

**Validation report for the GS4GG Design Certification Renewal
of a Voluntary Project Activity**



BASIC INFORMATION

Title and GS ID of the programme of activities (PoA)	“African Biogas Carbon Programme (ABC) PoA” GS ID 2747		
Version number and completion date of the validation report	21.0 1821/086/2024		
Validation report ID	TÜV NORD CERT, P-No.: 8003061184 – 23/081		
Version numbers of PoA-DD, to which this report applies	9.2		
Title and GS reference number of each VPA for renewal	VPA GS ID:	Title	
	5801	“African Biogas Carbon Programme (ABC) - Kenya – VPA006”	
Sectoral scopes for each VPA	VPA GS ID:	Sectoral scopes (indicate mandatory and conditional sectoral scopes)	
	5801	13/13.2 (conditional scopes: N/A)	
Applied methodologies and standardized baselines for each VPA	VPA GS ID:	Applied methodologies and standardized baselines (if any)	
	5801	“Methodology for animal manure management and biogas use for thermal energy generation”, v1.1 Applied standardized baseline: N/A	
Number and duration of the next crediting period (CP)	VPA GS ID:	No. of CP	Duration of the CP:
	5801	2	14/03/2024 – 13/03/2031 (incl. both dates)
Coordinating/managing entity (CME)	Africa Bioenergy Programs Ltd.		
Host Party(s)	The Republic of Kenya		
Estimated amount of annual average greenhouse gas (GHG) emission reductions or GHG removals by sinks in the next crediting period, per VPA	VPA GS ID:	Annual emission reductions or removals (tCO ₂ e)	
	5801	57,870632	
Name and UNFCCC ID of the VVB	TÜV NORD CERT GmbH (E-0022)		
Name, position and signature of the approver of the validation report	 Digital unterschrieben von Kröger Anna Anna Kröger Deputy Head of CP “JI/CDM” bv TN CERT GmbH		

SECTION A. Executive summary

The Africa Bioenergy Programs Limited (ABPL) has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Gold Standard Design Certification Renewal (DCR) / re-validation for the voluntary project activity **“African Biogas Carbon Programme (ABC) - Kenya - VPA006” (GS ID 5801)**, with regard to the relevant requirements and procedures for GS Programme of Activities (PoA) / Voluntary Project Activities (VPA)..

The VPA was design certified on 14/03/2019 and included under the “African Biogas Carbon Programme (ABC) PoA” (cf. GS ID 2747). During the first crediting period, the VPA has been verified as follows:

Monitoring period	Duration	Verified Emission Reductions, tCO ₂ e	Status
# 1	14/03/2017 – 28/02/2019	10,921	approved / issued
# 2	01/03/2019 – 30/04/2020	13,926	approved / issued
# 3	01/05/2020 – 30/04/2021	13,834	approved / issued
# 4	01/05/2021 – 30/04/2022	14,733	approved / issued
#5	01/05/2022 – 31/03/2023	(14,525)	under performance review / assessment

The start date of the VPA is 23/10/2015. The first crediting period started on 15/03/2017 and ended on 14/03/2024. The second crediting period is being validated based on the updated PoA-DD, v9.2, dated 14/09/2023, and based on the GS baseline and monitoring methodology “*Methodology for Animal Manure Management and Biogas Use for Thermal Energy Generation*” v.1.1.

The objective of the VPA is to contribute to the Sustainable Development Goals (SDGs) through the dissemination of domestic biogas systems as a local, sustainable energy source and the development of a commercially viable, market-oriented biogas sector. The goal of the programme is to improve the livelihoods and quality of life of rural and peri-urban farmers in Kenya through utilizing the market and non-market benefits of domestic biogas.

The project activity involves the installation of different biodigester types with useful lifetimes ranging between 7 and 35 years ^{/TECH/}.

The biodigester sizes are 4 m³, 6 m³, 8 m³, 10 m³ and 12 m³ in volume. The average thermal capacity of digesters approximately 10,546 units installed and in operation is 43.128 kWh_{th}, which is below the small-scale thermal threshold of 45 MWh_{th}. For further information, please see Section A.3 of the VPA-DD.

Kenya Biogas Program (KBP) founded by Africa Bioenergy Programs Limited is the VPA implementer responsible for coordinating, facilitating, and monitoring sector functions and supporting the technical, financial and institutional architecture necessary for development of the domestic biogas sector in Kenya.

A.1: Objective

The objective of this validation is the review by an independent entity whether the project is compliant with the applicable sections of:

- the Gold Standard for the Global Goals PoA Requirements and Procedures,
- the GS4GG Principles and Requirements,
- the GS4GG Safeguarding Principles & Requirements,
- the GS4GG Community Services Activity Requirements,
- the GS4GG GHG Emission Reductions & Sequestration Project Requirements,
- Gold Standard Gender Equality Guidelines and Requirements,
- the applied GS Methodology,
- other relevant rules, including the host country legislation.

A.2: Scope of Validation

As per the requirements of the Gold Standard for the Global Goals Principles and Requirements^{/PR/}, a desk review and a remote audit have been conducted to verify the data submitted in the VPA-DD.

TÜV NORD CERT confirms that the validation is based on:

- the updated GS VPA-DD^{/VPA-DD/},
- the updated GS PoA-DD^{/PoA-DD/},
- the emission reduction calculation and fNRB spreadsheets^{/XLS/},
- Baseline Survey
- the SDG Monitoring Survey^{/SMS/},
- referred publicly available information/data
- further supporting documents made available to the validator as well as information collected through performing remote site interviews.

Details of the project location are given in table A-1 below:

Table A: Project Location

No.	Office Location
Host Country	The Republic of Kenya
Region:	The Republic of Kenya
Latitude:	1°17'19" S
Longitude:	36°47'0.999 E

SECTION B. Validation team, technical reviewer and approver**B.1. Validation 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 review	On-site inspection	Interviews	Validation findings
1.	Team Leader & Validator	IR	Winter	Stefan	TN CERT GmbH	x	-	-	-
2.	Technical Expert ¹	EI	Lubanga	David	-	x	-	x	x
3.	Host Country Expert, Trainee	EI	Mwikali	Joyce Mbuyta	-	x	x	x	x

B.2. Technical reviewer and approver of the validation report for RCP

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 review/Technical Expert	EI	Abarca	Víctor	TN Mexico
2.	Technical reviewer / GS listed auditor	IR	Nuske	Alexandra	TN CERT

¹ Assessment team member until 30/10/2023

3.	Technical reviewer /Approver	IR	Kröger	Anna	TN CERT
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SECTION C. Means of validation

C.1. Desk/document review

During the desk review all documents initially provided by the client and publicly available documents relevant for the validation were reviewed. The main documents are listed below:

- the last revision of the PoA-DD^{/POA-DD/},
- the last revision of the PoA validation report^{/POA-VAL/},
- draft version of the VPA-DD^{/VPA-DD/},
- draft version of the emission reduction and fNRB calculation spreadsheets^{/XLS/},
- the Baseline Survey,
- the latest verification documents^{/VER/}.

Other supporting documents, such as publicly available information on the GS and SustainCERT websites and background information were also reviewed.

C.2. On-site inspection

The audit event within the validation process was planned in accordance with the guidance provided in the GS "Site Visit and Remote Audit Requirements and Procedures", v2.0. ^{/Audit/} In particular, those requirements for audits, using remote audit techniques as well as the corresponding procedure and guidelines were taken into consideration.

At the beginning of the validation the TL has assessed the nature, scale and complexity of the tasks by carrying out a strategic analysis of all activities relevant to the assessment work. According chapter 3, see para 3.2.1. there ^{/Audit/}: "...a physical site visit by VVB is not mandatory at the validation, i.e. Design (change) Certification or Design Certification Renewal of the project". A minimum physical site visit is (also) not mandated as per GS4GG requirements^{/Site visit/} and not required / recommended as per VVB's previous audit findings. Further qualifying criteria (cf. para 6.3.1^{/Audit/}) for initiating a remote assessment were fully fulfilled. Thus, carrying out validation audit applying remote assessment approach is a feasible option in this particular case, here: voluntary project activity (VPA) seeking design certification renewal.

A detailed audit plan has been prepared and submitted to the project participant(s) in due time before the agreed date of remote audit. It lists activities, areas, information and personnel to be involved/interviewed in the remote assessment. The audit event was basically carried out as per the audit plan. All used audit techniques have been reported accordingly. For further details please refer to the subsequent sections of this Report.

Duration of on-site inspection:				
#	Activity performed on-site	Site location	Date	Team member
1.	Not applicable			
...				

C.3. Interviews

No.	Activity performed	Site/location	Date	Team member
1.	Opening Meeting: interviews with the ABPL	remote	09/10/2023	David Lubanga Joyce Mwikali
2.	Interviewing sampled Farmers	remote	17/10/2023- 18/10/2023	Joyce Mwikali

3	Interviewing sampled Farmers	remote	14/11/2023-15/11/2023	Joyce Mwikali
4	Closing meeting Remote site visit findings	remote	08/11/2023 ²	Joyce Mwikali

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Buysman	Eric	Carbon consultant	09/10/2023	Opening Meeting: introductions, confidentiality, validation scope, management system, document review, , going through the VPADD, calculations and clarification in the findings report, biodigester specifications	David Lubanga Joyce Mwikali
2.	Wahome	Salome	Operations-ABPL			
3.	Kinusu	Kevin	CEO –KBP			
4.	Wasonga	Michael	KBP			
5.	Gitonga	Peter	KBP			
6.	Gichana	Isaiah	KBP			
7.	Ochieng	Eric	Enumerator	17/10/2023	BFT survey interview	Joyce Mwikali
8.	Waweru	synthia	Enumerator	17/10/2023	BFT survey interview	Joyce Mwikali

Interviews /IM/02

List of End Users interviewed ³		
No.	Name	Location
1.	Njoroge Grace Wanjiku	Nakuru county, Bahati
2.	Kamau Samuel	Muranga county, Gatanga
3.	Beatrice Wangui	Kiambu county, Githunguri
4	Ndung'u Robert	Nyeri county, Kieni
5.	Gladness Wakesho	Taita Taveta, Wudanyi
6.	Magaret Nyawira	Nakuru, Bahati-Dundori
7	Joyce Jeruto	Nakuru-Rongai
8.	Peter Mbugua	Kiambu county
9.	Peter Wachira Kimani	Nyandarua county, Ndaragua

² Remote calls were repeated on 14th Nov and 15th Nov which was after the closing meeting since as there was a mix up of samples shared by the PP whereby the data used was only from baseline survey(2021)and not KPT(2023)

³ Same as VPA01 end users since it is the same host country and baseline

10.	Beatrice Muthoni Mugweru	Nakuru county,Gachura
11.	Harriet Wambui	Laikipia county, Melwa
12.	Zechariah Mogunde Onsando	Kisii county
13.	Cletus Kimutai Kipkorir	Uasin Gishu county
14.	Samuel Kinyanjui Nguuro	Kiambu county, Limuru
15.	Wafugwa Alex	Bungoma county, Kimilili
16.	Peninah Wanja Kungu	Nakuru county,Ngata
17.	Roy Maina (For Jedida Wamuyu Ndanu)	Kirinyaga county, Kanyekini
18.	Hannah Waithaka	Kajiado conty, Loitoktok-kwa maji
19.	Bornice Soy	Bomet county
20.	Peter Wambua Masila	Kajiado county,Loitoktok
21.	Walter Njuguna	Kiambu county, Mwamuto-Kabete
22.	Zakayo Kiprotich	Baringo county
23.	Berita Rashid Emacar	Busia county
24.	Everline Korir	Nandi county,Kapsabet
25.	Jackline Rono	Bomet county, Longisa
26.	Ephantus Nyaga Karanja	Embu county, Kianyaga
27.	Nancy Towett	Bomet county, Longisa
28.	Priscilla Mutregi	Kiambu county, Membley
29.	Teresiah Sigilai	Nakuru county, Rongai
30.	Beatrice Wanjiru	Kiambu county
31.	Emily Mose	Trans-Nzoia county, Chepkaos

C.4. Sampling approach

The Validation Team (VT) followed the “Standard for Sampling and Surveys for Gold Standard Voluntary Project Activities and Programme Activities” v9.0, para 29 to 32 for taking sample out of the PP's sample. Due to the large number of baseline participants, the validation team has adopted the acceptance sampling approach (AS) in accordance with paragraph 29, 30, 31 to 32 of the Sampling Standard. VT invoked provisions of the para 32 of the applied standard to apply the producer risk and consumer risk as below: The team considered an AQL 1% and UQL 15%, Producer risk of 10% and consumer risk of 10% for determination of the sample size for site assessment.

AQL	1%
UQL	15%
Producer risk	10%
Consumer risk	10%
Sample size	25
Acceptance Number	1
Total samples covered	31

Considering the above reference under applied sampling standard, the VVB should verify 25 samples under this approach with acceptance (c) number 1. The validation Team has contacted a total of 31 farmers (over sample) selected randomly from PP sample using Excel randomizer. All the farmers confirmed that a survey was conducted and their baseline fuels and technologies were as reported in the baseline survey results. No inconsistency was recorded. The values are also valid for VPA01 as they share the same baseline characteristics and the host country.

Questions for BFT survey participants on virtual site visit
• What stove and fuels do you currently use for cooking? • Did anyone /people visit from EcoFrontiers to conduct a survey on type of stove and fuel consumption? • If yes, do you remember when it was? • Briefly explain how they did the survey. What questions were asked. • How many days was the survey? • Was your fuel weighed? Briefly explain the procedure and how many days it took to monitor your fuel consumption. • How much of the fuel (charcoal/fuel wood) do you use per day? • What are some of the challenges you face using the baseline technology /fuel.
Questions for Baseline survey participants on virtual site visit
• What animal types do you own. How many? • Do you practice zero grazing or are animals taken out to the fields to graze? • How were you disposing of the manure prior to installing a biodigester? • Was all manure applied in the fields, or what other uses? • How do you use the bioslurry (coming out of the biodigester)? • Do you apply all the bioslurry in the field as fertilizer? Directly or dried out first. • What would you say are the benefits of using the bioslurry • Was a survey carried out to find out how you treated manure before, and how you use the bioslurry. If yes, do you remember when?

C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Area of validation findings (SECTION D)	No. of CL	No. of CAR	No. of FAR
VPAs to be renewed and corresponding generic VPAs	0	0	0
Compliance with VPA-DD form	1	0	0
Application and selection of methodologies and standardized baselines	0	0	0
Validity of original baseline or its update	1	0	1

Project Boundary	0	0	0
Demonstration of eligibility of the VPAs	0	1	0
Estimated emission reductions or net anthropogenic removals	0	0	0
Validity of monitoring plan	0	1	0
Monitoring parameters	0	0	0
Crediting period	0	0	0
CME and project participants	0	0	0
Total	2	2	1

SECTION D. Validation findings

D.1. VPAs to be renewed and corresponding generic CPAs

Title and GS reference number of the VPA	Version number of the VPA-DD	Host Party	Version number of the PoA-DD on which the DCR is based
"African Biogas Carbon Programme (ABC) – Kenya –VPA006" (GS ID 5801)	1.2	Kenya	9.2

D.2. Compliance with VPA-DD form

Means of validation	The VPA-DD applies the correct version 1.1 of the GS VPA-DD form. All sections are completed as required by the VPA-DD template guideline. The validation team (VT) can confirm that the information transferred from the registered VPA-DD is materially the same. The following sources of information have been used in this context: • /CPA-DD/ • /VPA-DD-T/ • /PoA-DD/ • /gs/ • /VVS/		
Findings	☒	The latest reporting template VPA-DD-FORM as listed on the GS website has been used for the VPA-DD.	
	☐	The latest instructions for filling out the VPA-DD have been followed. No adverse finding has been identified in the course of this validation.	
	☒	The respective requirements have widely been complied with. However in this context the following CARs, CLs, FARs have been raised:	
		- CL 01	
Conclusion	☐	No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.	
	☒	The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.	
		The validation team has checked all sections of the VPA-DD and confirms by comparing the VPA-DD that the standardized GS VPA-DD template has been correctly applied.	

D.3. Application and selection of methodologies and standardized baselines

Means of validation	The updated VPA-DD complies with the revised GS methodology <i>Methodology for Animal Manure Management and Biogas Use for Thermal Energy Generation v.1.1</i>, which is in line with the updated PoA-DD. All applicability conditions of the applied methodology have been met and the VPA design is in line with all requirements and stipulations mentioned in all sections of the applied methodology. Besides, the VPA design is not expected to result in significant emissions related both to project and leakage, other than those listed in the methodology.			
	No.	Applicability Condition	Applicability	VVB assessment
	1.	This methodology applies only to the fraction of the manure which would decay anaerobically in the absence of	The ER calculations are based on fraction of manure that would	MS% _{BIj} is established ex-ante and applied in the estimation of

		the project activity, which is established by a survey	decay anaerobically in absence of the project activity and this is captured in parameter BGTA 12 and BGTA 8	emission reductions from the improved AWMS. The value will be updated via surveys as part of the first verification (FAR 01). The applicability condition is therefore met
	2.	The methodology offers two methods for baseline emission quantification from AWMS. a. AWMS method 1 - IPCC Tier 1 approach, b. AWMS method 2 - IPCC Tier 2 approach	The VPA targets household farms and therefore Tier 1 is applied.	The VPA-DD targets small-holder farmers. The VT checked the baseline emission quantification and confirms that Tier 1 method has been applied in the VPA-DD. The applicability condition is therefore met
	3.	The methodology is applicable under the following conditions when applying AWMS method 1: a. The category is limited to measures at individual households, small farms (e.g., installation of a domestic biogas digester) or livestock farms or institutional settings. b. The activity shall ensure that: i. The digestate must be handled aerobically. In soil application of the final digestate, proper conditions and procedures (resulting in negligible methane emissions) must be ensured. ii. The biogas captured from the biogas digesters is utilised (e.g., combusted or burnt for thermal applications).	a) biogas digesters are installed at individual households, small farms (e.g., installation of a domestic biogas digester) or livestock farms or institutional settings b) The activity ensures that: i. Digestate is a potent organic fertilizer and used by the vast majority of the households as fertilizer. Households are encouraged to compost the digestate in case storage is necessary. Both systems are aerobic, see parameter BGTA 33 where this is monitored. ii. All biogas digesters sold include a biogas stove to ensure effective and efficient use of gas for cooking	The VT confirms through assessing the baseline data, the BFT data and the validation calls that the biogas digesters are installed in individual households and small farms. The applicability condition is therefore met
	4.	The methodology is applicable under the following conditions when applying AWMS method 2: a. The livestock population in the farm is managed fully or partly under confined conditions; b. Manure or the streams obtained after treatment are not discharged into natural water resources (e.g., river or estuaries); c. The annual average temperature of baseline site where anaerobic manure treatment facility is located is higher than 5°C; d. In the baseline scenario, the	This VPA applies Tier 1 for household scale digesters. However, in case larger units are added for which method 2 is to be applied, the following conditions will be met: a. As per BGTA 8: there is a mix of AWMS, but all farmers have livestock that are managed fully or partly confined population. b. Bio-slurry is considered a valuable fertilizer, and discharge to natural water resources is	The VT confirms that this VPA has applied Tier 1 method of quantification by crosschecking the applied methodology against the ER calculations. Therefore, this condition is not applicable.

		retention time of manure waste in the anaerobic treatment system is greater than one month, and if anaerobic lagoons are used in the baseline, their depths are at least 1 m; e. The baseline scenario should not involve methane recovery and destruction by flaring or combustion for gainful use. f. The storage time of the manure after removal from the animal barns, including transportation, should not exceed 45 days before being fed into the anaerobic digester. If the project developer can demonstrate that the dry matter content of the manure when removed from the animal barns is larger than 20%, this time constraint will not apply. g. A technical measure to ensure that the gas holding capacity of the biodigester is sufficiently large to capture the biogas during periods of non-usage. A justification to demonstrate compliance with this requirement pertaining to the biogas digester size shall be included in the Project Design Documentation (PDD)	therefore unlikely. Usage of bio-slurry is monitored under SDG2 including an examination of its usage. c. See BGTA 12, the annual average temperature is much higher than 5 d. The typical retention time is around 40 days. However, in case Tier 2 is applied, this will be justified in the MR. e. The baseline scenario is the situation prior to biodigester. Thus flaring is not possible, see BGTA 12 for the baseline scenario f. The period will be monitored in case Tier 2 is applied. g. For larger units, a technical measure to ensure that the gas holder capacity is sufficiently large will be demonstrated (Tier 2 only)	
	5.	The activity is implemented by a project developer and can include additional project participants listed in Appendix 2 of the PDD template. The individual households may be represented collectively by community organisations, etc., but do not individually act as project participants	The VPA is implemented by KBP, the project developer. There are no additional participants.	The Validation Team confirms that KBP is the project developer per agreement with the CME//, and there is no other project participant. The applicability condition is therefore met
	6.	The developer must design incentive mechanism(s), which should be effective as fast as possible, for the displacing the use of inefficient baseline stoves or cooking practices by the project cooking devices for daily usage and describe the incentive mechanism(s) in the PDD/VPA-DD at the time of validation	The VPA implementer has set up an elaborative system to ensure that biodigesters are used effectively. This includes: - Households trainings on biogas and bio-slurry use - Warranty of 1 year for technical issues (if identified, these are repaid at cost) - 100% of newly constructed plants are called by the client support center to ensure biodigesters are installed properly - Mandatory after sales physical visits by biodigester construction company to rectify potential issues and ensure proper use of biogas and bio-slurry - Grievance	The VT checked the warranty sample ^{WR/} which contains clause on ER claims ownership and training records provided by the CME. The CME has set up a grievance mechanism for farmers to report in case of any grievances as in the reviewed VPA-DD. The applicability condition is therefore met

			mechanism has been set-up for households to report issues		
	7.	To avoid double counting or double claiming, the project developer must: a. clearly communicate its ownership rights and intention of claiming the emission reductions resulting from the project activity to the following parties by contract or clear written assertions in the transaction paperwork: all other project participants; project technology manufacturers; and retailers of the project technology; and b. inform and notify the end users that they cannot claim emission reductions from the project, and c. exclude from the project activity, any biodigester and cookstoves that are included in any other voluntary market or CDM or Article 6 based mechanisms project activity/PoA and strive not to displace the cooking devices of another CDM or voluntary project/PoA. See data and parameters not monitored (section 3.11), Avoidance of double counting or double claiming with other mitigation actions (BGTA 2), for details on this demonstration.	a. Captured in parameter BGTA1. b. End users of a biodigester are informed and notified that they cannot claim emission reductions. This is a standard clause in the warranty certificate. The certificates are retained at the household and digital copies are available in the data management system used called Salesforce. c. Captured in parameter BGTA 2	The VT checked the signed declaration by KBP and a signed agreement between the CME and KBP// . The CME also provided a warranty certificate sample signed by the end user and technology providers. The applicability condition is therefore met.	
	The following sources of information have been used in this context: • /VPA-DD/ • /PoA-DD/ • /IM01/ • /Meth/ • /gs/ • /WR/				
	Findings	☒	The applicability criteria of the applied methodology are met.		
		☒	The respective requirements have widely been complied with. However in this context the following CARs, CLs, FARs have been raised:		
Conclusion	☒	No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.			
	☐	The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.			
	The validation Team confirms that the selected baseline and monitoring methodology is approved by the Gold Standard and is the applicable version at validation. No standardized bseline is applied.				

D.4. Validity of original baseline or its update

Means of validation	There are two baselines within the context of the project activity, as defined by the applied methodology: - AWMS: The baseline scenario is the situation where, in the absence of the project activity, animal manure is left to decay anaerobically within the project boundary and methane is emitted to the atmosphere. Thermal Application: The baseline is the fuel consumption of the thermal application used or that would have been used in the absence of the project activity times an emission factor for the fossil fuel and non-renewable biomass displaced.
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Some of the data and parameters used for determining the original baseline, as determined ex ante are no longer valid. The CME has accordingly updated such data and parameters in accordance with applicable requirements of the new methodology, the CSA and the GS VVS requirements.

The fraction of waste or raw materials that would decay anaerobically in the absence of the project activity is determined in the baseline survey (Parameter BGTA 5).

The baseline survey shall be conducted with a sample group of households/small farms with a 90% confidence interval and 10% margin of error. Refer to section 4.3.3 for minimum sample size for each baseline scenario.

In line with Section 4.3.3 of the applied methodology, the baseline survey should be carried out for each baseline scenario using representative and random sampling, following these guidelines for minimum sample size:

Group Size	Minimum sample size
< 300	30 or population size, whichever is smaller
300 to 1000	10% of group size
>1000	100

A baseline survey on non-project HHs was carried out from November 2021 to 16/11/2021 and KPT conducted from 09/07/2023 to 31/07/2023 for each baseline scenario in the project area for the design certification renewal in line with the requirements of the applied methodology for animal waste management and and biogas application.

Two thermal application baselines were identified as follows;

1. Firewood
2. Charcoal

The VT carried out a remote validation from 17/11/2023 to 18/10/2023 and from 14/11/2023 to 15/11/2023. A total of 31 farmers were selected randomly from the PP sample using excel randomizer.

The following are the ex-ante fixed parameters for the crediting period and will only be re-assessed at design certification renewal, as outlined in Section B.6.2 of the VPA-DD: -

Parameter	Value	Unit	Justification
BGTA 1: Avoidance of double counting or double claiming among project participants.	-	-	Appropriateness of the value: N/A Purpose of the parameter: Calculation of project outcome Supporting Document: warranty certificates Conclusion: VT checked signed sample warranty certificates and confirms that the warranty certificate contains a clause of ownership rights and intentions to sell emissions resulting from the project activity are transferred to the VPA

				implementer.
	BGTA 2: Avoidance of double counting or double claiming with other mitigation actions.	-	-	Appropriateness of the value: N/A Purpose of the parameter: Avoidance of double counting Supporting Document: UNFCCC; GS, Verra, GCC and other standards Conclusion: As per the methodology, this VPA has already been included with validated design and there is no review required as the parameter is undertaken at the time of VPA inclusion review.
	BGTA 3: Regulatory framework for provision of animal waste management and thermal energy services.	-	-	Appropriateness of the value: The PP has demonstrated that the project is voluntary, and does not undermine or conflict with any National, subnational or local regulations as per GS requirements. Purpose of the parameter: calculation of baseline scenario Supporting Document: Not Applicable Conclusion: The VT cross checked the draft National Energy policy 2019 pdf and confirms that the Project is in support of the policy and therefore does not undermine or conflict with any National energy policy or regulations.
	BGTA 4: Project technology description	-	-	Appropriateness of the value: The PP has provided a detailed description of the project of the biodigester and the biogas stove and a manual have been provided to the VT. Purpose of the parameter: calculation of project outcome Supporting Document: Biodigester manual Conclusion: The VT confirms that the project description provided by the PP is sufficient as per the GS requirements and the applied technology.
	BGTA 5: Expected technical life of project technology.	Various models (7-35)	years	Appropriateness of the value: This value has been obtained from a reliable literature and technical specifications^{TECH/} source as required by the methodology. Purpose of the parameter: Calculation of project outcome. Supporting Document: FAO BEFS Rapid Appraisal – Biogas Community Component p8 Conclusion:

				The VT reviewed the literature source provided and confirmed that the source is authentic the value applied by PP is in line with the source.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	BGTA 6: Baseline scenario survey results			-	Appropriateness of the value: The values have been obtained from a baseline survey as per the GS requirements and applied methodology. Purpose of the parameter: Calculation of baseline scenario Supporting Document: ER spreadsheet VPA006 CPII SDG database sheet BGTA6 Conclusion: The VT confirms that the PP conducted a baseline scenario survey in 2021 in line with the applied methodology and GS methodology. This was further confirmed through the remote validation calls to the farmers																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	BGTA 7: GWP _{CH4}	28		tCO _{2e} per tCH ₄	Appropriateness of the value: This value has been obtained from IPCC as per the applied methodology. Purpose of the parameter: Calculation of baseline scenario and project scenario Supporting Document: IPCC AR5 report Conclusion: The VT cross checked applied methodology and confirms the value given for the IPCC AR5 is 28 and that the value applied has been correctly applied in line with the methodology.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	BGTA 37.5: CC	4		Wood to charcoal conversion factor	Appropriateness of the value: VT checked Tool 33 Methodological tool: Default values for common parameters v 2.0 and confirmed the value applied is correct. Purpose of the parameter: calculation of project scenario Supporting Document; CDM Tool 33 Methodological tool: Default values for common parameters v 2.0. Conclusion: The default value applied is correct and valid.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	BGTA 48: MS% _{BLJ}	Ex-ante, will be updated for the first verification, see additional comments			%	Appropriateness of the value: Baseline survey results in SDG database spreadsheet were checked for correctness against baseline underlying filled survey forms. Calculations were checked in SDG spreadsheet by validation team for correct formulas and accurate calculation of values applied. VT confirms that survey results match data collected in survey forms and correct formulas are																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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		liqui d/slur ry	9 %	1 %	12 %	10 %	3%	4 %	2 %	applied in the calculation of the parameter values in the SDG spreadsheet. VT thus confirms that the values determined are correct and valid.			
		solid stor age	28 %	23 %	46 %	52 %	31 %	36 %	31 %				
		dry lot	9 %	4 %	22 %	15 %	4%	6 %	11 %				
		daily spre ad	16 %	4 %	13 %	16 %	7%	16 %	14 %				
		Past ure	9 %	40 %	0%	0%	34 %	20 %	21 %				
		burn ed as fuel	0 %	0 %	0%	0%	0%	0 %	0 %				
		com posti ng passi ve wind row	1 %	21 %	4%	3%	4%	6 %	8 %				
		anot her way	8 %	3 %	0%	0%	19 %	3 %	9 %				
	BGTA 59: EF _{LT}			D a i r y c o w	O t h e r c a t t l e	Gro wing swin e	Bree ding swin e	S h e e p	Go at		Po ult ry	kgCH ₄ per animal per year for livestoc k type LT	Appropriateness of the value: IPCC 2019 volume 4, chapter 10 table 10.14 has been checked and confirmed that the default values applied is correct. Purpose of the parameter: Calculation of baseline scenario Supporting Document: IPCC 2019 volume 4, chapter 10 table 10.14. Conclusion: The values have been correctly obtained and applied in calculation of baseline scenario in line with the methodology.
			Unco vere d Anaer obic lagoo n	66 20	66 20	147.7 0	147.7 0	66 20	66 20		19 8.6 0		
		liquid /slurr y pit > 1 mont h	51 40	51 40	114.6 0	114.6 0	37 45	37 45	15 4.2 0				
		solid stora ge	44 00	44 00	9.70	9.70	44 00	4.4 0	13. 10				
		dry lot	17 00	17 00	3.90	3.90	17 00	1.7 0	5.2 0				
		daily spre ad	09 00	09 00	1.90	1.90	08 77	0.8 77	1.6 1				
		Past ure	04 11	04 11	0.91	0.91	04 11	0.4 11	0.7 6				
		burn ed as fuel	87 00	87 00	19.40	19.40	87 11	8.7 11	2.6 0				
		comp ostin g passi ve windr ow	21 88	21 88	4.86	4.86	21 88	2.1 88	4.0 2				
		anot her way	09 00	09 00	1.90	1.90	04 11	0.4 11	2.4 0				
BGTA 610: VS _{rate,LT}			Dairy cow	15.2							kg VS / (1000 kg		Appropriateness of the value: The PP has applied default
			Other cattle	12.7									
			Swine	9.40									

		<table><tr><td>finishing</td><td></td></tr><tr><td>Swine breeding</td><td>6.00</td></tr><tr><td>Sheep</td><td>8.30</td></tr><tr><td>Goat</td><td>10.40</td></tr><tr><td>Poultry</td><td>13.00</td></tr></table>	finishing		Swine breeding	6.00	Sheep	8.30	Goat	10.40	Poultry	13.00	animal mass) / day	values from Table 10.13A of the IPCC 2019 Refinement values. Purpose of the parameter: Calculation of baseline scenario Supporting Document: 2019 IPCC guidelines for National Greenhouse Gas Inventories (kg VS / (1000 kg animal mass) / day) Conclusion: The default values have been correctly obtained from IPCC source and applied correctly in calculating the baseline scenario in line with the methodology..The VT confirmed this by cross-checking the applied methodology.			
	finishing																
	Swine breeding	6.00															
	Sheep	8.30															
Goat	10.40																
Poultry	13.00																
BGTA 10a: $v_{S,LT}$	<table><tr><td>Dairy cow</td><td>4.104</td></tr><tr><td>Other cattle</td><td>2.642</td></tr><tr><td>Swine finishing</td><td>0.310</td></tr><tr><td>Breeding swine</td><td>0.366</td></tr><tr><td>Sheep</td><td>0.257</td></tr><tr><td>Goat</td><td>0.250</td></tr><tr><td>Poultry</td><td>0.010</td></tr></table>	Dairy cow	4.104	Other cattle	2.642	Swine finishing	0.310	Breeding swine	0.366	Sheep	0.257	Goat	0.250	Poultry	0.010	kg VS / animal mass / day	Appropriateness of the value: VT checked table 10.13A of chapter 'Emissions from Livestock and Manure Management' under the volume 'Agriculture, Forestry and other Land use' of the 2019 IPCC Guidelines for National Greenhouse Gas) for the region Africa for correct default values applied and confirmed that the values have been correctly applied using correct formulas in calculation of the parameter values in SDG database and are thus appropriate. Purpose of the parameter: Calculation of baseline scenario Supporting Document: SDG database. 2019 IPCC GUIDELINES FOR National Greenhouse Gas inventories Conclusion: The values have been correctly obtained and applied in line with the applied methodology.
Dairy cow	4.104																
Other cattle	2.642																
Swine finishing	0.310																
Breeding swine	0.366																
Sheep	0.257																
Goat	0.250																
Poultry	0.010																
BGTA 11: $B_{0,LT}$	<table><tr><td>Dairy cow</td><td>0.13</td></tr><tr><td>Other cattle</td><td>0.13</td></tr><tr><td>Swine finishing</td><td>0.29</td></tr><tr><td>Swine breeding</td><td>0.29</td></tr><tr><td>Sheep</td><td>0.13</td></tr><tr><td>Goat</td><td>0.13</td></tr><tr><td>Poultry</td><td>0.24</td></tr></table>	Dairy cow	0.13	Other cattle	0.13	Swine finishing	0.29	Swine breeding	0.29	Sheep	0.13	Goat	0.13	Poultry	0.24	$m^3 CH_4/kg\text{-}dm$	Appropriateness of the value: The PP has applied IPCC default values as per the methodology. Purpose of the parameter: calculation of baseline scenario Supporting Document: 2019 IPCC Guidelines for National Greenhouse Gas Inventories volume 4 Chapter 10 Conclusion: the values are correctly obtained from Table 10.16 and correctly applied.
Dairy cow	0.13																
Other cattle	0.13																
Swine finishing	0.29																
Swine breeding	0.29																
Sheep	0.13																
Goat	0.13																
Poultry	0.24																
BGTA 13: EF_{b,i,CO_2}	Wood:112 Charcoal:165.22 LPG: 63.1	$tCO_2/T J$	Appropriateness of the value: The VT cross checked these values with the applied methodology and confirms that they are correct and are correctly applied in the calculation of values. Purpose of the parameter: Calculation of baseline emissions. Supporting Document:														

				applied methodology Conclusion: The values are methodology defaults and are correctly applied in the project.
	BGTA 14: EF _{B,i,non-CO2}	Wood - 9.46 Charcoal: 44.83 LPG: 0.17	tCO ₂ /TJ	Appropriateness of the value: IPCC 2019 and applied methodology were checked for correct default values. VT confirmed that the default values applied are correct. Purpose of the parameter: Calculation of baseline scenario. Supporting Document: IPCC 2019 and applied methodology Conclusion: The applied values are default values and are correctly applied in line with the methodological requirements and AR5.
	BGTA 15: EF _{B,i,CO2}	Wood: 112 Charcoal: 165.22 LPG: 63.1	tCO ₂ /TJ	Appropriateness of the value: VT checked IPCC 2006, volume 2, chapter 2 table 2.5 and the applied methodology for correctness of applied value and confirmed that the values applied are correct. Purpose of the parameter: Calculation of project emissions Supporting Document: IPCC 2006 Vol 2 and applied methodology Conclusion: The applied values are default values and correctly applied in line with the methodological requirements.
	BGTA 16: EF _{B,i,non-CO2}	Wood - 9.46 Charcoal: 44.83 LPG: 0.17	tCO ₂ /TJ	Appropriateness of the value: VT checked IPCC 2019 guideline and the applied methodology for correctness of applied value and confirmed that the values applied are correct. Purpose of the parameter: Calculation of project scenario Supporting Document: applied methodology Conclusion: The applied values are default values and are correctly applied in line with the methodological requirements.
	BGTA 17: NCV _{B,j}	Wood: 0.0156 Charcoal: 0.0295 LPG: 0.0473	TJ/ton	Appropriateness of the value: The VT checked IPCC 2006, volume 2, chapter 1 table 1.2 for correctness of values applied. It was confirmed that the values applied are correct. Purpose of the parameter: Calculation of baseline scenario

				Supporting Document: Applied methodology and IPCC 2006 vol 2, chapter 1 Conclusion: These values are methodological default IPCC values and are correctly applied in line with methodological requirements.
	BGTA 18: NCV _{p,i}	Wood: 0.0156 Charcoal: 0.0295 LPG: 0.0473	TJ/ton	Appropriateness of the value: The VT checked IPCC 2006, volume 2, chapter 1 table 1.2 for correctness of values applied. It was confirmed that the values applied are correct. Purpose of the parameter: calculation of baseline scenario Supporting Document: applied methodology and IPCC 2006 vol 2, chapter 1. Conclusion: The applied values are methodology default values and have been correctly applied in line with methodological requirements.
	BGTA 19: NCV _{biogas}	0.0215	GJ/m ³	Appropriateness of the value: VT checked the applied methodology for correctness of the applied value and confirmed that the value is correct. Purpose of the parameter: Calculation of baseline scenario Supporting Document: applied methodology Conclusion: The applied value is methodology default values and has been correctly applied in line with methodological requirements.
	BGTA 20: P _{b,i,y}	Wood: 2.670 Charcoal 0.073 LPG: 0.045	tonnes/ household/year	Appropriateness of the value: VT checked KPT results in SDG database against KPT survey forms for correctness, accuracy and consistency. The same was crosschecked against applied methodology for completeness and compliance. VT confirmed that KPT was correctly conducted in line with the applied methodological requirements, using the correct sample size and procedure and correct formulas were applied in the SDG database. Values applied are thus correct. Purpose of the parameter: Calculation of baseline scenario -- Supporting Document: KPT, Sheet BE in VPA06 SDG database cell E71, E76, and E81 Conclusion: All methodological requirements have been fully met in the determination of the applied parameter values.

	BGTA 21: Percentage of fuel_i	Wood: 76 Charcoal: 8 LPG: 16	%	Appropriateness of the value: VT checked SDG database results against baseline survey forms and applied methodology for correctness and consistency and completeness and compliance to methodological and GS requirements. VT confirmed that the values have been correctly obtained through baseline survey and all calculations apply correct formulas as checked in the SDG database. The applied values are thus suitably valid. Purpose of the parameter: Calculation of baseline scenario Supporting Document: VPA03 SDGdatabase Conclusion: This parameter is applicable for method 2.
	BGTA 22: f _{b,i,j}	To be determined during monitoring.	fraction	Appropriateness of the value: As outline in the applied methodology, VT confirms values will be determined during monitoring based on the correct methodology options indicated in the VPA-DD, applicable for Thermal application method 2. VT confirms validity of these options, therefore. Purpose of the parameter: Calculation Supporting Document: applied methodology Conclusion: the parameter is applicable for method 2 and values will be determined during monitoring base of the valid methodological options indicated in the VPA-DD.
	BGTA 23: f _{p,d,y}	55	%	Appropriateness of the value: VT checked approved CPI VPA-DD and confirmed that the thermal efficiency parameter value applied is correct and remains valid. Purpose of the parameter: Calculation of baseline scenario for Thermal Application method 2. Supporting Document: approved CPI VPA-DD Conclusion: The parameter is applicable for method 2 and there is no indication that methodological requirements for this parameter are not fully met.
	BGTA 41: f _{NRB,i,y}	74.38	%	Appropriateness of the value: VT checked f_{NRB} Kenya spreadsheet against CDM Methodological Tool 30 version 4.0: Calculation of the fraction of non-renewable biomass and confirmed that all steps required by the tool have been correctly followed, source of data used are credible and up-to-date, all parameters and formulas applied in the calculations are

			correct. VT thus confirms that the parameter value applied is correct and valid. Purpose of the parameter: calculation of baseline and project emissions. Supporting Document: approved CPI VPA-DD Conclusion: The parameter has been determined in line with all methodological requirements.
		Therefore, the baseline emission quantification follows AWMS method 1 - IPCC Tier 1 approach, since the voluntary project activity involves the installation of domestic biogas digesters at individual households (small farms), as defined by Section 2.2.3 of the methodology. The biogas is utilized for household thermal applications (mainly cooking), and the bioslurry is handled anaerobically through direct application to the fields, and not confined to encourage further anaerobic degradation. The following sources of information have been used in this context: • /VPA-DD/ • /PoA-DD/ • /Meth/ • /BS/ • /VVS/ • /CSA/ • /WR/ • /TECH/ • /fNRB/	
Findings	☒	The calculation of the emission reductions was found to be fully compliant with the above stated principles. The calculations of baseline, project GHG emissions and leakage or net GHG removals have been carried out in accordance with the formulae and methods described in the PoA-DD, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information has been identified.	
	☐	The respective requirements have widely been complied with. However in this context the following CARs, CLs, FARs have been raised:	
		-	
Conclusion	☒	No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.	
	☐	The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.	
		All ex-ante fixed parameters are included in Section B.6.2 of the VPA-DD and justified.	

D.5. Demonstration of eligibility of the VPAs

Means of validation	A complete list of eligibility criteria has been prescribed in the PoA-DD.				
	The compliance and fulfilment on the established VPA inclusion criteria has been sufficiently justified in section A.1.1 of the VPA-DD.				
	The VVB confirms that all eligibility criteria are sufficiently fulfilled with appropriate evidences. Detailed assessment can be found in Appendix 8 of this report.				
	No.	Eligibility criterion – Category	Eligibility criterion Required condition	Supporting evidence for inclusion	VVB assessment
	1.	The geographical boundary of the VPA including any time-induced boundary consistent with the geographical boundary set in the PoA	All biogas systems included in the VPA will demonstrate they fall within the geographical boundary of the PoA through: - Recording the address/location of the system in Salesforce or equivalent software - Warranty or household sales agreement	Project database with address and location is provided. Contractual agreement between CME and VPA implementer is provided (confidential document) Warranty or household sales contract of the first digester with plant code BSU/46 is provided	The Validation team confirms that the geographical boundary of the VPA is consistent with the boundary set in the PoA.
	2.	Conditions to avoid double counting of GHG emission reductions or net anthropogenic GHG removals, such as unique identifications of product and end-user locations	Double counting is avoided by unique biodigester identification and as per methodology procedure indicator BGTA 1 and 2	Project database with unique codes is provided. Other responses are captured in parameter BGTA 1 and 2 in Section B6.2	Validation team confirms that this eligibility criterion has been sufficiently set. There are unique identification of plants and the end user locations provided in the spreadsheets.
	3.	Conditions to confirm that VPAs are neither registered as project activities with other offset Schemes, included in other registered PoAs, nor the project activities that have been deregistered;	The required condition is that the biodigester is only registered under this project	– captured in parameter BGTA 2 in Section B6.2	The VPA is under the PoA GS2747 only and VPA GS5801. The digesters within each VPA can be uniquely identified
	4.	Specification of the technology/measure such as the level and type of service, as well as performance specification based on, inter alia, testing/certification;	Demonstration that the plant is installed according to specifications by conducting a commission check	Only plants that are commissioned are included, the evidence is the database containing the date of commissioning	The PP has demonstrated that only commissioned plants are included in the project database
	5.	Conditions to check the start dates of VPA through documentary evidence	The start date is defined as the first digester commissioned in	Warranty certificate or sales contract of the first plant	The Validation team assessed a sample warranty certificate of the

			a VPA	commissioned with code BSU/46 is provided	first plant commissioned as well as the registered VPA-DD, and confirms that start date is 23/10/2015, which is the date that the first digester was commissioned under the VPA
	6.	Conditions to ensure compliance with the applicability of the applied methodologies, the applied standardized baselines and the other applied methodological regulatory document	The VPA shall provide a discussion on the applicability of the applied methodology	Description as per VPA-DD section B.2	The validation team checked the selected methodology and confirms compliance of the VPA to its applicability
	7.	Conditions to ensure that VPA meet the requirements for demonstration of additionality	As per CDM Tool 21 Demonstration of additionality of small-scale project activities. Version 13.1	Additionality is demonstrated in VPA-DD section B.5	The VPA conforms to the additionality requirements of the applied methodology. No additionality reassessmen at DCR
	8.	Conditions to ensure no diversion of official development assistance;	VPAs will demonstrate that any Official Development Assistance received for the VPA has not occurred on the condition that the resulting credits are transferred to the donor country	A signed ODA no diversion letter is uploaded to the registry	There is no diversion letter uploaded to the registry. Therefore the validation team confirms compliance to this condition
	9.	Target group (e.g. domestic/commercial/industrial, rural/urban, gridconnected/offgrid)	The VPA will describe the target group	As per table 4 in this VPA-DD, the VPA disseminates a technology developed for small farmers with sufficient manure available for feeding. Farmers typically live in rural areas.	The Validation team checked the gographical locations provided by participants of BFT and baseline surveys. This was also confirmed during the virtual interviews and it is confirmed that the target group is small farmers living in rural areas with a number of animals to provide sufficient manure
	10.	Conditions related to sampling requirements for the PoA	The conditions as stipulated in the applied methodologies	Section B7.2 of this VPA-DD contains the conditions related to sampling aligned with the applied methodologies	The validation teams confirms that the PP has complied to the general sampling survey procedures and technique as described in Section B.7.2 of the VPA-DD
	11.	Conditions to ensure that CPAs that will be included meet the small-scale	The VPA Implementer will ensure that each	See section A.4 in this VPA-DD for this	As per GS optional requirement

		thresholds and remain within those thresholds throughout the crediting period	VPA remains below the small-scale limits. For activities falling under Type I, each VPA in aggregate will remain below 15 MW (45MW _{th}) per year. For activities falling under Type III, each VPA will achieve below 60,000 tCO ₂ e in emission reductions annually.	demonstration	'GHG emissions reductions & sequestration product requirements' v2.1', the VPA falls under the small scale threshold as the emission reductions are below 60,000 tCO ₂ e annually. The VT confirmed this by crosschecking the calculations in the spreadsheets provided by PP. Further, based on the thermal energy output, maximum of 11,004 units will be installed.
	12.	Conditions to confirm that technologies in V/CPAs are eligible	Demonstration that only biodigesters are included up to 100 m ³	The ER spreadsheet contains the project database with the size of each plant installed. None of the digesters included are over 100 m ³	The VT cross checked the plant sizes in the spreadsheet to confirm that all plants included were not above 100 m ³
	13.	Conditions to be met by each VPA regarding SDG outcomes assessment	N/A. From 13 March 2022, the SDG Impact Tools are a mandatory part of the project development cycle. This tool has been adopted	SDG impact tool is used to identify SDGs as per GS requirements	The VT checked the SDGimpact tool spreadsheet provided by PP and confirms that the tool has been correctly adopted.
	The following sources of information have been used in this context: • /VPA-DD/ • /PoA-DD/ • /VVS/ • /Meth/ • /XLS/				
Findings	☒	The list of eligibility criteria is in accordance with the applicable VVS requirements.			
	☐	A complete list of eligibility criteria has been set up in the PoA-DD and the generic VPA-DD. The respective requirements have widely been complied with in this VPA. However in this context the following CARs, CLs, FARs have been raised:			
		-			
Conclusion	☒	No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.			
	☐	The raised CARs/CLs have been addressed appropriately. The PE has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.			
		All eligibility criteria prescribed in the PoA-DD have been fulfilled, justified, and evidenced.			

D.6. VPA Boundary

Means of validation	The project boundary is defined in the methodology Section 3.1.1 as the physical, geographical sites of: a) The livestock; b) Animal manure management systems; c) Biogas utilization for thermal applications; d) Digestate treatment, usage and/or disposal (where applicable). The target area and fuel production and collection area and the the physical, geographical sites of the project technologies/practicesare also included in the project boundary: In line with the methodology, where the baseline fuel is woody biomass (including charcoal), the project boundary also includes the area within which this woody biomass is grown and collected. For other fuels such as fossil fuel e.g., Coal, LPG, Kerosene, the boundary can be ignored. Emissions sources included in or excluded from the project boundary <table><tr><th>Scenario</th><th>Source</th><th>Gas</th><th>Included</th><th>Explanation</th></tr><tr><td rowspan="9">Baseline Scenario</td><td rowspan="3">Animal Waste Management System</td><td>CO₂</td><td>No</td><td>CO₂ emissions from the decomposition of organic waste are not included.</td></tr><tr><td>CH₄</td><td>Yes</td><td>Major source of emissions.</td></tr><tr><td>N₂O</td><td>No</td><td>This is excluded as Tier 1 is applied</td></tr><tr><td rowspan="3">Delivery of thermal energy</td><td>CO₂</td><td>Yes</td><td>Important source of emissions.</td></tr><tr><td>CH₄</td><td>Yes</td><td>Important source of emissions, unless justified negligible.</td></tr><tr><td>N₂O</td><td>Yes</td><td>Can be significant for some fuels, unless justified negligible.</td></tr><tr><td rowspan="3">Production of fuel, transport of fuel</td><td>CO₂</td><td>No</td><td>Excluded when Tier 1 approach is applied and production of fuel and transport of fuel does not take place</td></tr><tr><td>CH₄</td><td>No</td><td>Excluded when Tier 1 approach is applied and production of fuel and transport of fuel does not take place</td></tr><tr><td>N₂O</td><td>No</td><td>Excluded when Tier 1 approach is applied and production of fuel and transport of fuel does not take place</td></tr><tr><td rowspan="9">Project Scenario</td><td rowspan="3">Animal Waste Management System</td><td>CO₂</td><td>No</td><td>CO₂ emissions from the decomposition of organic waste are not included.</td></tr><tr><td>CH₄</td><td>Yes</td><td>Emissions from physical leakage, as well as emissions from the animal waste not treated in the bio-digester.</td></tr><tr><td>N₂O</td><td>No</td><td>Excluded as a biodigester does not produce N₂O gases.</td></tr><tr><td rowspan="3">Delivery of thermal energy</td><td>CO₂</td><td>Yes</td><td>Important source of emissions.</td></tr><tr><td>CH₄</td><td>Yes</td><td>Important source of emissions.</td></tr><tr><td>N₂O</td><td>Yes</td><td>Can be significant for some fuels.</td></tr><tr><td rowspan="3">Production of fuel, transport of fuel</td><td>CO₂</td><td>No</td><td>Excluded when Tier 1 approach is applied. Also, production of fuel and transport does not take place</td></tr><tr><td>CH₄</td><td>No</td><td>Excluded when Tier 1 approach is applied. Also, production of fuel and transport does not take place</td></tr><tr><td>N₂O</td><td>No</td><td>Excluded for simplification.</td></tr></table>					Scenario	Source	Gas	Included	Explanation	Baseline Scenario	Animal Waste Management System	CO ₂	No	CO ₂ emissions from the decomposition of organic waste are not included.	CH ₄	Yes	Major source of emissions.	N ₂ O	No	This is excluded as Tier 1 is applied	Delivery of thermal energy	CO ₂	Yes	Important source of emissions.	CH ₄	Yes	Important source of emissions, unless justified negligible.	N ₂ O	Yes	Can be significant for some fuels, unless justified negligible.	Production of fuel, transport of fuel	CO ₂	No	Excluded when Tier 1 approach is applied and production of fuel and transport of fuel does not take place	CH ₄	No	Excluded when Tier 1 approach is applied and production of fuel and transport of fuel does not take place	N ₂ O	No	Excluded when Tier 1 approach is applied and production of fuel and transport of fuel does not take place	Project Scenario	Animal Waste Management System	CO ₂	No	CO ₂ emissions from the decomposition of organic waste are not included.	CH ₄	Yes	Emissions from physical leakage, as well as emissions from the animal waste not treated in the bio-digester.	N ₂ O	No	Excluded as a biodigester does not produce N ₂ O gases.	Delivery of thermal energy	CO ₂	Yes	Important source of emissions.	CH ₄	Yes	Important source of emissions.	N ₂ O	Yes	Can be significant for some fuels.	Production of fuel, transport of fuel	CO ₂	No	Excluded when Tier 1 approach is applied. Also, production of fuel and transport does not take place	CH ₄	No	Excluded when Tier 1 approach is applied. Also, production of fuel and transport does not take place	N ₂ O	No	Excluded for simplification.
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		N ₂ O	No	Excluded for simplification.																																																																				
The following sources of information have been used in this context: • /VPA-DD/ • /PoA-DD/ • /Meth/																																																																								
Findings	☒	The calculation of the emission reductions was found to be fully compliant with the above stated principles. The calculations of baseline, project GHG emissions and leakage or net GHG removals have been carried out in accordance with the formulae and methods described in the PoA-DD, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in emission or removal calculations have been iustified. Appropriate emission factors. IPCC default																																																																						

		values, GWPs and other reference values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information has been identified.
	☐	The respective requirements have widely been complied with. However in this context the following CARs, CLs, FARs have been raised: -
Conclusion	☒	No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.
	☐	The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
		The project boundary is set in line with the methodology

D.7. Additionality

Means of validation		The additionality of the VPA is demonstrated per the conditions outlined in the registered GS PoA. Accordingly, the VPA has proved the additionality at initial validation as follows: - Biogas system rated capacity is less than 2.25MW_{th} each - Biogas systems are disseminated to households or communities or Small and Medium Enterprises (SMEs). The VVB validated that no biogas systems larger than 150kW (450kW_{th}) are accepted under this SSC-VPA. Each subsystem has 37.36 kW thermal capacity according to the calculations of the Emissions Reductions Calculation spreadsheet. Therefore, all units qualify under the positive list. Further, as per GS template guide VPA design document and Section 4.1.51 of the GS4GG Principles and Requirements, ongoing financial need has to be demonstrated by projects that demonstrate financial additionality. This project did not demonstrate need to financial additionality during the initial project design validation/registration for the first crediting period. The following sources of information have been used in this context: /VPA-DD/ /PoA-DD/ /CSA/ /XLS/
Findings	☒	The calculations of baseline, project GHG emissions and leakage or net GHG removals have been carried out in accordance with the formulae and methods described in the PoA-DD, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied.
	☐	The respective requirements have widely been complied with. However in this context the following CARs, CLs, FARs have been raised: -
Conclusion	☒	No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.
	☐	The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.
		The validation team can confirm that upon revalidation, the VPA is still additional and complies with the PoA-DD additionality requirements.

D.8. Estimated emission reductions or net anthropogenic removals

Means of validation	The validation team has checked the ex-ante ER calculation in section B.6.1 of the VPA-DD as well as the XLS calculation sheet. In detail the following has been verified: <i>Transparency:</i> It has been checked whether the calculation of the ER calculation is fully traceable and, where used, the Excel calculation provides
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all calculation formulae.

- *Parameter consistency:* It has been checked whether all parameters and data used for the calculation are applied consistently in the VPA-DD and the calculation spreadsheet.
- *Correctness:* It has been checked whether the applied formulae and methods for calculating emission reductions are in accordance with the monitoring plan in the PoA-DD and the approved methodology.
- *Completeness:* It has been checked whether all calculations are complete and without omissions.

The VPA-DD applies steps and equations to calculate project emissions, baseline emissions, leakage and emission reductions as per the requirements of the applied methodology. By checking ex-ante calculations of the VPA-DD, the validation team assessed the data to determine the baseline and the methodological choices in section B.6.1 of the VPA-DD

The GHG emission reductions are calculated as the difference between the baseline emissions and the project emissions. This project includes two sources of emission reduction:

1. Avoidance of methane emissions from AWMS.
2. Displacement of non-renewable biomass and fossil fuels

The applied methodology offers two methods for baseline emission quantification from AWMS:

- a) AWMS method 1 - IPCC Tier 1 approach,
- b) AWMS method 2 - IPCC Tier 2 approach,

In this VPA IPCC Tier 1 approach is applied as the target is household farms.

(a) Baseline Emissions AWMS

AWMS method 1 requires livestock population data by animal species/category, climate region or temperature and data on baseline animal manure management practice in the project boundary.

Baseline emissions for the production system (low productivity systems) are determined as follows:

$$BE_{AWMS,y} = N_{b,p,y} \div 365 \times GWP_{CH_4} \times UF_b \times U_{p,y} \times \sum_{j,LT} (N_{LT,y} \times VS_{LT,y} \times MS\%_{BL,j} \times EF_{LT,y}) \div 1000$$

Where:

$BE_{AWMS,y}$ = Baseline emissions in year y (t CO₂e)

$N_{b,p,y}$ = Number of project technology-days included in the project database for each project scenario in year y

GWP_{CH_4} = Global Warming Potential (GWP) of CH₄ applicable to the crediting period

UF_b = Model correction factor to account for model uncertainties (0.89)

$U_{p,y}$ = Usage rate for technologies in project scenario p in year y (fraction).

LT = Index for all types of livestock

- j = Index for animal waste management system
- $N_{LT,y}$ = Annual average number of animals of type LT in year y (numbers)
- $VS_{LT,y}$ = Volatile solids production/excretion per animal of livestock LT in year y (on a dry matter weight basis, kg-dm/animal/year)
- $MS\%_{bl,j}$ = Fraction of animal manure handled in baseline animal manure management system j . (%). The project developer may apply the default IPCC values or conduct surveys to assess the animal manure management practices in the baseline.
- $EF_{LT,y}$ = Emission factor for direct CH_4 emissions by livestock LT , in manure management system j .

Survey methods are used to determine $MS\%_{bl,j}$ and the annual average animal population ($N_{LT,y}$).

The annual average number of animals ($N_{LT,y}$) is determined as follows:

$$N_{LT,y} = N_{da,y} \times \left(\frac{N_{p,y}}{365} \right)$$

Where:

- $N_{da,y}$ = Number of days animal is alive in the farm in the year
- $N_{p,y}$ = Number of animals produced annually of type LT for t

Volatile solids (VS) are the organic material in livestock manure and consist of both biodegradable and non-biodegradable fractions.

The parameter $VS_{LT,y}$ is calculated as below:

$$VS_{LT,y} = (VS_{rate,LT} \times \frac{TAM_{LT}}{1000}) \times nd_y$$

Where:

- $VS_{LT,y}$ = Annual volatile solid excretions for livestock LT entering all animal waste management systems on a dry matter weight basis (kg-dm/animal/yr)
- $VS_{rate,LT}$ = VS excretion rate (kg VS / (1000 kg animal mass) / day)
- TAM_{LT} = Typical animal mass for livestock LT (kg/animal).
- nd_y = Number of days that the animal manure management system was operational in year y

b. Thermal application method 1: Based on avoided quantity of fuel consumption

The baseline emission from thermal application in year y shall be calculated as outlined below. Each unit (e.g., cook stove, heater) have a rated capacity equal to or less than 150 kW thermal.

$$BE_{TA,y} = \sum_{b,p} (N_{b,p,y} \times U_{p,y} \times (f_{NRB,i,y} \times SE_{b,y,CO2} + SE_{b,y,non-CO2}))$$

Where:

$BE_{TA,y}$	= Baseline emissions for total project activity in year y (tCO ₂ e/yr)
$\sum_{b,p}$	= Sum over all relevant baseline b/project p pairs
$N_{b,p,y}$	= Number of project technology-days included in the project database for each project scenario in year y. The start date is the day a plant start producing biogas. A default of 2 weeks will be used for the period from installation date and start date.
$U_{p,y}$	= Usage rate for technologies in project scenario p in year y (fraction)
SE_{b,y,CO_2}	= Specific CO ₂ emissions for a baseline b technology in year y (tCO ₂ /technology*day)
$SE_{b,y,non-CO_2}$	= Specific non-CO ₂ emissions for a baseline b technology in year y (tCO ₂ e/technology*day)
$f_{NRB,i,y}$	= Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass (fraction). The parameter $f_{NRB,b,y}$ is excluded from this equation when the observed baseline fuel is fossil fuel.

Specific emission CO₂ & non-CO₂ are determined by using one of the following options below, for each baseline scenario b /project scenario p pair separately.

$$SE_{b,y,CO_2} = \sum_i P_{b,i,y} \times NCV_{b,i,fuel} \times EF_{b,i,CO_2}$$

$$SE_{b,y,non-CO_2} = \sum_i P_{b,i,y} \times NCV_{b,i,fuel} \times EF_{b,i,non-CO_2}$$

Where:

i	= Index for the type of baseline/fossil fuel consumed
$P_{b,i,y}$	= Average yearly consumption of baseline fuel i per household before the start of the project activity or at the renewal of each crediting period, whichever is later (tonnes/household/day)
$NCV_{b,i}$	= Net calorific value of the fuel(s) i that is substituted in baseline b (TJ/tonne)
EF_{b,i,CO_2}	= CO ₂ emission factor arising from use of fuels i in baseline scenario (tCO ₂ /TJ)
$EF_{b,i,non-CO_2}$	= Non-CO ₂ emission factor arising from use of fuels i in baseline scenario (tCO ₂ e/TJ)

$P_{b,i,y}$ will be determined via KPT survey

The fNRB is calculated as per CDM Tool 30 v4.0

Project emissions

A. Project emission from AWMS system

AWMS method 1 (IPCC 2019 TIER 1 approach)

The project emissions involve emissions from the biodigester, which include:

- Physical leakage biogas
- Emissions from the use of fossil fuels or electricity for the operation

$$PE_{AWMS,y} = PE_{PL,y} + PE_{power,y}$$

Where:

$PE_{AWMS,y}$ = Project emissions in year y (t CO₂e)

$PE_{PL,y}$ = Emissions due to physical leakage of biogas in year y (t CO₂e)

$PE_{power,y}$ = Emissions from the use of fossil fuel or electricity for the operation of the installation in the year y (t CO₂e)

The physical leakage from biodigesters is calculated as 10% of the maximum methane producing potential of the manure fed into the management systems implemented by the project activity, as per the following equation:

$$PE_{PL,y} = 0.10 \times N_{b,p,y} + 365 \times U_{p,y} \times GWP_{CH_4} \times D_{CH_4} \times \sum_k \sum_{i,LT} B_{0,LT} \times N_{LT,y} \times VS_{LT,y} \times MS\%_{i,y}$$

Where:

$PE_{PL,y}$ = Project emissions from physical leakage in year y (t CO₂e)

GWP_{CH_4} = Global Warming Potential (GWP) of CH₄ applicable to the crediting period.

D_{CH_4} = CH₄ density (0.00067 t/m³ at room temperature (20 °C) and 1 atm pressure)

LT = Index for all types of livestock

i = Index for animal manure management system

k = Climate region k

$B_{0,LT}$ = Maximum methane producing potential of the volatile solid generated for animal type LT.

$MS\%_{i,y}$ = Fraction of manure handled in project animal manure management system i

B. Project emission from thermal application

Thermal application method 1: Based on avoided quantity of fuel consumption

The Project emission from thermal application in year y shall be calculated as follows:

$$PE_y = \sum_{b,p} (N_{b,p,y} \times U_{p,y} \times (f_{NRB,i,y} \times SE_{p,y,CO_2} + SE_{p,y,non-CO_2}))$$

Where:

PE_y = Project emissions for total project activity in year y (tCO₂e/yr)

$\sum_{b,p}$ = Sum over all relevant baseline b/project p pairs

$N_{b,p,y}$ = Number of project technology-days included in the project database for each project scenario in year y

$U_{p,y}$ = Usage rate for technologies in project scenario p in year y (fraction)

SE_{p,y,CO_2} = Specific CO₂ emissions for a project p technology in year y (tCO₂/technology*day)

$SE_{p,y,non-CO_2}$ = Specific non-CO₂ emissions for a project p technology in year y (tCO₂e/technology*day)

$f_{NRB,i,y}$ = Fraction of biomass used in year y for project scenario p that can be established as non-renewable biomass (fraction). The parameter $f_{NRB,p,y}$ is excluded from this when the observed project additional fuel is fossil fuel.

Specific emission CO₂ & non-CO₂ are determined below, for each baseline b /project p pair separately.

$$SE_{p,y,CO_2} = \sum_i P_{p,i,y} \times NCV_{p,i,fuel} \times EF_{p,i,fuel,CO_2}$$

$$SE_{p,y,non-CO_2} = \sum_i P_{p,i,y} \times NCV_{p,i,fuel} \times EF_{p,i,fuel,non-CO_2}$$

Where:

i = Index for the type of project/fossil fuel consumed

$P_{p,i,y}$ = Average daily consumption of project fuel i per household (tonnes/household/day)

$NCV_{p,i,fuel}$ = Net calorific value of the fuel(s) i that is used in project p (TJ/tonne)

$EF_{p,i,fuel,CO_2}$ = CO₂ emission factor arising from use of fuels i in project scenario (tCO₂e/TJ)

$EF_{p,i,fuel,non-CO_2}$ = Non-CO₂ emission factor arising from use of fuels in baseline scenario (tCO₂e/TJ)

$P_{p,i,y}$ shall be determined via KPT survey.

Leakage Emissions:

a. Animal waste management system

AWMS method 1: The proper soil application (which not resulting in methane emissions) of the digestate shall be verified on a sampling basis. This will be part of the SMS and is captured in monitoring parameters BGTA 32.

The verification will be part of the SDG monitoring survey (SMS).

In addition to this, households may use bio-slurry as animal feed, insecticide, sell it as fertilizer, etc. These options do not result in methane emissions as well.

b. Thermal application

Leakage emissions $LE_{p,y}$, shall be determined allowing one of two options below.

Option 1 - Apply a default adjustment factor of 0.95 to the emission reductions to approximate leakage emissions for thermal application.

Option 2 - The project developer must evaluate the following potential sources of leakage and provide an evidence-based description and preliminary quantification of each potential source and its relevance for the project:

- a. The displaced baseline technologies are reused outside the project boundary in place of lower emitting technology or with a higher intensity than would have occurred in the absence of the project.
- b. Members of the population who do not participate in the project, and

	previously used lower emitting energy sources, instead use the non-renewable biomass or fossil fuels saved under the project activity. c. The project significantly reduces the NRB fraction within an area where other GHG mitigation project activities account for NRB fraction in their baseline scenario. d. The project population compensates for loss of the space heating effect of inefficient technology by adopting some other form of space heating or by retaining some use of inefficient technology. e. By virtue of promotion and marketing of a new technology, the project stimulates substitution with this technology by households who commonly used a technology with relatively lower emissions. For each source for which the leakage assessment expects an increase in fuel consumption by non-project households/users attributable to the project activity, then calculations must be undertaken to account for the leakage from this source. Leakage is either calculated as a quantitative emissions volume (tCO₂e) or as a percentage of total emission reductions. The project documentation shall include a projection of leakage emissions based on available data and information. The monitoring plan must include monitoring parameters to be registered during the leakage investigation every two years to populate the leakage calculation. Option 1 and 2 is captured in BGTA 43. Summary: Baseline Emissions (BE_y): = 765,202890 tCO₂e Project Emissions (PE_y): = 18,333257 tCO₂e Leakage emissions (LE_y): = 0 tCO₂e Summary of ex-ante estimates of annual average emission reductions over the 7-year crediting period (CPII) ER_y = BE_y – PE_y - LE_y = 765,202890 tCO₂e - 18,333257 tCO₂e - 0 tCO₂e = 57,870632 tCO₂e The following sources of information have been used in this context: • /VPA-DD/ • /PoA-DD/ • /Meth/ • /XLS/
Findings	<input checked="" style="margin-right: 10px;" type="checkbox"/> The calculation of the emission reductions was found to be fully compliant with the above stated principles. The calculations of baseline, project GHG emissions and leakage or net GHG removals have been carried out in accordance with the formulae and methods described in the PoA-DD, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in emission or removal

		calculations have been justified. Appropriate emission factors, IPCC default values, GWPs and other reference values have been correctly applied.
	☐	CARs, CLs, FARs have been raised:
		-
Conclusion	It is confirmed that the emission reduction calculation is overall correct.	

D.9. Validity of monitoring plan

Means of validation	The validation team has checked the VPA-DD, PoA-DD and the monitoring requirements of the applied methodology.			
	Parameter	Value	Unit	Justification
	BGTA 24: Avoidance of double counting or double claiming among project technology end users	-	-	Measurement Method: The avoidance of double counting is to be ensured via unique identification of the biodigesters and end-users and inspection of warranty cards Monitoring Frequency: whenever project technology is sold or otherwise disseminated Purpose: Calculation of project scenario QA/QC Procedures: Unique identification of users Conclusion: The monitoring plan is in line with the methodology
	BGTA 25: $U_{p,y}$	80.40	%	Measurement Method: Monitoring of operationality of the biogas systems, including the operationality of both the biogas digester and biogas cookstove Monitoring Frequency: Annual Purpose: Calculation of project scenario QA/QC Procedures: Compliance with the general requirements for sampling. For annual monitoring the sample size will be at 90/10 while biennial is 95/10, in line with the CDM Sampling Standard^{/SS/}. For ex-ante estimates, the latest usage rate per the approved verification of the fourth monitoring period is applied, with an expected linear decline of 2% per annum. This is found to be reasonable. Conclusion: The VT cross checked the applied methodology and confirms that the monitoring plan complies with the methodology.
	BGTA 26: NLT_y	Dairy cows-4.85 Other cattle-0.46 Swine finishing-0.71 Breeding swine-0.15 Sheep-1.13 Goat-0.74 Poultry-38.32	Number	Measurement Method: The annual average is determined by: - for animals with generally a static population: Asking the farmer how many on average he owns during a particular MP- -For animals raised in cycles like fattening will be asked how many rounds per year, the average length of a round and number of animal per round to calculate the annual average Monitoring Frequency: Annual Purpose: Calculation of baseline and project scenario QA/QC Procedures: Compliance with the general requirements for sampling where sampling . Conclusion: The monitoring plan is in line with the methodology
	BGTA 27: TAM_{LT}	Dairy cow-270	Kg/animal	Measurement Method: IPCC adjusted to site-specific animal weight

		Cattle-208 Fattening pig-33 Breeding pig-61 Goat-24 Sheep -31 Poultry-0.80		Monitoring Frequency: Annual Purpose: Calculation of project scenario QA/QC Procedures: Proper implementation of the methodology Conclusion: Values are correctly applied
	BGTA 28: nd _y	Varies with the length of MP	days	Measurement Method: Survey methods Monitoring Frequency: Annual Purpose: Calculation of project scenario QA/QC Procedures: Compliance with general requirements for sampling Conclusion: The PP proposed sampling plan is in line with the methodology and the CDM Sampling Standard v9.0
	BGTA 29: Nda _y	Fattening pigs-120	days	Measurement Method: Monitoring surveys Monitoring Frequency: Annual Purpose: Calculation of project scenario QA/QC Procedures: Compliance with the general requirements of sampling Conclusion: Only value for fattening pig is provided. The monitoring plan complies with the methodology for animals raised in cycles which follows a sampling approach
	BGTA 30: N _{p,y}	Dairy cows-4.85 Other cattle-0.76 Swine finishing-0.12 Breeding swine-0.15 Sheep-1.13 Goat-0.74 Poultry-38.32	-	Measurement Method: In-person interview Monitoring Frequency: annual Purpose: calculation of project scenario QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan complies with the methodological requirements.
	BGTA 31: MS% _{l,y}	Dairy Cow: 87 Other Cattle: 56.7 Fattening Pig: 25 Breeding Pig: 62 Sheep: 0 Goat: 4 Poultry: 6	%	Measurement Method: Calculated based on the share fed into the digester Monitoring Frequency: Annual Purpose: Calculation of project scenario QA/QC Procedures:- Compliance with the general requirements for sampling. For annual monitoring, this follows a 90/10 confidence/precision level. Conclusion: The monitoring plan complies with the

				methodology
	BGTA 32: Proper soil application	0	-	Measurement Method: The use of bio-slurry will be monitored and in case bio-slurry is not used, it will be assessed if this leads to methane emissions Monitoring Frequency: Annual Purpose: Calculation of baseline scenario QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan complies with the methodology
	BGTA 38: N _{b,p,y}	Varies with length of MP	days	Measurement Method: Calculated from the Project database as the sum of the number of installed project technology units times the calendar days during the year y that they were used at the end user locations. The methodological default of 2 weeks is used for the period from commissioning and start date Monitoring Frequency: Annual Purpose: Calculation of project outcome QA/QC Procedures: Cross check the results of the usage survey with the contents of the project database to confirm whether the project technology units surveyed are present at end user locations as expected, or not Conclusion: The monitoring plan complies with the methodology
	BGTA 39: LE _{p,y}	0	tCO ₂ e per year	Measurement Method: Monitoring Survey Monitoring Frequency: Every two years, or default discount value of 0.95 applied to emission reductions Purpose: calculation of project outcome QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan complies with the general requirements for sampling
	BGTA 42: P _{p,i,y}	Fire Wood:0.5132 Charcoal: 0.0124 LPG: 001	tonnes/household/year	Measurement Method: KPT protocol Monitoring Frequency: Updated every two years, or more frequently. Purpose: calculation of project outcome QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan is in line with the methodology

	BGTA 43: Leakage assessment	0	tonnes/household/year	Measurement Method: Leakage assessment follows the prescription of the methodology. The VT checked values applied for VPA01 CPIX-MPI and confirms the value is correct and can be applied for the same host country (project boundary). Monitoring Frequency: Updated every two years, or more frequently Purpose: calculation of project outcome QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan is in line with the methodology
	GSDM-I1.1.1: SDG1	26.32	KSh/day	Measurement Method: Monitoring survey Monitoring Frequency: Annual Purpose: Calculation of project outcome QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan is in line with the methodology
	GSDM-I1.1.1: Forex	0.00064	KSh/USD	Measurement Method: The website Xe.com will be used for the exchange rate Monitoring Frequency: Annual Purpose: Calculation of project outcome QA/QC Procedures: Inclusion of day of exchange rate for traceability Conclusion: The VT confirms that the PP included date of exchange as 8/8/2023 and applied the correct value as at the said date of exchange.
	GSDM-I2.2.3: BIOu	100	%	Measurement Method: Survey method – households will be asked how much land is in cultivation and the proportion on which bio-slurry is applied as main fertilizer Monitoring Frequency: Annual Purpose: calculation of project scenario QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan is in line with the methodology
	GSDM-I2.2.3: Fa	1.42	Hectare/HH	Measurement Method: Survey method – households will be asked how much land

				is in cultivation and the proportion on which bio-slurry is applied as main fertilizer Monitoring Frequency: Annual Purpose: calculation of project scenario QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan complies with sampling requirements. The proposed estimation method is reasonable.
	GSDM-I3.3.9: HAP _r	93	%	Measurement Method: Survey method, households will be asked if a reduction in household air pollution is observed. The CME has applied values from the MP1 of the second crediting period of VPA01 which is in the same project boundary. Monitoring Frequency: Annual Purpose: Calculation of project scenario QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan will comply with sampling requirements. The proposed estimation method is reasonable.
	GSDM-I4.4.1: Quality education	122	number	Measurement Method: Training reports for both VPA01 and VPA06 Monitoring Frequency: Annual Purpose: Calculation of project scenario QA/QC Procedures: Recording of training and participant list Conclusion: The monitoring plan is in line with the methodology
	GSDM-I5.4.1: Ts	1.94	Hours per day	Measurement Method: Sample surveys in representative households. The main cook will be asked how much time she saved on collecting wood, starting and tendering the fire and cleaning of pots attributed to the biodigester. Monitoring Frequency: Annual Purpose: calculation of project scenario QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan is deemed to be reasonable
	GSDM-I5.4.1: Usage of time	Producti	Usage of time	Measurement Method: Sample surveys in representative households

	saved	ve time use: 54% Leisure: 4% Family activities : 15% education activities : 3% Social activities : 24%	saved	Monitoring Frequency: Annual Purpose: Calculation of baseline scenario QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan and sampling method is deemed to be feasible and reasonable.
	GSDM-I7.1.1.1: HHs	4.788	HH size	Measurement Method: Sample surveys in representative households Monitoring Frequency: Annual Purpose: Calculation of project scenario QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan and sampling method is deemed to be feasible and reasonable.
	GSDM-I.12.5.2: $F_{(p,b)}$	138.37	Kg feeding/day	Measurement Method: Sample surveys in representative households Monitoring Frequency: Annual Purpose: Calculation of project scenario QA/QC Procedures: Compliance with the general requirements for sampling Conclusion: The monitoring plan is in line with the methodology
	Operational and Management Structure The VPA-DD monitoring plan includes the Operational and Management Structure. Roles and responsibilities between KBP and the CME have been outlined such that data recording, reporting, archiving and QA/QC procedures are clearly defined. • /VPA-DD/ • /Meth/ • /IM01/ • /PS/			
Findings	☒	The monitoring plan for the VPA is in accordance with the applicable VVS requirements, the PoA standard.		
	☐	This sampling plan has been provided to the VVB for validation as a separate document. For further details on the proposed sampling plan please refer to the PoA Validation Report.		
	☐	In this context the following CARs, CLs, FARs have been raised: N/A		
Conclusion	☒	No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.		
	☐	The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.		

	The Validation team has validated all parameters in the monitoring plan against the requirements of the methodology. All the procedures for all monitoring parameters have been properly reviewed by the assessment team. This information, together with interviews conducted during the remote site visit, has allowed the validation team to confirm that the proposed monitoring plan is feasible, and in accordance with the project design and the applied methodology.
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D.10. Sustainable Development Goals

SDG Goal	Assessment of Methodological choices/approaches for estimating the SDG outcome
SDG 01 – No Poverty: Relevant SDG Target: 1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day	Measurement Method: The average household savings in expenditure on basic services such as cooking are monitored by asking the household how much money is saved on cooking fuel expenditure since they started using biogas. The savings are then annualized and reported as USD/year and in local currency. $\text{GSDM-I.1.1.1} = \text{SDG}_1 \times \text{Forex} \times N_{b,p,y}$ Where: GSDM-I.1.1.1: Financial savings (KSH or USD saved in the MP) SDG ₁ : Gross savings (local currency/day) OM: Maintenance cost (local currency/day) Forex: Foreign exchange rate at time of MR writing (for expression in USD only) N _{b,p,y} : Technology days included QA/QC Process: Sampling guidelines and data analysis will be followed Indicator: Average household savings in expenditure on basic services such as cooking
SDG 02 – Zero Hunger: Relevant SDG Target: 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	Measurement Method: The number of farmers using bioslurry is monitored by including question on bio slurry usage in the SDG monitoring survey (SMS). The total contribution is then calculated by multiplying this with the number of biodigesters in use. GSDM-I2.4.2 Number of farmers adopted the practice by the project $\text{GSDM-I.1.2.4.2} = U_{p,y} \times N_d \times \text{BIO}_u$ Where: GSDM-I.1.2.4.2: Number of farmers using bio-slurry U _{p,y} : Usage rate for technologies in project scenario p in year y (fraction) N _d : Number of biodigesters constructed BIO _u : Bio-slurry usage rate (% farmers using bio-slurry) GSDM-I2.4.3: Area under sustainable agriculture Calculated by multiplying the outcome of GSDM-I.2.4.2 with the land area (Ha) on which bio-slurry is applied. The land area will be obtained by asking the farmer interviewed for the SMS how much land is owned and the share on which bio-slurry is applied. QA/QC Process: Not applicable

	Indicator: 1) Number of farmers adopted the practice by the project 2) Area under sustainable agriculture
SDG 03 – Good Health and Wellbeing: Relevant SDG Target: 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	Measurement Method: Monitored by monitoring the percentage families mentioning a reduction in household air pollution. $GSDM - I3.9.3 = U_{p,y} \times N_d \times HAP_r$ Where: GSDM-I.3.9.3: Number of households reporting a decrease in PM2.5 and CO $U_{p,y}$: Usage rate for technologies in project scenario p in year y (fraction) N_d: Number of biodigesters constructed HAP_r: % of families mentioning reduction in household air pollution QA/QC Process: Sampling and data analysis Indicator:. Number of households that observed reduction in PM2.5 & carbon monoxide (CO) concentration reductions
SDG 04 – Quality of Education: Relevant SDG Target: 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	Measurement Method: The VT noted that number of trainings provided will be determined by summing the number of masons trained during the monitoring period on biogas construction, refresher training and other biogas related trainings QA/QC Process: Cross checking the record of the number of people trained Indicator: Number of employees provided skill development training
SDG 05 – Gender Equality: Relevant SDG Target: 5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate	Measurement Method: The contribution will be reported as: (1) hours/year saved on fuel wood collection and cooking time (including cleaning) attributed to the installation of a biodigester and (2) usage of saved time. The female member of the household in charge of cooking and/or cooking fuel collection, will be asked: <i>How much time did you save on cooking and other cooking activities due to cooking on biogas and what she did with the saved time, or if no time savings were reported, the reason why there was no time saved</i> QA/QC Process: . Time savings will be calculated with this equation: $GSDM-I.5.4.1 = T_s \times N_{b,p,y} \times U_{p,y}$ Where: GSDM-I.5.4.1: Hours' time saved in the MP

	Ts: Time savings (hours per day) $N_{b,p,y}$: Technology days included in the MP $U_{p,y}$: Usage rate for technologies in project scenario p in year y (fraction) Indicator: Average time saving associated with cooking time and fuel collection. Use of saved time								
SDG 07 – Affordable and clean energy: Relevant SDG Target: 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	Measurement Method: Increased access to clean energy will be calculated with this equation: $GSDM-I.7.1.1 = U_{p,y} \times N_d \times HHs$ Where <table> <tr> <td>$GSDM - I.7.1.1$</td><td>Contribution to SDG 7 in number beneficiaries with increased access to energy</td></tr> <tr> <td>$U_{p,y}$</td><td>Usage rate for technologies in project scenario p in year y (fraction)</td></tr> <tr> <td>N_d</td><td>Number of biodigesters constructed</td></tr> <tr> <td>HHs</td><td>Household size</td></tr> </table> QA/QC Process: Not applicable Indicator: Number of beneficiaries: Individuals and households	$GSDM - I.7.1.1$	Contribution to SDG 7 in number beneficiaries with increased access to energy	$U_{p,y}$	Usage rate for technologies in project scenario p in year y (fraction)	N_d	Number of biodigesters constructed	HHs	Household size
$GSDM - I.7.1.1$	Contribution to SDG 7 in number beneficiaries with increased access to energy								
$U_{p,y}$	Usage rate for technologies in project scenario p in year y (fraction)								
N_d	Number of biodigesters constructed								
HHs	Household size								
SDG 08 – Decent work and economic growth: Relevant SDG Target: 8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	Measurement Method: Defined as the total number of masons provided biodigester jobs. This data will be collected from the project database and constitutes a simple count of the individual masons provided employment. QA/QC Process: Cross checking the employee records for consistency with the database. Indicator: Total number of jobs								
SDG 09 – Industry, innovation and infrastructure: Relevant SDG Target: 9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets	Measurement Method: The total number of companies supported are defined as the total number of biodigester construction enterprises (BCE) involved in biodigester construction QA/QC Process: This data will be collected from the project database and constitutes a simple count of individual BCE. On top of that, other companies active in the biodigester value chain, can be included, i.e. stove importers or assemblers. Indicator: Total number of companies supported for their integration into value chains and markets								
SDG 12 – Responsible Consumption & Production: Relevant SDG Target: 12.5 By 2030, substantially reduce waste generation through prevention,	Measurement Method: Determined through surveys. This is the total amount of bio-slurry produced by multiplying feeding (kg manure/day) with the total number of digesters in operation with the following equation. $GSDM-I.12.5.2 = F_{b,p} \times N_{b,p,y} \times U_{p,y} \div 1000$ $GSDM-I.12.5.2$: Contribution to $GSDM-I.12.5.2$ in ton bio-slurry								

reduction, recycling and reuse	$F_{b,p}$: Biodigester feeding rate (kg manure/day) $N_{b,p,y}$: Number of technology days in included $U_{p,y}$: Usage rate for technologies in project scenario p in year y (fraction) QA/QC Process: Calculated based on surveys, and data analysis. Indicator: Bio-slurry produced and used for sustainable agriculture
SDG 13 – Climate Action: Relevant SDG Target: 13.2 Integrate climate change measures into national policies, strategies and planning	Measurement Method: Calculated and assessed in Section D.8 of this document QA/QC Process: N/A Corresponding indicator: Amount of GHGs emissions avoided or sequestered
SDG 15 – Life on Land: Relevant SDG Target: 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	Measurement Method: This value is calculated as the difference between baseline fuelwood consumption and project scenario consumption after implementation of the proposed project activity. $GSDM - 15.1.1 = N_{b,p,y} \times U_{p,y} (P_{b,wood,y} + P_{b,charcoal,y} \times C_c) - (P_{p,wood,y} + P_{p,charcoal,y} \times C_c)$ Where: GSDM-15.1.1: Contribution to SDG 15 in tonne/year $N_{b,p,y}$: Number of technology days in included $U_{p,y}$: Usage rate for technologies in project scenario p in year y (fraction) $P_{b,wood,y}$: Average daily consumption of wood in the baseline scenario per household obtained from the BFT (tonnes/household/day) $P_{b,charcoal,y}$: Average daily consumption of charcoal in the baseline scenario per household obtained from the BFT (tonnes/household/day) $P_{p,wood,y}$: Average daily consumption of wood in the project scenario per household obtained from the PFT (tonnes/household/day) $P_{p,charcoal,y}$: Average daily consumption of charcoal in the project scenario per household obtained from the PFT (tonnes/household/day) C_c: Wood to charcoal conversion factor QA/QC Process: Not applicable Indicator: Total amount non-renewable wood fuel saved
Conclusion	All SDGs in the Transition Annex are included for the second crediting period. Additional SDGs for the second crediting period (CPII) are: SDG 4, SDG 9, SDG 12 & SDG 15

D.11. Safeguarding Principle & Gender Sensitivity

Means of validation	According to Appendix 1 of the revised VPA-DD, no safeguarding principle is relevant and requires a mitigation measure. Therefore, no safeguarding principle is added into the proposed monitoring plan. The validation team can confirm that the ongoing voluntary project activity is not at risk of violating any of the GS4GG safeguarding principles. The CME has further assessment whether the project activity complies with GS4GG Gender Sensitive requirements. Section D.2 of the updated VPA-DD has demonstrated how the project address gender sensitive issues in line with the GS4GG. All the four questions in the VPA-DD template version 2.3 have been duly
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	answered to the satisfaction of the validation team. The following sources of information have been used in this context: • /VPA-DD/ • /PoA-DD/ • /IM01/ • /TECH/
Findings	-
Conclusion	The project complies with the GS4GG safeguarding principles and gender sensitive requirements. None of the principles or requirements require a mitigation measure.

D.12. Crediting period

Means of validation	The start date of the second crediting period is 15/03/2024, which is the date immediately after the end of the last crediting period. Therefore, the second crediting period shall be 15/03/2024 to 14/03/2031. The operational lifetime of the various biodigester models is between 7 and 35 years. Therefore, the crediting period is reasonable The chosen crediting period is 7 years renewable per the original registration, which is in line with the PoA-DD and VPA-DD. The following sources of information have been used in this context: • /VPA-DD/ • /PSD/ • /IM01/ • /TECH/
Findings	- CAR 01
Conclusion	The type and duration of the crediting period also indicated as 7years renewable per the original validation

D.13. CME and project participants

Means of validation	The validation team has checked the updated VPA-DD and the SustainCERT website^{/gs/}. The CME is Africa Bioenergy Program Limited (ABPL) and the local VPA implementing partner is Kenya Biogas Program (KBP). The information is consistent with Section A.6 of the validated and registered VPA-DD, and hence, no further analysis is required. The validation team has also checked the management agreement^{/AGR/} between the CME and the indicated VPA implementer in the VPA-DD. The following sources of information have been used in this context: - /VPA-DD/ - /PoA-DD/ - /gs/ - /AGR/						
Findings	<table border="1"> <tr> <td>☒</td><td>The names of the project participants as listed in the revised VPA-DD (sections A.1. and appendix 2) are consistent.</td></tr> <tr> <td>☐</td><td>The respective requirements have widely been complied with; however; the following issues needed to be addressed in this context:</td></tr> <tr> <td></td><td>- N/A</td></tr> </table>	☒	The names of the project participants as listed in the revised VPA-DD (sections A.1. and appendix 2) are consistent.	☐	The respective requirements have widely been complied with; however; the following issues needed to be addressed in this context:		- N/A
☒	The names of the project participants as listed in the revised VPA-DD (sections A.1. and appendix 2) are consistent.						
☐	The respective requirements have widely been complied with; however; the following issues needed to be addressed in this context:						
	- N/A						
Conclusion	<table border="1"> <tr> <td>☒</td><td>No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.</td></tr> <tr> <td>☐</td><td>The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.</td></tr> </table>	☒	No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.	☐	The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.		
☒	No CARs/CLs have been raised in this context. No correction was required in the context. The project is in line with the respective requirements.						
☐	The raised CARs/CLs have been addressed appropriately. The PP has carried out the requested corrections. All respective findings could be closed out. For details please refer to Appendix 4.						

	The names of the CME and the VPA Implementer are consistent with those listed on the original VPA-DD, and the title page and Section A.1 and Appendix 2 of the updated VPA-DD for the second crediting period (CPII).
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D.14. Post-registration changes

Type of post-registration changes (PRCs)	Confirmation (Y/N)	Validation report for PRCs	
		Version	Completion date
Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline	N		
Corrections	N		
Changes to start date of crediting period	N		
Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline			
Changes to project design of approved project	N		
Changes to the project design	N		
Changes specific to afforestation and reforestation activities	N/A		
Others (please specify)	N/A		

SECTION E. Internal quality control

Before the submission of the final validation report a technical review of the whole validation procedure was carried out. The technical reviewers are competent GHG auditors where at least one is being appointed for the scope this VPA falls under. The technical reviewers are not considered to be part of the verification team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the validation opinion and the topic specific assessments as prepared by the validation team leader may have been confirmed or revised. Furthermore reporting improvements might have been achieved.

After the successful technical review, an overall (esp. procedural) assessment of the complete validation has been carried out by a senior assessor located in the accredited premises of TÜV NORD CERT GmbH.

After this step the submission for requesting for registration is conducted.

SECTION F. Validation opinion

The Africa Bioenergy Programs Limited (ABPL) has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Gold Standard Design Certification Renewal (DCR) for the GS VPA “African Biogas Carbon Programme (ABC) - Kenya - VPA006” (GS ID 5801) with regard to the relevant requirements of the Gold Standard project activities, as well as criteria for consistent project operations, monitoring and reporting. The Gold Standard documentation and supporting documents were reviewed against the criteria as set out in the Gold Standard GS4GG requirements.

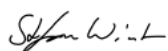
The Gold Standard documentation and supporting documents were reviewed against the criteria as set out in the GS4GG, respective Annexes and CDM requirements, as applicable. The subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM Certification Program with sufficient evidence to validate the fulfilment of the stated criteria applicable for validation.

In detail the conclusions can be summarized as follows:

- The project meets all eligibility criteria set by the GS.
- The project does not result in negative social, environmental and/or economic impacts.
- The project contributes to sustainable development.
- The project additionality is sufficiently justified in the VPA-DD.
- The project does not result in diversion of ODA.
- Conservative assumptions were applied in the project description.
- The monitoring plan of SDG parameters is transparent and adequate.
- The project meets all the stakeholder consultation requirements.
- The calculated emission reductions of **57,870632 tCO₂e** are most likely to be achieved within the 2nd crediting period of 7 years.

The conclusions of this report shows that the project, as it was described in the project documentation, is in line with all criteria applicable for the Renewal of crediting period.

Essen, ~~21~~8/086/2024



Winter Stefan

TÜV NORD JI/CDM Certification Program

Validation Team Leader

Appendix 1. Abbreviations

Abbreviations	Full texts
ABPL	Africa Bioenergy Program Limited
BCE	Biodigester construction enterprise(s)
BEST	Biogas Extension Service Technicians (field coordinators)
BGTA	BioGas Thermal Application
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
CME	Coordinating/Managing Entity
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Crediting Period
CSA	Community Services Activity
DCR	Design Certification Renewal
EcoFrontier	EcoFrontier Kenya Ltd. (consultant)
ER	Emission Reduction
FAR	Forward Action Request
fNRB	Non-renewable biomass (<i>fraction</i>), cf. applied GS methodology
GHG	Greenhouse gas(es)
GS	Gold Standard
GS4GG	Gold Standard for Global Goals
HH	Household
IPCC	Intergovernmental Panel on Climate Change
KBP	Kenya Biogas Program
MP	Monitoring Plan
LPG	Liquefied petroleum gas
LSC	Large Scale
MR	Monitoring Report
PRC	Post-registration changes
VPA-DD	Voluntary Project Activity Design Document
PP	Project Participant
SDG	Sustainable Development Goal
SSC	Small Scale
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VER	Voluntary Emission Reductions
VVB	Validation and Verification Body
VVS	GS Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

Statement of Competence

Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Winter Stefan

SCHEME	STATUS					VALID UNTIL
	Assessor	Lead Assessor	Senior Assessor	Host Country Expert	Technical Reviewer	
	Validation, Verification					
ISO 14064-2		X			X	2026.07.27
VCS		X			X	2026.07.27
UER		X			X	2026.07.27
Gold Standard		X			X	2026.07.27
CDM		X			X	2026.07.27

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.1	Thermal energy generation
1.2	Renewables
10.1	Fugitive emissions from oil and gas
13.1	Solid waste and wastewater
13.2	Manure
2.1	Energy distribution
3.1	Energy demand
4.1	Cement and lime production
4.2	Paper
5.2	Caprolactam, nitric and adipic acid
9.1	Aluminium and magnesium production
9.2	Iron, steel and Ferro-alloy production

163 - Rev. 09, Date: 2024-04-24

This document has been approved according to CERT-401-VA-007. Details are available from the QM-Department.

S01-VA060-F20

Rev. 04/02.23

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Statement of Competence

Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. David Lubanga

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor Technical Reviewer Host Country Expert (Kenya, Uganda, Rwanda, Tanzania, Burundi, Mali, Nigeria Ethiopia, Malawi, Ghana)	2025-09-30
Gold Standard	Senior Assessor Technical Reviewer Host Country Expert (Kenya, Uganda, Rwanda, Tanzania, Burundi, Mali, Nigeria Ethiopia, Malawi, Ghana)	2025-09-30

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
3.1	Energy demand
13.2	Manure

251 - Rev. 12, Date: 2023-06-15

251_S01-VA060-F20_20230615_rev12

S01-VA060-F20 rev12 2023-10-25

Statement of Competence

Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Victor Claudio Abarca Arriagada

SCHEME	STATUS					VALID UNTIL
	Assessor	Lead Assessor	Senior Assessor	Host Country Expert	Technical Reviewer	
	Validation, Verification					
ISO 14064-2		x				2025-07-05
VCS		x				2025-07-05
UER		x				2025-07-05
CDM		x				2025-07-05

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
6.1	Construction
13.1	Solid waste and wastewater
13.2	Manure

420 - Rev. 4, Date: 2024-03-04

Valid without signature

This document has been approved according to CERT-401-VA-007. Details are available from the QM-Department.

S01-VA060-F20

Rev. 04/02.23

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Statement of Competence

Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Ms. Alexandra Nuske

SCHEME	STATUS					VALID UNTIL
	Assessor	Lead Assessor	Senior Assessor	Host Country Expert	Technical Reviewer	
	Validation, Verification					
ISO 14064-2		X			X	2025.03.03
VCS		X			X	2025.03.03
UER		X			X	2025.03.03
Gold Standard		X			X	2025.03.03
CDM		X			X	2025.03.03
WKS		x			x	2025.03.03

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
14.1	Afforestation and Reforestation
1.2	Renewables

095 - Rev. 10, Date: 2024-04-24

Valid without signature

This document has been approved according to CERT-401-VA-007. Details are available from the QM-Department.

S01-VA060-F20

Rev. 04/02.23

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Statement of Competence

Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Ms. Joyce Mwikali Mbuyta

SCHEME	STATUS					VALID UNTIL
	Assessor	Lead Assessor	Senior Assessor	Host Country Expert	Technical Reviewer	
	Validation, Verification					
ISO 14064-2						2024-11-03
VCS				Kenya, Tanzania, Uganda, Rwanda,		2024-11-03
UER						2024-11-03
Gold Standard						2024-11-03
CDM						2024-11-03

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
15.1	Agriculture

407 - Rev. 00, Date: 2023-11-27

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Statement of Competence

Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Ms. Kröger Anna

SCHEME	STATUS					VALID UNTIL
	Assessor	Lead Assessor	Senior Assessor	Host Country Expert	Technical Reviewer	
	Validation, Verification					
ISO 14064-2	x				x	2028-07-10
VCS	x				x	2028-07-10
CDM	x				x	2028-07-10

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
13.1	Solid waste and wastewater
3.1	Energy demand
2.1	Energy distribution

425 - Rev. 01, Date: 2024-02-29

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S01-VA080-F20

Rev. 04/02.23

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Appendix 3. Documents reviewed or referenced

No.	Reference	Author	Title	References to the document	Provider
1.	/VPA-DD-T/	GS	- Voluntary project activity design document template form for GS Voluntary project activities – v1.1 - Template- V1.1 VPA Design Document	https://cdm.unfccc.int/Reference/PDs_Forms/index.html	Other
2.	/CPM/	VVB	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)	-	Other
3.	/GOT/	UNFCCC	Glossary “CDM terms” – version 10.0	https://cdm.unfccc.int/filestorage/e/x/t/extfile-20150226124447549-glos_CDM.pdf/glos_CDM.pdf?t=UmZ8bnFjODI3fDCW9A3vJwR03kQQh4sbLiYu	Other
4.	/IPCC/	IPCC	1. 1996 IPCC Guidelines for National	www.ipcc-	Other

No.	Reference	Author	Title	References to the document	Provider
			Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book 3. 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories	nggip.iges.or.jp	
5.	/KPI/	UNFCCC	Kyoto Protocol (1997)	http://unfccc.int/kyoto_protocol/items/2830.php	Other
6.	/MA/	UNFCCC	Decision 3/CMP. 1 (Marrakesh – Accords)	http://cdm.unfccc.int/Reference/CO2PMOP/index.html	Other
7.	/Meth/	GS	Methodology for Animal Manure Management and Biogas Use for Thermal Energy Generation v.1.1	https://globalgoals.goldstandard.org/standards/433_V1.1_TC_EE_ICSMethodology-for-Animal-Manure-Management-and-Biogas-Use-for-Thermal-Energy-Generation.pdf	Other
08.	/VVS/	GS	GS validation and verification standard, v1.0	http://cdm.unfccc.int/Reference/Standards/index.html	Other
09.	/PoA-DD/	CME	Programme of Activities: “African Biogas Carbon Programme (ABC)” version 8.1 – 29/06/2020 Programme of Activities: “African Biogas Carbon Programme (ABC)” version 9.2 – 14/09/2023	-	CME
10.	/CPM/	TÜV NORD	TÜV NORD JI / CDM Certification Program Manual (incl. procedures and forms)	-	TÜV NORD
11.	/DC/	TÜV NORD	PoA Design Change Validation Report “African Biogas Carbon Programme (ABC)” v2.0, dated 03/01/2024		Other
12.	/VPA-DD/	CME	GS5801: African Biogas Carbon Programme (ABC) - Kenya – VPA006 v.2.3 dated 21/01/2019 GS5801: African Biogas Carbon Programme (ABC) - Kenya – VPA006 v.1.1 dated 18/04/2024 GS5801: African Biogas Carbon Programme (ABC) - Kenya – VPA006 v.1.3 dated 06/05/2024 GS5801: African Biogas Carbon Programme (ABC) - Kenya – VPA006 v.1.4 dated 03/06/2024 <u>GS5801: African Biogas Carbon Programme (ABC) - Kenya – VPA006 v.1.5 dated 13/08/2024</u>		CME
13.	/KPT/	CME	- 03 SEP ABPL BFT LPG RESULTS SHEET - 03SEP ABPL BFT FIREWOOD RESULTS SHEET - 03SEP23 ABPL BFT CHARCOAL		CME

No.	Reference	Author	Title	References to the document	Provider
			RESULTS SHEET		
14.	/WRI/	CME	Warranty Certificate form		CME
15.	/TR/	CME	29Aug2023 VPA01 and VPA06 training list since 2016		CME
16.	/fNRB/	CME	27Feb23 Kenya_fnrb_assessmentVPA1 and VPA6		CME
17.	/PSD/	CME	first plant-Account_ KE-KWA-1512-13913 _ Salesforce - Enterprise Edition (002)		CME
18.	/ODA/	CME	Official Development Assistance Declaration		CME
19.	/BS/	CME	Baseline Survey		CME
20.	/TECH/	CME	Technical Specifications Manual-		
21.	/XLS/	CME	Emission Reduction Calculations_v1.1 Emission Reduction Calculations_v1.2 Emission Reduction Calculations_v1.3 <u>Emission Reduction Calculations_v1.4</u>		Other
22.	/PTA/	CME	PoA Transition Annex		Other
23.	/XLS/	CME	KPT survey results		CME
24.	/ipcc/	IPCC	IPCC publications	www.ipcc-nggip.iges.or.jp	Other
25.	/unfccc/	UNFCCC	UNFCCC	http://cdm.unfccc.int	Other
26.	/gs/	GS	Gold Standard Foundation	https://globalgoals.goldstandard.org/all-documents/	Other
27.	/XLS/	CME	SDG survey analysis		CME
28.	/MS%/	GS	GS Email on MS Survey		CME
29.	/SMS/	CME	SDG Monitoring Survey		CME
30.	/VER/	CME/VVB	Monitoring Report v1.5, dated 10/01/2023 (CPI-MPIV) Verification Report v5.0, dated 30/01/2023 (CPI-MPIV) Monitoring Report v1.4, dated 06/04/2024 (CPI-MPV) <u>Monitoring Report v1.6, dated 03/07/2024 (CPI-MPV)</u> Verification Report v1.0, dated 19/04/2024 (CPI-MPV) <u>Verification Report v2.0, dated 10/07/2024 (CPI-MPV)</u>		CME/VVB
31.	/VVS/	/GS/	GS Validation and Verification Standard v1.0		/GS/
32.	/PARP/	/GS/	GS4GG Programme of Activity requirements and procedures, v.2.0		
33.	/GE/	/GS/	GS4GG Gender Equality Requirements and Guidelines, v2.0		/GS/
34.	/PRI/	/GS/	GS4GG Principles & Requirements, v1.2		/GS/
35.	/CSA/		GS4GG Community Services Activity Requirements, v1.2		/GS/
36.	/SVR/	/GS/	GS4GG Site Visit and Remote Audit Requirements and Procedures, v2.0		/GS/
37.	/SSI/	/UNFCCC/	Standard - Sampling and surveys for CDM project activities and programmes of activities, v9.0		
38.	/SG/	/UNFCCC	Guideline - Sampling and surveys for		

No.	Reference	Author	Title	References to the document	Provider
		C/	CDM project activities and programmes of activities, v4.0		
39.	/TECH/	/various/	Technical Specifications of the Biogasifiers: - 1. Blue Frame Product Catalogue 2. Home Biogas Flyer 3. Flexi Biogas Product 4. Construction Manual MKD 5. MKD, KENBIM and AKUT product 6. Design and construction of domestic biogas plants-Code of practice Floating drum 7. Design and construction of domestic plants-Code of practice Fixed dome		/CME/

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

Table 1. CL from this validation

CL ID	01	Section no.	Date: 01/05/2024
Description of CL			
VPA-DD version 1.1, Key Project Information 1. The date of the VPA06 design certification is not correct 2. The VPA06 GS ID is not correct			
Project participant response (1st round)			Date: 03/05/2024
Both are now updated			
Documentation provided by project participant (1st round)			
☒	Changes in the PDD	Section(s): 1.1	New version No.: 1.2
☐	Changes in MR	Section(s):	New version No.:
☐	Changes in XLS	Worksheet(s):	New version No.:
☐	Other:		
VVB assessment (1st round)			Date: 04/05/2024
VPA-DD version 1.2, Key Project Information 1. The date of the VPA06 design certification is now corrected. 2. The VPA06 GS ID is not correct			
Conclusion Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed	

CL ID	02	Section no.	Date: 01/05/2024
Description of CL			
VPA-DD version 1.1, Section B.2 BGTA 14 & BGTA 15: Please clarify if AR4 values will be applied for vintages prior to 2021, considering the start of CPII			
Project participant response (1st round)			Date: 03/05/2024
The start date of CP2 is in 2024, thus only AR5 values will be applied			
Documentation provided by project participant (1st round)			
☒	Changes in the PDD	Section(s):	New version No.: 1.2
☐	Changes in MR	Section(s):	New version No.:

☐ Changes in XLS	Worksheet(s):	New version No.:
☐ Other:		
VVB assessment (1st round)		Date: 04/05/2024
VPA-DD version 1.2, Section B.2		
Only AR5 values are applicable. The AR4 values are now excluded		
Conclusion <i>Tick the appropriate checkbox</i>	☐ Additional action should be taken (finding remains open) ☒ The finding is closed	

Table 2. CAR from this validation

CAR ID	01	Section no.		Date: 01/05/2024
Description of CAR				
VPA-DD version 1.1, Section C.2.1				
The start date of the CPII crediting period is not correct				
Project participant response (1st round)				Date: 03/05/2024
This is now corrected				
Documentation provided by project participant (1st round)				
☒ Changes in the PDD	Section(s): c.2.1		New version No.: 1.2	
☐ Changes in MR	Section(s):		New version No.:	
☐ Changes in XLS	Worksheet(s):		New version No.:	
☐ Other:				
VVB assessment (1st round)				Date: 04/05/2024
VPA-DD version 2.2				
The start date of the CPII crediting period is now corrected to 14/03/2024				
Conclusion <i>Tick the appropriate checkbox</i>	☐ Additional action should be taken (finding remains open) ☒ The finding is closed			

CAR ID	02	Section no.		Date: 01/05/2024
Description of CAR				
VER Spreadsheet				
Tab 'Sampling': Some cells have errors and must be corrected.				
Project participant response (1st round)				Date: 03/05/2024
The tab sampling is removed. The tab was erroneously copied from the VPA01 spreadsheet. In that spreadsheet the tab was used to calculate the sample size of the first monitoring survey of VPA01 in CPII. The results from that survey are used to estimate values of certain parameters in this VPA-DD. References to VPA01 are made were applicable.				
Documentation provided by project participant (1st round)				
☐ Changes in the PDD	Section(s):		New version No.:	
☐ Changes in MR	Section(s): n/a		New version No.: 1.2	
☒ Changes in XLS	Worksheet(s):		New version No.:	
☐ Other:				
VVB assessment (1st round)				Date: 04/05/2024
VPA-DD version 2.2				
The tab is removed. VPA06 applies values for VPA01 for CPII since the baseline characteristics and the project boundary are the same				
Conclusion <i>Tick the appropriate checkbox</i>	☐ Additional action should be taken (finding remains open) ☒ The finding is closed			

Table 3. FAR from this validation

FAR ID	01	Section no.	B.6.1	Date: 01/05/2024
Description of FAR				

Baseline Survey,			
1. The baseline survey study was conducted based on 2006 IPCC provisions. The same shall be repeated at first verification following the requirements of the 2019 IPCC procedures for baseline parameters BGTA 5, BGTA 6, BGTA 8, BGTA 9, and BGTA 31.			
2. The verifying VVB shall ensure to confirm during the site visit that only households with similar socio-economic characteristics to the project households and did not own a biodigester prior to the survey are included in the survey sample.			
Project participant response			Date: 03/05/2024
That is correct, see the additional comments and remark in the MR. This is an activity we will execute for the first verification.			
Documentation provided by project participant			
☐	Changes in the PDD	Section(s):	New version No.:
☐	Changes in MR	Section(s):	New version No.:
☐	Changes in XLS	Worksheet(s):	New version No.:
☐	Other:		
VVB assessment			Date: DD/MM/YYYY
N/A at the stage of Design Certification Renewal			
Conclusion <i>Tick the appropriate checkbox</i>		☒ Additional action should be taken (finding remains open) ☐ The finding is closed	