA. The local expert has shared all the photos clicked during the assessment which were checked by the verification team to confirm that the project activity is implemented in line with the registered PDD/1/. The project activity is consistent with the description given in the registered PDD/1/.

	Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period is 7,419 tCO_{2e}.
Findings	No findings
Conclusion	The project activity was fully implemented according to the description presented in the GS PDD/1/. The assessment team confirms, through the interviews with PP /29/ & document review /10/,/11/,/18/ that all physical features of the proposed project activity including data collecting systems and storage have been implemented in accordance with the GS PDD/1/ and Passport/2/.

E.3.1. Implementation and operation of the management system

Means of verification	The responsibilities of data measurement, collection, verifying, archiving etc. have been clearly defined in the PDD /1/ & Transition Annex/3/. It is confirmed by the assessment team during the on-site visit by the local expert and interviews with PP/29/. The information flow of each parameter has been verified by the assessment team by interviewing with responsible personnel. It's verified during the interviews with PP & document review, the monitoring procedure as well as the internal quality management and control procedures are stipulated in the PDD/1/. The monitoring personnel have been interviewed by the assessment team (including LE) and it's confirmed that the monitoring is implemented as per the procedure/29/. Also, the training record/16/ has been checked by the assessment team and it is confirmed that the monitoring personnel are well trained to perform the monitoring/16/.
Findings	None
Conclusion	The Assessment team has checked all the parameters of management system via interview with the PP and all the necessary documents submitted by the PP are cross-checked with MR/8/ and PDD/1/. All the information provided was found to be correct and consistent through all the documents.

E.3.2. Post-registration changes

E.3.2.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

Not applicable

E.3.2.2. Corrections

Not applicable

E.3.2.3. Inclusion of a monitoring plan in a registered PDD

Not applicable

E.3.2.4. Permanent changes to the monitoring plan as described in the registered PDD, applied methodology, or applied standardized baseline

Not applicable

E.3.2.5. Changes to the project design of the registered PDD

Not applicable

E.3.2.6. Changes to the start date of the crediting period

Not applicable

E.3.2.7. Types of changes specific to afforestation and reforestation component project activities

Not applicable

E.3.3 Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

Means of verification	The verification team has confirmed that the monitoring plan is in accordance with the approved methodology AMS I.E. (version 04) Switch from Non-Renewable Biomass for Thermal Applications by the User/6/, applied by the proposed GS project activity by onsite verification by the local expert and interviews with PP/29/. Based on this review it was found the monitoring plan includes all the required parameters to be monitored in the context of project design and description/1/ and allows proper determination of emission reductions and in accordance with the applied methodology/6/.
Findings	No finding raised
Conclusion	The verification team confirms that the registered monitoring plan is in accordance with the approved methodology/6/ and correctly applied by the registered GS project activity.

E.3.4. Compliance of monitoring activities with the registered monitoring plan

E.3.4.1 Data and parameters fixed ex ante or at renewal of crediting period

Means of verification

The values considered ex-ante for this monitoring period were cross-checked with registered PDD/1/, GS Passport/2/ & Transition Annex/3/ and their respective sources. The summary of all the ex-ante parameters has been given below:

Parameter/ Description	Value applied	MoV
SDG 13: Climate Action 13.2.1 **B_y, net per unit** Quantity of fuelwood and woodfuel consumption displaced	4.257 tons/year/household	The value of the parameter was checked from registered PDD/1/. The value of the parameter is consistent with the Study On Kenya's Energy Demand, Supply And Policy Strategy For Households/18/, Small Scale Industries And Service Establishments (Final Report, 2002, prepared by Kamfor Ltd.)/15/ and PDD/1/.
SDG 13: Climate Action 13.2.1	0.962	The value of the parameter was checked from registered PDD/1/. The

	$f_{NRB,y}$ Fraction of non-renewable biomass		value of the parameter is consistent with FAO (Forest Resource Assessment)/15/ and PDD/1/.
	SDG 13: Climate Action 13.2.1 $NCV_{biomass}$ Net calorific value	0.015 TJ/tonne	The value of the parameter was checked from registered PDD/1/. The value of the parameter was found to be consistent with the applied methodology/6/ and PDD/1/.
	SDG 13: Climate Action 13.2.1 $EF_{projected\_fossilfuel}$ Emission factor	81.6 tCO2/TJ	The value of the parameter was checked from registered PDD/1/. The value of the parameter was found to be consistent with the applied methodology/6/ and PDD/1/.
Findings	None		
Conclusion	The value mentioned in the Monitoring Report /8/ and Emission Reduction Spreadsheet /9/ are consistent with the registered PDD/1/. The applied value are correct and justified .		

E.3.4.2 Data and parameters monitored (Carbon & SDG)

SDG 13 and SDG 17, Adjusted number of biogas units commissioned, N_y (Target 13.2 and 17.7; Indicator 13.2.1 and 17.7.1)

Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring / Reading/ Recording Frequency	The data of number of total units commissioned is continuously collected.
	Is measuring and metering frequency are in according with the monitoring plan and monitoring methodology? (Yes/No)	Yes
	Monitoring equipment	NA
	Is accuracy of the monitored equipment as started in the monitoring plan? If the monitoring plan does not specific the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacture's specifications?	NA

	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to the different measuring ranges?	NA
	Calibration Frequency/interval:	NA
	Is the calibration interval inline with the monitoring plan and or the methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacture's specifications?	NA
	Is the calibration of the measuring equipment carried out by an accredited person or institution?	NA
	Is(are) calibration(s) valid for the whole reporting period?	NA
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	NA
	How were the values in the monitoring report verified?	The net value of total unit commissioned is found to be 740 and the number of units were confirmed from the end used agreement and sales receipt that was shared by the PP.
	If applicable, has the reported data been cross-checked with other available data?	Yes, the values reported in the monitoring report and ER sheet are further cross verified from the sales invoices. All reported values were found consistent.

	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and appropriate.
	In case project participants have temporarily not monitored the parameter, has either (i) a deviation been approved by the CDM EB or (ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues identified during the monitoring period.
Findings	No findings	
Conclusion	The VVB confirms that: • Monitoring of parameter is implemented in accordance with registered monitoring plan/1/. • Monitoring results are consistently recorded as per approved frequency. • The value of the monitored parameter is 740 and was found to be consistent throughout all the reports.	

SDG 13 Dropout rate, DO_y (Target 13.2, Indicator 13.2.1)

Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring / Reading/ Recording Frequency	One time monitoring campaign for each monitoring period is mandatory.
	Is measuring and metering frequency are in according with the monitoring plan and monitoring methodology? (Yes/No)	Yes
	Monitoring equipment	NA
	Is accuracy of the monitored equipment as started in the monitoring plan? If the monitoring plan does not specific the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacture's specifications?	NA

	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to the different measuring ranges?	NA
	Calibration Frequency/interval:	NA
	Is the calibration interval inline with the monitoring plan and or the methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacture's specifications?	NA
	Is the calibration of the measuring equipment carried out by an accredited person or institution?	NA
	Is(are) calibration(s) valid for the whole reporting period?	NA
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	NA
	How were the values in the monitoring report verified?	The dropout rate for this monitoring period was found to be 0.00%. Primary data collected from the monitoring campaign was used for the verification of the value of dropout rate.
	If applicable, has the reported data been cross-checked with other available data?	The values reported in the monitoring report /8/ and ER sheet /9/ are further cross verified from the survey forms, DOE sampling in onsite inspection by the local expert and interviews with the end users.
	Does the data management ensure correct transfer of data and reporting of emission	Data management system was found to be reliable and appropriate.

	reductions and are necessary QA/QC processes in place?	
	In case project participants have temporarily not monitored the parameter, has either (i) a deviation been approved by the CDM EB or (ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues identified during the monitoring period.
Findings	No findings	
Conclusion	The value of dropouts was assessed from the Primary data collection: dedicated monitoring team and survey conducted by the PP. The applied value is 0% which is found to be correct, consistent, and justified as per monitoring report/8/ and PDD/1/.	

SDG 3, GS Monitoring Parameter 01: Air quality; Status of respiratory Problems (Target 3.9, Indicator 3.9.1)

Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring / Reading/ Recording Frequency	One time monitoring campaign for each monitoring period is mandatory.
	Is measuring and metering frequency are in according with the monitoring plan and monitoring methodology? (Yes/No)	Yes
	Monitoring equipment	NA
	Is accuracy of the monitored equipment as started in the monitoring plan? If the monitoring plan does not specific the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacture's specifications?	NA
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to the different measuring ranges?	NA

	Calibration Frequency/interval:	NA
	Is the calibration interval inline with the monitoring plan and or the methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacture's specifications?	NA
	Is the calibration of the measuring equipment carried out by an accredited person or institution?	NA
	Is(are) calibration(s) valid for the whole reporting period?	NA
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	NA
	How were the values in the monitoring report verified?	The status of air quality and respiratory problems for this monitoring period was found to be 91% improvement in the air quality and 100% improvement in the respiratory problems. The response of end-users in the questionnaire of monitoring campaign verifies the improvement in the ambient air quality.
	If applicable, has the reported data been cross-checked with other available data?	The values reported in the monitoring report /8/ and ER sheet /9/ are further cross verified from the survey forms, DOE sampling in onsite inspection by the local expert and interviews with the end users.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and appropriate.

	In case project participants have temporarily not monitored the parameter, has either (i) a deviation been approved by the CDM EB or (ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues identified during the monitoring period.
Findings	No finding	
Conclusion	The mentioned monitoring parameter is cross-checked through questionnaire for sample households during monitoring campaign. As per the campaign there is 91% improvement in the air quality and 100% improvement of respiratory problems. The applied value is correct, consistent and justified.	

SDG 17; GS Monitoring Parameter 02: Quality of employment; Report on training for masons carried out up to the specific monitoring period (Target 17.7, Indicator 17.7.1)

Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring / Reading/ Recording Frequency	One time for each monitoring period
	Is measuring and metering frequency are in according with the monitoring plan and monitoring methodology? (Yes/No)	Yes
	Monitoring equipment	NA
	How were the values in the monitoring report verified?	The value of number of people trained in this monitoring period was found to be 7 and it is cross check with the training records/12/ and value was in line with the MR/8/ and PDD/1/. The applied value is correct, justified and consistent.
	If applicable, has the reported data been cross-checked with other available data?	The values reported in the monitoring report /8/ was further cross verified with the training records/12/ provided by the PP.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and appropriate.

	In case project participants have temporarily not monitored the parameter, has either (i) a deviation been approved by the CDM EB or (ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues identified during the monitoring period.
Findings	No finding was raised.	
Conclusion	The value of number of people trained is 7 as mentioned in the Monitoring Report/8/ and Emission Reduction Spreadsheet/9/ as per the registered PDD/1/, GS Passport/2/ & Transition Annex/3/. The applied value is correct, consistent, and justified.	

SDG 7: GS Monitoring Parameter 03: Access to affordable and clean energy services; Thermal Capacity of commissioned biogas units (Target 7.1, Indicator 7.1.2)

Means of verification		
	Criteria/Requirements	**Assessment/Observation**
	Measuring / Reading/ Recording Frequency	Continuously and calculation of thermal capacity once per monitoring period.
	Is measuring and metering frequency are in according with the monitoring plan and monitoring methodology? (Yes/No)	Yes
	Monitoring equipment	NA
	How were the values in the monitoring report verified?	The thermal capacity of commissioned biogas units was found to be 2.641 MW, this value is the outcome of commissioning database/14/ and with the help of equations provided in the PDD/1/.
	If applicable, has the reported data been cross-checked with other available data?	NA
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and appropriate.

	In case project participants have temporarily not monitored the parameter, has either (i) a deviation been approved by the CDM EB or (ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues identified during the monitoring period.
Findings	No finding was raised.	
Conclusion	The value of Thermal capacity of commissioned biogas units is 2.641 MW as mentioned in the Monitoring Report/8/ and Emission Reduction Spreadsheet/9/ as per the registered PDD/1/. The applied value is correct, consistent and justified.	

SDG 8 and SDG 17; GS Monitoring Parameter 04: Quantitative employment and income generation; Number of masons working for SES in the specific monitoring period (Target 8.5., Indicator 8.5.2 and Target 17.7, Indicator 17.7.1)

Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring / Reading/ Recording Frequency	Once per monitoring period.
	Is measuring and metering frequency are in according with the monitoring plan and monitoring methodology? (Yes/No)	Yes
	Monitoring equipment	NA
	How were the values in the monitoring report verified?	The number of handyman and marketing people working for SES are 40 and was found to be consistent with the MR/8/ and values are cross checked with the training records/12/.
	If applicable, has the reported data been cross-checked with other available data?	NA

	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management system was found to be reliable and appropriate.
	In case project participants have temporarily not monitored the parameter, has either (i) a deviation been approved by the CDM EB or (ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues identified during the monitoring period.
Findings	No finding was raised.	
Conclusion	The value of employment number is 40 as mentioned in the Monitoring Report/8/ and Emission Reduction Spreadsheet/9/ as per the registered PDD/1/, GS Passport/2/ & Transition Annex/3/. The applied value is correct, consistent and justified.	

E.3.4.3. Comparison of monitored parameters with last monitoring period

Means of verification	**No instrument was used that needs to be calibrated in this monitoring period.**
Findings	**Not applicable**
Conclusion	**Not applicable**

E.3.4.4. Implementation of sampling plan

Means of verification	According to AMS I.E. (Version 4.0), par. 12 and 14, monitoring plan was framed with frequency biennial to determine the percentage dropouts units in the population. **Sampling Design/Target Population:** Target population for the monitored parameters is the total number of biogas installed/distributed to the households in the project. **Parameter to be checked:** • Statistically adjusted dropout from total population of units in period y.(DO_y) **Sampling Frame:**. There is one model of biogas digester installed in all the households. Thus, only one sampling frame is considered. **Sampling Method and Selection:** Simple random sampling has been done in line with the registered PDD/1/ **Sampling Size and its implementation:** A sample size of 50 users was calculated for DOy following sample size formula sourced from Guidelines: Sampling and surveys for CDM project activities and programmes of activities /33/. The PP had selected 56 samples for the entire population randomly. Out of the 56 sampled households, 52 users could be contacted. All houses

<table>
<tr><td></td><td>reported biogas plants to be well-maintained and in use. The information was recorded in the survey forms and submitted to the verification team. The verification has verified the monitored data for 11 samples following acceptance sampling plan outlined under section D.4. of this report.

Monitoring survey (by PP) duration:

The monitoring survey (field survey / tests) was carried out by PP representatives between following duration for the current monitoring period.
<table><tr><th>Technology</th><th>MP3 (Previous MP)</th><th>MP4 (Current MP)</th></tr><tr><td>Domestic Biogas Units</td><td>26/03/2019 to 27/03/2019</td><td>08/04/2021 to 30/05/2021</td></tr></table>It was confirmed that the monitoring survey has been conducted biennially which was found to be in-line to the stated frequency.

Reliability and precision calculation:

The verification team has verified the ER calculation spreadsheets /9/ with the monitored data, where the actual achieved precision is calculated against the Guidelines outlined under Guidelines for sampling and surveys for CDM project activities and programme of activities Version 4.0/33/ and confirms that the calculation of achieved reliability was done correctly.

All parameters of interest are included in the ER spreadsheet/9/ as per the applied methodology/6/. These were checked for the input values as well as formula applied and were found consistent. The reliability (demonstration of precision achieved after the survey results) is depicted in the ER calculation sheets /9/ corresponding to final Monitoring Report /3/, which were also found correct.
Thus, the verification team confirms that required precision has been met and the results are reliable.

<u>Version of Sampling Standard applied:</u>

The PP has applied Standard: “Sampling and surveys for CDM project activities and programmes of activities”, version 8.0/34/ as it was the latest available standard at the time sampling survey being conducted.</td></tr>
<tr><td>Findings</td><td>CAR#03 and CAR#04 were raised and resolved.</td></tr>
<tr><td>Conclusion</td><td>The sampling plan has been followed in line with the registered PDD/1/.</td></tr>
</table>

E.3.4.5. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	**No instrument was used that needs to be calibrated in this monitoring period.**
Findings	**Not applicable**
Conclusion	**Not applicable**

E.3.5. Assessment of data and calculation of emission reductions or net removals

E.3.5.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	Baseline emission estimation has been done in accordance with registered monitoring plan/01/ and applied methodology/04/. The equation used is as follows: $ER_y = B_y * f_{NRB,y} * NCV_{biomass} * EF_{projected\ fossil\ fuel}$ $B_y = N_y * B_y(net\ per\ unit) * (1-DO_y)$ $ER_y = N_y * B_y(net\ per\ unit) * (1-DO_y) * f_{NRB,y} * NCV_{biomass} * EF_{projected\ fossil\ fuel}$ Where: ER_y - Emission reduction during the year *y* in tCO_{2e} N_y- Adjusted total number of biogas units deployed until year y of end users who confirmed that non-renewable biomass was displaced/substituted DO_y - Statistically adjusted drop out from total population of units in period y B_y *(net per unit)* - Quantity of fuelwood and woodfuel consumption for charcoal that is substituted or displaced in tons $f_{NRB,y}$ - Fraction of non-renewable woody biomass used in the absence of the project activity in year y $NCV_{biomass}$ - Net calorific value of the non-renewable woody biomass that is substituted $EF_{projected\_fossilfuel}$ - Emission factor for substitution of non-renewable woody biomass by similar consumers Accounting leakage has been done through para 10a of AMS I.E., ver.4/6/ by multiplying the net to gross adjustment factor of 0.95. Therefore, By (net per unit) is calculated according to the following formula: $By(net\ per\ unit) = B_y * LE_{NRB}$ **Where:** B_y *(net per unit)* - Quantity of fuelwood and woodfuel consumption for charcoal that is substituted or displaced in tons (including potential leakage) B_y *(gross per unit)* - Quantity of fuelwood and woodfuel consumption for charcoal that is substituted or displaced in tons LE_{NRB} - 0.95 default value The equations applied were found to be consistent with the applied methodology/6/ and the registered PDD/1/. The parameters have been assessed in detail under section E.6.2.and E.6.1. From the above equation and the parameter values, ERy = 7,419 tCO2e.

Findings	No Findings
Conclusion	Baseline emissions calculations were found to be in line as per the monitoring plan/1/ and the applied methodology/6/. Values defined for each parameter were cross check with the PDD/1/ and other related documents. The final value of ERy is 7,419 is correct, consistent and justified.

E.3.5.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	Not applicable as per the methodology and also no source of project emission could be identified.
Findings	Not applicable
Conclusion	Not applicable

E.3.5.3. Calculation of leakage GHG emissions

Means of verification	No leakage as per the registered PDD/1/.
Findings	Not Applicable
Conclusion	Not Applicable

E.3.5.4. Calculation of net benefits or direct calculation for each SDG Impact

Means of verification	The calculations presented in this regard in the final monitoring report/8/ and corresponding ER calculations sheet/9/ were found appropriate and complying with the provisions prescribed in the registered monitoring plan of PDD/1/ and applied methodology/6/. The verification team confirms that an audit trail that contains the evidence and records that validated the stated figures were checked and found acceptable.
Findings	No finding was raised.
Conclusion	The verification team confirms that a) The complete data was available and is duly reported; b) As indicated above, the description with regard to cross-check of reported data is included under respective parameter; c) Appropriate methods and formulae for calculating net GHG removals and leakage emissions were followed; d) Appropriate emission factors, IPCC default factors and other reference values were correctly applied. e) There is no pro-rata approach was applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol.

E.3.6. Comparison of actual SDG Impacts with estimates in approved PDD

Means of verification	SDG	Values estimated in ex ante	Actual values achieved during

		calculation of approved PDD	this monitoring period
	Goal 13, Target 13.2: Reduction of GHG emissions	91,729 tCO_{2e}	7,419 tCO_{2e}
	Goal 3, Target 3.9: Reduction of indoor air pollution	Construction of 10,000 biogas units under the project until 2016	Construction of 796 biogas units, perceived improvement of air quality for 91%[1] of the installed units
	Goal 7, Target 7.1: Availability of affordable and clean energy	Commissioned biogas units (10,000 units in total) have an overall maximal thermal capacity of 33.20 MW.	2.641 MW installed thermal capacity
	Goal 8, Target 8.5 Achieve decent work and employment	Depending on implementation plan, > 60 masons trained and sub-contracted by SES	7 handyman became masons during MP 40 People working for SES during MP
	Goal 17, Target 17.7 Transfer of an innovative and clean energy technology	10,000 biogas units under the project until 2016 Depending on implementation plan, > 60 masons trained and sub-contracted by SES	796 biogas units under the project until 2020 40 People working for SES during MP
	The actual emission reduction achieved in the monitoring period is 7,419 (731 days) tCO_{2e}, whereas the estimated ERs in the registered PDD/1/ is 91,729 tCO_{2e} (annually). Actual emission reduction is 91.8% lower than the emission reductions for the considered monitoring period.		
Findings	No findings.		
Conclusion	The achieved emission reduction for the monitoring period is lower than the estimation as per the PDD/1/.		

E.3.6.1. Remarks on difference from estimated value in registered PDD

Means of verification	The assessment team checked the ER sheet and found that the actual emission reduction achieved in the monitoring period is 7,419 tCO_{2e}(731 days), whereas the estimated ERs in the registered PDD/1/ is 91,729 tCO2e(annual). Actual emission reduction is 91.8% lower than the emission reductions for the considered monitoring period.
Findings	None
Conclusion	The achieved emission reduction for the monitoring period is lower than the estimation as per the PDD/1/.

[1] Value from survey was 96%. Since the required precision was not achieved, the lower bound value is used instead.

E.3.7. SAFEGUARDS REPORTING

Means of verification	Not applicable
Findings	Not applicable
Conclusion	Not applicable

E.3.8. STAKEHOLDER INPUTS AND LEGAL DISPUTES

Means of verification	Not Applicable
Findings	Not Applicable
Conclusion	Not Applicable

SECTION F. Internal quality control

The draft verification report that is prepared by verification team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by Earthood were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable Gold Standard rules/requirements. The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the verification team.

During the technical review process additional findings may be identified or the closed-out findings may be opened, which needs to be satisfactorily resolved before the request for issuance is finalised. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the verification team. The decision taken by the Technical Reviewer is final and is authorized on behalf of Earthood Services Private Limited.

SECTION G. Verification opinion

Earthood Services Private Limited (Earthood), contracted by atmosfair GmbH , has performed the independent verification of the emission reductions for the GS PA "Nairobi River Basin Biogas Project" in Kenya for the monitoring period 31/12/2018 to 30/12/2020 (Inclusive of both days) as reported in the Monitoring Report Version 02 dated 11/10/2021, atmosfair GmbH is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

The VVB commenced the verification on the basis of the baseline and monitoring methodology AMS I.E. (version 04) Switch from Non-Renewable Biomass for Thermal Applications by the User, "Gold Standard for Global Goals Transition Annexure", the monitoring plan contained in the PDD, Monitoring Report.

VVB's verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. Earthood planned and performed the verification by obtaining evidence and other information and explanations that Earthood considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

The verification team confirms that:

- The PA was found completely implemented as per the description given in the registered PDD.
- The actual operation conforms to the description in the registered PDD

SECTION H. Certification statement

Earthood Services Private Limited (Earthood), contracted by atmosfair GmbH, has performed the independent verification of the emission reductions for "Nairobi River Basin Biogas Project" for the monitoring period 31/12/2018 to 30/12/2020 (Inclusive of both days) as reported in the Monitoring

Report Version 02 dated 11/10/2021, atmosfair GmbH is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity. It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity.

VVB commenced the verification on the basis of the baseline and monitoring methodology AMS I.E. (version 04) Switch from Non-Renewable Biomass for Thermal Applications by the User, the monitoring plan contained in the PDD "Nairobi River Basin Biogas Project", Monitoring Report Version 02 dated 11/10/2021.

VVB's verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. Earthood planned and performed the verification by obtaining evidence and other information and explanations that Earthood considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions reported for the project activity for the period 31/12/2018 to 30/12/2020 (Inclusive of both days) are fairly stated in the Monitoring Report Version 02 dated 11/10/2021 The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS I.E. (version 04) Switch from Non-Renewable Biomass for Thermal Applications by the User, the monitoring plan contained in the PDD "Nairobi River Basin Biogas Project". Earthood Services Private Limited is able to certify that the emission reductions from the GS PDD "Nairobi River Basin Biogas Project" during the period 31/12/2018 to 30/12/2020(Inclusive of both days) amount to 7,419 tCO_{2e}.

Verified and certified emission reductions as per commitment period:

Commitment period	Amount
Up to 31/12/2012 (1st commitment period)	Nil
Between 01/01/2013-31/12/2020	7,419 tCO_{2e}
Onwards 01/01/2021	Nil

Appendix 1. Abbreviations

Abbreviations	Full Texts
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
PP	Coordinating and Managing Entity
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CP	Crediting Period
DNA	Designated National Authority
VVB	Validation/Verification Bodies
DR	Document Review
EB	Executive Board
ER	Emission Reduction
ER	Emission Reduction
ESPL	Earthood Services Private Limited (Earthood)
FAR	Forward Action Request
GHG	Green House Gas
GS	Gold Standard
IPCC	Intergovernmental Panel on Climate Change
IR	Internal Resource
ODA	Official Development Assistance
PCP	Project Cycle Procedure
PDD	Project Design Document
PFA	Pre-Feasibility Assessment
PMU	Project Management Unit
PA	Project Activities
PP	Project participant
PS	Project Standard
RSV	Remote Site Visit
SFR	Stakeholders Feedback Round
UNFCCC	United Nations Framework Convention on Climate Change
UPNEDA	DEPARTMENT OF ADDITIONAL SOURCES OF ENERGY, GOVERNMENT OF UTTAR PRADESH
VER	Verified Emission Reductions

Appendix 2. Competence of team members and technical reviewers

Competence Statement	
Name	Deepika Mahala
Country	India
Education	M. Sc. (Environment Management), GGSIP University B.Sc. Hons. (Chemistry), Sri Venkateshwar College, DU
Experience	5 Years +

Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	ACM0002, AMS.I.D., AMS.I.A, AMS.III.AV, AMS.II.G		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.2 & TA 3.1)		
Reviewed by	Shreya Garg	**Date**	15/04/2021
Approved by	Anshika Gupta	**Date**	15/04/2021

Competence Statement			
Name	Ashok Gautam		
Country	India		
Education	M. Sc. (Environmental Sciences) M. Tech. (Energy & Environmental Management)		
Experience	16 Years +		
Field	Energy, Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-I.A., AMS-I.C., AMS-I.E, AMS-II.D., AMS-II.G., AMS-III.E., AMS-III.H., AMS-III.Q, AMS-III.Z., AMS-III.AV., AMS III.AR, AM0029, AM0025, AM0056, ACM0001, ACM0002, ACM0004, ACM0012, ACM0006, AM0018, ACM0009, AM0034, AMS.I.B, ACM0003		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1, TA 13.1)		
Reviewed by	Shreya Garg	**Date**	15/04/2021
Approved by	Anshika Gupta	**Date**	15/04/2021

Competence Statement	
Name	Abhishek Bharti
Education	MA (Environmental Studies), University of Delhi B.Sc (Physics and Electronics)
Experience	2 months
Field	Environment
Approved Roles	

Team Leader	No		
Validator	No		
Verifier	No		
Methodology Expert	No		
Local expert	No		
Financial Expert	No		
Technical Reviewer	No		
TA Expert	No		
Trainee (Validator/Verifier)	Yes		
Reviewed by	Deepika Mahala	**Date**	14/06/2021
Approved by	Ashok Kumar Gautam	**Date**	14/06/2021

Competence Statement			
Name	Kaviraj Singh		
Country	India		
Education	Ph.D. (Environmental Engineering), IIT Delhi Masters (Energy & Environmental), DAVV Indore		
Experience	15 Years +		
Field	Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-II.D., ACM0006, AMS-I.A., AMS-I.C., AMS-II.B., AMS-III.H, ACM0002, ACM0001, AM0080, ACM0018		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1, TA 13.1, TA 13.2)		
Reviewed by	Shreya Garg	**Date**	12/02/2020
Approved by	Anshika Gupta	**Date**	12/02/2020

Competence Statement	
Name	Shifali Guleria
Education	M.Sc. (Environmental Studies and Resource Management), TERI University
Experience	2+ year
Field	Climate Change
Approved Roles	
Team Leader	YES
Validator	YES

Verifier	YES		
Methodology Expert	YES (AMS-I.A., AMS-II.G., AMS-III.A.V., AMS-I.D, ACM0002)		
Local expert	YES		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (1.2, 3.1)		
Reviewed by	Shreya Garg	**Date**	09/07/2020
Approved by	Ashok Gautam	**Date**	09/07/2020

Competence Statement			
Name	Virginia Njeri		
Country	Kenya		
Education	Diploma (Business Management)		
Experience	7 Years		
Field	Administration		
Approved Roles			
Team Leader	No		
Validator	No		
Verifier	No		
Methodology Expert	No		
Local expert	Kenya		
Financial Expert	No		
Technical Reviewer	No		
TA Expert	No		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018
Approved by	Ashok Kumar Gautam	**Date**	01/03/2018

Competence Statement	
Name	Vaishali Vatsa
Education	M.Sc. (Environmental Studies and Resource Management), TERI University
Experience	4 months
Field	Climate Change
Approved Roles	
Team Leader	NO
Validator	Yes
Verifier	Yes
Methodology Expert	NO
Local expert	NO

Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Trainee	NO		
Reviewed by	Shreya Garg	**Date**	30/12/2019
Approved by	Anshika Gupta	**Date**	02/01/2020

Competence Statement			
Name	Kalpana Arora		
Country	India		
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Experience	5.5 Years +		
Field	Waste management, Animal Waste, Environment		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local Expert	NO		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert	YES (TA 13.2 & TA 15.1)		
Reviewed by	Shreya Garg	**Date**	17/01/2019
Approved by	Anshika Gupta	**Date**	18/01/2019

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	PP	GS PDD, Version 02.4	Dated 11/06/2021	PP
2.	PP	GS Passport, Version 03.1	Dated 19/02/2013	PP
3.	GS	GS Transition Annex for PA, Version 2.2	Dated 31/12/2012	PP
4.	TUV Nord	Validation Report Version 01.0	Dated 19/10/2012	PP
5.	GS	GS webpage for the project: https://registry.goldstandard.org/projects/details/1267	Last accessed on 08/10/2021	Others
6.	UN	AMS I.E.-Switch from Non-Renewable Biomass for Thermal Application by the User	Version 4	Others
7.	PP	Preliminary Review feedback	-	PP
8.	PP	Monitoring Report Version 02 (Final version)	Dated 11/10/2021	PP
9.	PP	ER calculations sheet	-	PP
10.	PP	Commissioning certificate	-	PP
11.	PP	Product Specifications of Deenbandhu biogas plant AFPRO	-	PP
12.	PP	Invoices raised by PP covering monitoring period	-	PP
13.	PP	Technical details of project activity	-	PP
14.	CEA	CEA database	Version 11	Others
15.	PP	Forest Resource Assessment Report	2010	PP
16.	PP	Training records for year 2018, 2019 & 2020	-	PP
17.	PP	Breakdown record for the monitoring period	-	PP
18.	Ministry of Health, Kenya	Final Report on Study on Kenya's Energy Demand, Supply and Policy Strategy for Household	-	PP
19.	VVB	ESPL interim Travel Policy	-	ESPL
20.	PP	Baseline survey Report	NA	PP
21.	IPCC	IPCC Guidelines for National Greenhouse Gas Inventories 2.1 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf)	Vol. 2	Others
22.	GS4GG	Principles and Requirements	Version 1.2	Others
23.	GS4GG	GS4GG Activity Requirements	Version 1.3	Others

No.	Author	Title	References to the document	Provider
24.	UNFCCC	PS for PA https://cdm.unfccc.int/Reference/Standards/index.html	Version 3.0	Others
25.	UNFCCC	VVS for PA https://cdm.unfccc.int/Reference/Standards/index.html	Version 3.0	Others
26.	UNFCCC	PCP for PA https://cdm.unfccc.int/Reference/Standards/index.html	Version 3.0	Others
27.	GS	Interim measures released by GS for site visit exemptions	-	Other
28.	PP	Grievance records /Grievance register maintained at plant	-	PP
29.	NA	Interviews with PP during remote audit	13/09/2021-14/09/2021	NA
30.	GS	GS MR template & guidelines to complete it https://www.goldstandard.org/	-	Other
31.	PP	Monitoring Questionnaire	-	PP
32.	GS	Verification Report of third Monitoring period	25/05/2019	Other
33.	UNFCCC	Guidelines: Sampling and surveys for CDM project activities and programmes of activities https://cdm.unfccc.int/Reference/Standards/index.html	Version 4.0	Others
34.	UNFCCC	Standard: Standard for sampling and surveys for CDM project activities and programme of activities https://cdm.unfccc.int/Reference/Standards/index.html	Version 8.0	Others
35.	CDM	Final Verification Report of fourth Monitoring Period	Version 2.0 06/12/2021	ESPL
36.	PP	Co-operation agreement atmosfair and Sustainable Energy Strategies limited	-	Others

Appendix 4. Clarification requests, corrective action requests and forward action requests

CAR: Corrective Action Request
CL: Clarification Request
FAR: Forward Action Request

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	01	**Section no.**	NA	**Date :** 07/09/2021
Description of FAR				
During next verification, VVB is requested to check whether there is any training provided in the verified monitoring period. If still no, PP shall re visit the SD indicator scoring and monitoring plan and VVB shall verify the updating.				
Project participant response				**Date :** 08/10/2021
As stated in the monitoring report in the current fourth Monitoring Period 15 handyman were under training of which 7 became masons and 1 became plumber during the MP.				
Documentation provided by project participant				
List_of_staff_in_2019_and_2020_confidential.pdf				
DOE assessment				**Date:** 12/11/2021
As per the PP's response and the 'list_of_the_staff_in_2019_and_2020_confidential.pdf', there are 7 hanyman who became manson and 1 became plumber out of 15 handyman. Name of the qualified personnel has been verified from the list by the VVB. FAR#01 closed.				

Table 2. CL from this verification

CL ID	01	**Section no.**	E.3.4.4.	**Date :** 07/09/2021
Description of CL				
The sampling plan under section D.4. of the GS4GG MR does not include SDG3.				
Project participant response				**Date :** 08/10/2021
MR is updated.				
Documentation provided by project participant				
Monitoring Report				
DOE assessment				**Date:** 12/11/2019
PP has added the sampling plan under section D.4 of the monitoring report, which is found to be in line with the registered PDD. CL#01 closed.				

Table 3. CAR from this verification

CAR ID	01	**Section no.**	E.3.5.1.	**Date :** 07/09/2021
Description of CAR				
1. Date of first issuance is incomplete on page 2 of the MR.				

2. The value of parameter Ny on page 10 of MR was found to be inconsistent with worksheet titled “Ny MP4”, ER sheet, cell O7. PP shall confirm the final number of Biogas units (total and adjusted) and present it consistently between the ER sheet and MR. PP shall also provide complete database with end user details of all 768 units. 3. The total ERs are inconsistent between the ER sheet and the MR	
Project participant response	**Date :** 08/10/2021
1) Date is adjusted. 2) Formatting of ER sheet is corrected. Values are consistent now. Total numbers of biogas units built until the end of MP4 are 796 which corresponds to an adjusted value of 740 biogas units for MP4. Complete Database is provided. *3)* Formatting of ER sheet is corrected. Values are consistent now.	
Documentation provided by project participant	
Database Kenya Biogas_24092021.xlsx	
DOE assessment	**Date:** 10/11/2021
1. The PP has corrected the date of first issuance on page 1 of MR. 2. The number has been made consistent. PP has also provided the complete database of the biogas and from that the value of Adjusted total number of biogas units deployed until monitoring period y of end users who confirmed that non-renewable biomass is displaced/ substituted is found to be 740 which is now consistent with all the documents. 3. Formatting errors are now corrected by the PP which has made the values consistent between the ER sheet and MR. Thus, CAR#01 is closed.	

CAR ID	02	**Section no.**	E.3.4.4.	**Date :** 07/09/2021
Description of CAR				
1. It is not clear why the sample size has been taken as 50 to check the achieved precision while the monitored number of samples are 52. Please see cell C55, worksheet “Sample size+precision MP3”, ER sheet 2. For Endusers, Rosemary Kiare, there are two entries with same phone number and same geo coordinates are same. How are the biogas units differentiated at such households? (There is another case with name and Samuel Mawarangu). Please see worksheet “Database MP4”, ER sheet. *3.* Internal number for drawing random sample is same for many end users under column N, worksheet “Database MP4”, ER sheet. Please explain				
Project participant response				**Date :** 08/10/2021
1) Number corrected to 52. 2) The two entries were deleted from the database. Calculations were adjusted accordingly. *3)* Column labeling was misleading. Internal number for drawing the sample can be found in column A. Column labeling adjusted accordingly				
Documentation provided by project participant				
Kenya_MP4_CER calculation_28092021.xlsx				
DOE assessment				**Date:** 10/11/2021

1. PP has corrected the sample size of the monitoring survey to 52 in the cell C55 of the worksheet “Sample size+precision MP3”, of the ER sheet and the value of the sample size is found to be consistent in all the documents.
2. Repeated entries have been removed from the database.
3. Column labelling and repeated entries were also corrected by the PP to make the documents consistent with each other.

CAR#02 is closed.

CAR ID	03	**Section no.**	E.3.4.4.	**Date :** 07/09/2021

Description of CAR

As per PDD page 30,
Monitoring shall consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial) to ensure that they are still operating or are replaced by an equivalent in service appliance.
Moreover page 32 says, When biennial inspection is chosen a 95% confidence interval and a 5% margin of error requirement shall be achieved for the sampling parameter.

For parameter DOy, PP has chosen 95/5 confidence precision. And biennial monitoring has been done.

As per general guidelines for SSC CDM methodologies, para 26, to apply these simplified requirements, PAs/CPAs shall not have more than 24 months gap between consecutive surveys, and shall implement their first survey within 24 months of the implementation of the first unit of the PA/CPA.

The last sampling was conducted between 30/01/2019 and 16/02/2019. The current sampling has been conducted between 08/04/2021-30/05/2021. The gap between the two periods is greater than 24 months. PP shall explain how the condition of biennial monitoring has been fulfilled

Project participant response	**Date :** 08/10/2021

PP confirms that the chosen monitoring frequency for this monitoring period was according to the applied methodology AMS-I.E vers.04 para 12: ”at least once every two years (biennial)”.
In accordance with the registered PDD and the CDM methodology AMS-I.E vers.04 §17 the chosen confidence interval/margin of error 95/5 was applied. PP confirms that regular requirements for biennial sampling were applied. PP did not apply simplified requirements as per general guidelines for SSC CDM methodologies, para 26 for this Monitoring Period, since none of the simplifications described in §27-31 was applied, but a regular monitoring survey was conducted for the specific Monitoring Period.
PP also confirms that the 2-year monitoring periods of the project were consecutive: MP3: 31 Dec 2016 - 30 Dec 2018 and MP4: 31 Dec 2018 - 30 Dec 2020. The monitoring surveys have been conducted in 2019 and 2021. This is in accordance with the applied CDM methodology AMS-I.E vers.04 §12, which requests monitoring ”at least once every two years (biennial)”. PP therefore considers the condition of biennial monitoring as fulfilled.
According to the approved Monitoring Plan in the registered PDD: “In general (under normal circumstances), measurements will be conducted at last 6 months after the end of the specific monitoring period. Therefore: In general (under normal circumstances), the measurement will be conducted at last 12 + 6 months after the start of the specific monitoring period (annual monitoring) or at least 24 + 6 months after the start of the specific monitoring period if biennial inspection is chosen.”
According to the approved Monitoring Plan in the registered PDD, sampling can only take place after the end of the monitoring period. “The sampling frame is the list containing all biogas units which are deployed up to the specific monitoring period.” The measurements (survey) for this

monitoring period has been conducted 24 + 6 months after the start of the specific monitoring period. Therefore, as requested by the VVS §361d, PP confirms that monitoring results have been consistently recorded as per the approved frequency.
Documentation provided by project participant
NA
DOE assessment **Date:**10/11/2021
PP has provided the explanation for the gap between the two survey dates. The results have been applied only to a period of 2 years in line with the set frequency. Thus CAR#03 is closed.

CAR ID	04	**Section no.**	NA	**Date :** 07/09/2021
Description of CAR				
The latest version of the sampling standard is version 9.0. However, PP has applied version 8.0. The latest version of the sampling standard, which para 12(ii)(b), precision 10% is standard, and when the parameter of interest is a proportion, the target proportion (p) +10 per cent of the target proportion (0.1p), in relative terms, shall remain below 1 in the sample size calculation, as the proportion scale cannot exceed 1. PP shall explain how this condition has been met.				
Project participant response				**Date :** 08/10/2021
The latest version of the standard was released on 27th May 2021 while the monitoring was started on 08th April 2021. The latest available version of the standard was used for sampling. Nonetheless, the referred para is for the cases where applied precision is 10%. For this PA, the PP has applied 5% precision, and the expected proportion was decided based on the past monitoring results.				
Documentation provided by project participant				
NA				
DOE assessment				**Date:** 10/11/2021
The justification provided by the PP was found to be sufficient. Thus, the CAR is closed.				

CAR ID	05	**Section no.**	E.3.4.2	**Date :** 07/09/2021
Description of CAR				
The monitoring resulted in 100% value of DOy. PP shall explain the obtained value.				
Project participant response				**Date :** 08/10/2021
We prevent the plants from not running as desired by really taking a lot of time with the sale. SES visits each construction site several times and explains to the users in detail how they should use their biogas plant. Atmosfair and SES have created an illustrated manual especially for this purpose, on which the use of the biogas plant is very clearly illustrated and, as you can see, the telephone numbers of both SES and atmosfair are printed. When selling, SES staff clearly emphasize that feeding the plant is the be-all and end-all. This effectively prevents problems (as one also knows from health sector). With the biogas plants, we are building a kind of community; most of our plants are sold by word of mouth. This also means that the new users usually know other users (neighbors/family/friends) and help each other when the plant does not produce the expected amount				

of gas. The most common reason is under- or overfeeding, what can be solved very easily by adjusting the feeding habits and production of gas starts again at the usual rate. When SES comes by, the staff sometimes finds out that there was a problem with the gas production and that the problem was solved in communication with the other users. The exchange with other users is particularly good, because these are the people who have the most experience in using the system and can therefore give particularly good tips. Because this remedy is so decentralized in the community, there is no organized record of these support cases. However, all in all miss functioning cases are really rare as SES prevents them by emphasizing the importance of feeding and by distributing the colored manual.
Documentation provided by project participant
NA
DOE assessment **Date:** 10/11/2021
The PP engaged the end users in maintenance of the biogas units. Moreover, the user manuals are provided to the end users for better usage of the unit. The manual also has a contact number in case any problem with the unit happens. The PP clarified that no complaints/problems were registered during the current MP. Thus, the applied value was found to be correct. Moreover, the value was checked with acceptance sampling as explained in the VCR(section E.6.2) above. The justification provided by the PP was found to be sufficient. Thus, the CAR is closed.

Table 4. FAR from this verification

~~**FAR ID**~~		~~**Section No.**~~		~~**Date :** DD/MM/YYYY~~
~~**Description of FAR**~~				
~~**Project participant response**~~				~~**Date :** DD/MM/YYYY~~
~~**Documentation provided by project participant**~~				
~~**DOE assessment**~~				~~**Date:** DD/MM/YYYY~~

e.g., there is no FAR from this verification.