Verification and certification report form for GS Voluntary Project Activity		
Complete this form in accordance with the instructions attached at the end of this form.		
BASIC INFORMATION		
Title and GS reference number of the Voluntary Project Activity (VPA)	African Biogas Carbon Programme (ABC) – Uganda VPA003 (GS4236) (PoA: African Biogas Carbon Programme (ABC) (GS2747)) Project No: MY-GSPVer 21/08 <21/043>	
Version number(s) of the VPA-DD to which this report applies	3.1	
Version number of the verification and certification report	1.1	
Completion date of the verification and certification report	25/11/2021	
Monitoring period number and duration of this morning period	CPI MP: 4 Duration: 01/05/2020 – 30/04/2021 (both dates inclusive)	
Number and version number of the monitoring report to which this report applies	Number: 1 Version: 1.3	
Project Representative	Project Representative - HIVOS VPA Implementer: Biogas Solutions Uganda Ltd (BSUL)	
Host Parties	Host Parties of the PoA	Is this a host Party to a VPA covered in this report? (yes/no)
	Uganda	Yes
Applied methodologies and standardized baselines	Technologies and Practices to Displace Decentralized Thermal Energy Consumption, version 1.0	
Mandatory sectoral scopes linked to the applied methodologies	Scope 1: Energy industries (renewable-/non-renewable sources) Scope 13: Waste handling and disposal	
Conditional sectoral scopes linked to the applied methodologies, if applicable	-	
Estimated amount of ex-ante GHG emission reductions or GHG removals for this monitoring period in the included VPAs covered in this report	**11,601 tCO_2e**	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included VPAs covered in this report	**22,154 tCO_2e**	

Name of the VVB	TÜV NORD CERT GmbH
Name, position and signature of the approver of the verification and certification report	Kunal Rami Senior Assessor 

SECTION A. Executive summary

Biogas Solutions Uganda Ltd (BSUL) has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 4th periodic verification of CPI of the Voluntary Project Activity:

"African Biogas Carbon Programme (ABC) – Uganda -VPA003 (GS 4236)"

The VPA was registered with GS on 09/04/2017, registration GS 4236 with the 1st crediting period from 19/04/2015 to 18/04/2022 (including both dates) according to the GS registration review.

The VPA aims to reduce GHG emissions to stimulate the use of biogas systems to replace traditional thermal energy generation methods by making biogas systems affordable and available to households.

This verification report covers the monitoring period from 01/05/2020 – 30/04/2021 (including both days).

Details of the VPA location in table A-1 below:

Table A-1: Project Location

No.	Project Location
Host Country	Uganda
Region:	All regions of Uganda
Latitude:	4°12'53.79" to -1°28'19.22" N,
Longitude:	29°34'17.52" to 35°2'33.81" E.

The technology implemented in this VPA are biodigesters of fixed dome type installed underground to treat animal waste anaerobically to generate biogas for use as cooking fuel and the bio-slurry as organic fertilisers for farming.

The below table for the number of units installed by size.

Table A-2: Digester capacities installed in this MP

Size (m^3)	Quantity	Percentage
4	323	3.8
6	5,191	61.7
8	8	0.1
9	1,870	22.2
12	246	2.9
13	738	8.8
>13	43	0.5
sum	**8,419**	**100**

Table A-3: Technical specification of the digester[1]

Plant Specification	Unit	4 m^3	6 m^3	9 m^3	12 m^3	13m^3	16 m^3
Plant Volume	litre	3,900	5,850	8,775	13,163	13,162.5	16,380
Gas Storage Volume	litre	900	1,350	2,025	3,038	3037.5	3,780
Digester Volume	litre	3,000	4,500	6,750	10,125	10,125	12,600
Min. Feeding	Kg/day	25	38	56	84	84.4	105

[1] As per BSUL technical information: Specific about MCD document. Larger digesters than 13 m^3 are installed, but these compromise just 0.5% of all units installed and therefore not detailed. The performance of these digesters will be proportional to the increase in digester volume. The 13 m^3 digester is relatively popular with 8.2% of all digesters installed. This digester has a comparable technical specification with the 12 m^3 as the size difference is small

Max. Feeding	Kg/day	38	56	84	127	126.6	157.5
Min. daily gas production	m^3/day	1.00	1.50	2.25	3.38	3.4	4.2
Max. daily gas production	m^3/day	1.50	2.25	3.38	5.06	5.1	6.3
Average daily feeding	Kg/day	31	47	70	105	105.5	131.3
Average gas production	m^3/day	1.25	1.88	2.81	4.22	4.2	5.3

Plant Specification	**Unit**	**20 m^3**	**35m^3**	**35m^3**	**40m^3**	**45m^3**
Plant Volume	litre	20,280	30,420	35,100	40,170	45,630
Gas Storage Volume	litre	4,680	7,020	8,100	9,270	10,530
Digester Volume	litre	15,600	23,400	27,000	30,900	35,100
Min. Feeding	Kg/day	130	195	225	257.5	292.5
Max. Feeding	Kg/day	195.0	292.5	337.5	386.3	438.8
Min. daily gas production	m^3/day	5.2	7.8	9.0	10.3	11.7
Max. daily gas production	m^3/day	7.8	11.7	13.5	15.5	17.6
Average daily feeding	Kg/day	162.5	243.8	281.3	321.9	365.6
Average gas production	m^3/day	6.5	9.8	11.3	12.9	14.6

As a result, of this verification, the verifier confirms that:

- all operations of the project are implemented and installed as planned and described in the approved Transition Annex for the PoA and VPA.
- the monitoring plan is in accordance with the applied approved GS methodology, i.e., *Technologies and Practices to Displace Decentralized Energy Consumption (version 1.0)*
- the monitoring system is in place and functional. The VPA has generated GHG emission reductions.

As the result of the 4th periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner

Emission reductions: **22,154 tCO_2e**

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team members

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	EI	Cheong	Chun Yuen (Robert)	TN Malaysia	x	-	x	x
2.	Interviewer	EI	-	-	Technobrian	-	-	x	-

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)
1.	Technical reviewer	EI	Lubanga	David	-
3.	Approver	IR	Rami	Kunal	TÜV NORD CERT GmbH

SECTION C. Means of verification

C.1. Desk/document review

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

- the approved Transition Annex the PoA including the monitoring plan;
- the approved revised version of the VPA-DD/;
- the GS approved version of the VPA validation report;
- the GS review and approval of design change;
- the monitoring report, including the claimed emission reductions for the VPA,
- the emission reduction calculation spreadsheet.

Other supporting documents, such as any publicly available information and background information were reviewed.

C.2. On-site inspection

Duration of remote audit:				
No.	**Activity performed**	**Site location**	**Date**	**Team member**
1.	Review of MR, ER, DB, Survey reports, KPT, Leakage	Kuala Lumpur	14/06/2021 to 17/06/2021	Cheong, Chun Yuen (Robert)
2.	Review of interview results		08/07/2021	
3.	Discussion of MR, ER, DB, Survey reports, Leakage, KP, interview results,		13/07/2021	

Interviews /IM/

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Buysman	Eric	HIVOS - Carbon Consultant / IM01/	14/06/2021	Opening meeting, Households interviews	Cheong, Chun Yuen (Robert)
2	Muule	MIchel	BSUL - Program Coordinator /IM02/			
3	Okello	Anthony Walter	BSUL - Quality, CSC, & Extension Manager /IM02/			
4	NA	NA	Technobrain	16/06/2020 to 07/07/2020	Households Interviews, BCE and masons	NA
5.	Buysman	Eric	HIVOS - Carbon Consultant / IM01/	12/07/2021	Interview results, Grievance tracker, DB	Cheong, Chun Yuen (Robert)
6.	Muule	MIchel	BSUL - Program Coordinator /IM02/			
7.	Okello	Anthony Walter	BSUL - Quality, CSC, & Extension Manager /IM02/			
8.	Buysman	Eric	HIVOS - Carbon Consultant / IM01/	13/0/7/2021	MR, ER, DB, Survey reports, KPT, Leakage, Interviews Review of households' interviews results	

The verification team sought support from Technobrain to conduct telephone interviews of BCEs, masons and householders to obtain feedback for compliance of SDG requirements

Telephone interview of masons and BCEs conducted on 16/06/2021 to 07/07/2021

List of BCEs

Name of BCE	Name of Person Interview
Biogas Gurus	David Okwii
Enercom	Yiga Vicar
BIOMEL	Tumureebe Mathias
RMDA	Twinomujuni Ephraim
ECOSAFE	Bannada Nswa
DREA	Steven Byekwaaso

List of Masons

Name of Mason	Name of BCE
Ocen Francis	Enercom
Bukenya Samuel	Green Gold
Kiconco Adrinah	PREC

Lukwago Richard	DREA
Olwa Mark	Enrcom
Owere Simon Ilado	MREC
Gumoshabe Gerivas	Innos

Telephone interviews of households from 19/06/2020 to 29/06/2020

Telephone Interviews of Households / LHH/

List of randomly selected households							
No.	**Plant Code**	**Householder Name**	**Location**				
1	BSU/46	Bateganya Henry	Buyende	Budiope	Kidera	Ntaala	Nakawa
2	BSU1/03683	Barungi Alex	Rukungiri	Rubabo	Buyanja	Rwakirungura	Kagarama
3	BSU1/04447	Godfrey Tebesigwa	Buikwe	Buikwe north	Njeru town council	Njeru	Mbiko
4	BSU1/04013	Omedo Sam	Pallisa	Agule	Apopong	Obwanai	Dudi
5	BSU1/01058	Kiwanuka Gladys	Butambala	Butambala	Bulo	Bulo	Mpanga
6	BSU1/02804	Rujoki Vellina	Kiruhura	Nyabushozi	kenshunga	Rushere	kacumbiro
7	BSU/04215	Bulalu Stephen	Kapchorwa	Tingey	Kapsinda	Kongowo	Kapchepangang
8	BSU1/02309	Magona Darius Nathan	Mbale	Bunghokho	Nakaloke	Namunsi	Busajabwakuba
9	BSU1/02316	Mubogi Lonah	Mbale	Bunghokho	Busoba	Busoba	Mikhai
10	BSU1/02525	Mutanda Nalongo	Sembabule	Mawogola	mateete	nakagongo	katyaaza
11	BSU1/00583	Muwema Christine	Jinja	Butembe	MAFUBIRA	Mafubira	Mafubira
12	BSU1/03060	Atnoto Agili	Mukono	Mukono municipality	Mukono central division	Gulu A	kigombya
13	BSU1/04472	Emanuel Kuteesa	Mukono	Mukono north	Kyampisi	Dundu	Dundu
14	BSU1/05156	Michael Edke Ojok	Wakiso	Kyaddodo	Nangabo	Gayaza	Kabunza
15	BSU/1645	Nkangabwa Abdu	Kalungu	Kalungu	Kalungu	Kitamba	Kagasa
16	BSU1/01273	John Ndazorore	Isingiro	Isingiro North	Nyamuyanja	Nyamuyanja	Karutanga

17	BSU1/01275	Jedrina Bagira	Isingiro	Nyakitunda	Nyakitunda	Ntungu	Ntungu west
18	BSU1/04609	Beda Tumwebaze	Sheema	Sheema	kagango	Kiziba	Rwenkarabo
19	BSU1/02106	Okurut Albert James	Kumi	Kumi municipality	Southern division	Akibui aputon ward	Alikodo
20	BSU1/04011	Ecaat Rose	Pallisa	Pallisa	Pallisa T C	Kaucho	Kalaki
21	BSU1/02179	Ogalai Robert	Ngora	Ngora	Kapir	Kokong	Kokong
22	BSU1/02280	Gidongo Loyce Paul	Mbale	Bungokho North	Namanyonyi	Aisa	Aisa teko
23	BSU/1047	Kaboggoza Ahmed	Mpigi	Mawokota	Mpigi Town Council	Mpami Ward A	Mpami
24	BSU/01549	Mupalya Michael	Mbale	Bunghokho	Bungokho	Bumagen	Shananada
25	BSU1/01671	Higenyi Moses	Butalejja	Bunyole west	Busabi	Malanga	Bugegere
26	BSU/00017	Nalusiba Kotilda	Tororo	Malanga	osukuru	Morukatipe	Aputir west
27	BSU/01557	Wamanga Salim	Mbale	Bunghokho	Bungokho Mutoto	Mooni	Mutoto
28	BSU1/01673	Kudeba Gideon	Butalejja	Bunyole west	Busabi	Malanga	Muhuyu
29	BSU/706	Annet Bwanika	Masaka	Masaka municipality	Nyendo Senyange.	Senyange	Senyange.
30	BSU1/02869	Livingstone Guloba	Kayunga	Ntenjeru south	Nazigo	Nsiima	Kiremezi (B)
31	BSU/1118	Kaswabri Besweri	Mayuge	Bunya West	Imaniro	Mbaale	Igunda
32	BSU1/04705	Nabukalu Gladys	Buikwe	Buikwe west	Najjembe	Kabanga	Kikkati
33	BSU1/03934	Fred Mugambi	Wakiso	Kyaddodo	Busukuma	Kambumba	Namawata
34	BSU1/03837	Godfrey Ntwatwa	Wakiso	Nansana	Busukuma	Wamilongo	Kibibi
35	BSU1/03211	Hiport Twineokwesiga	Mbarara	Kashari	Rubindi	Kabare	Karuhama
36	BSU1/04613	Xavier Bangirana	Sheema	Sheema	Kigarama	Kyengando	Rwenkaira
37	BSU1/01408	Massa John	Mbale	Bunghokho	Namanyonyi	Nkoma	Namatala
38	BSU1/05293	Arac Grace	Amuru	Kilak	Lamogi	Palema	Amilobo
39	BSU1/03694	Katesigwa Norah William	Rukungiri	Rubabo	Kebisoni	Kabingo	Karire

40	BSU1/02777	Mugisha John Forest	Kiruhura	Kazo	Kazo	Mbaba	Mbaba
41	BSU/03700	Manana David	Sironko	Budadiri east	Buhugu	Bumatofu	Bukibolo
42	BSU1/02271	Nabuka Getrude	Mbale	Bunghokho	Namanyonyi	NAMAGUMBA	NAMAGUMBA N
43	BSU1/04076	Wegomba Amos	Kibuku	Kabweri	Bulangira	Pulaka	BukomoloK
44	BSU1/04253	Kiyeyi John	Kapchorwa	Tingey	Kebeywa	Yembek	Matugutu
45	BSU1/01271	Grace Mugume	Isingiro	Isingiro	Nyamuyanja	Karutanga	Karutanga
46	BSU/2739	Musa Kagubiru	Iganga	Namungalwe	Namungalwe	Namungalwe	Busano
47	BSU/2237	David Lyagoba	Kamuli	Bugabula north	balawoli	kawaga	nawangaza
48	BSU1/02937	Hajj Lukenge Badru	Mpigi	Mawokota north	Muduma	Tiribogo	Busaanyi
49	BSU1/01985	Mudaki Fazali	Butalejja	Bunyole	Kachonga	Kyadongo	Nantalu
50	BSU1/01742	Massolo Rebecca	Manafwa	Bubulo west	Nalondo	Butsema	Nasya
51	BSU1/00373	Kakooko Elphazi	Kyegegwa	Kyakka	Ruyonza	Karwenyi	Kiremba
52	BSU/04639	Mugyimbaho Fred	Nakasongola	Budyebo	Nabiswere	Mulonzi	Kigalambi
53	BSU/02803	Mustafa Tafumba	Kayunga	Ntenjeru north	Kayunga	Bukorooto	Ntooke
54	BSU1/01067	Luyirika Edward	Mityana	Busujju	Kakindu	Kakindu Town Board	Kakindu
55	BSU/3054	Salimu Muhammed	Jinja	Kagoma	Bundondo	Naminzi	Buyala
56	BSU/2665	Mbuliro Pauline	Wakiso	nangabo	nangabo	watuba	kiti
57	BSU1/03932	Godfrey Ssentongo	Wakiso	Kyaddodo	Gombe	Mattuga	Kilyagonja
58	BSU1/03860	Abdala Waswa	Luweero	Katikamu	Katikamu	Bukalasa	Kibike
59	BSU1/03730	Muhereza Banard	Ntungamo	Ruhaama	Ntungamo	Kahunga	Kibogota
60	BSU/03262	Mbabazi Hellen	Isingiro	Isingiro North	Masha	Nyakakoni	Nyakakoni
61	BSU1/03658	Kweyamba Rauben	Rukungiri	Rubabo	Buyanja	Bugyera	Rugongo
62	BSU1/03743	Kiiza Godfrey	Ntungamo	Ruhaama	Ntungamo	Nyarubare	Kyabahinda

63	BSU1/01332	Cyril Kamagara	Bushenyi	Nyarubare	central	Ruharo	Kamira
64	BSU1/05080	Herbart Baguma	Lyantonde	Lyantonde	Ryakajjura	Ryakajjura	kyemamba
65	BSU/04122	Sukuku Erisa	Kapchorwa	Tingey	Kaptanya	Kirwoko	Karasa
66	BSU1/04080	Kapio Loy	Pallisa	Butebo	Petete	Sidanyi	Sidanyi B
67	BSU1/05260	Akello Gloria Anna	Lira	Erute North	Adekokwok	Boroboro	St Katherine
68	BSU1/05163	Willy Ssengendo	Wakiso	Nkumba	Katabi	Nkumba	Nkumba
69	BSU/04615	Kwesiga Elisha	Kagadi	Buyaga East	Mabaale	Karanzi	Kyejumikire
70	BSU1/00080	Jokene Jovan	Apac	Maruji	Ibuje	Tarogali	Baracut
71	BSU1/02321	Muyonga Samuel W	Bududa	Bulucheke	Bulucheke	Bumwale	Nabukara
72	BSU1/01512	Auyo Lekeboamu	Tororo	Tororo south	Kwapa	Kwapa	Amagoro
73	BSU1/04791	Shilaku Lukas	Manafwa	Bubulo west	Kaato	Bunabusale	Bunekesa
74	BSU1/04005	Arikod Nicholas	Pallisa	Kibale	Kibale	Agurur	otadan
75	BSU1/03221	Mable Kaita	Mbarara	Kashari	Biharwe	biharwe	Biharwe
76	BSU1/04640	George Tibaijuka	Bushenyi	Igara	Kyabugimbi	Baijengye	Beijegye
77	BSU1/04422	Lawrance Mukasa	Mukono	Mukono south	Nakisunga	Seeta-Nazigo	Kitebe
78	BSU1/00081	Akello Ebong Agness	Apac	Maruji	Ibuje	Tarogali	Teacoda
79	BSU1/04728	Kasujja Isma	Buikwe	Bubulo west	Buikwe	Bunabusale	Matale
80	BSU/4187	Madolena Moro	Lira	Erute North	Lira	Amuca	Adyangopiro
81	BSU/4422	Mutalage Kennth	Jinja	kagoma	buwenge	magamaga	magamaga east
82	BSU1/05245	Richard Mayanja	Wakiso	Kyaddodo	Makindye	Makindye	Nalumunye
83	BSU/4642	Nazziwa Wtheresa	Masaka	Bukoto	Kabonera.	Kirimya.	Gayaza.
84	BSU1/02818	Francis Ssimbwa	Kayunga	Ntenjeru north	Kayunga town council	Bukoloto	Ndeeba
85	BSU1/05200	Isirael Kambungu Kizza	Nakaseke	Bulemeezi	Nakaseke TC	Nakaseke	Kigedde

86	BSU1/03872	Nakyambadde Semambo	Luweero	Katikamu	Katikamu	Katikamu	Kande
87	BSU/3697	Haji Musa Lubega Masimbi	Wakiso	Kyaddodo	kira	Bweyogerere	Bweyogerere
88	BSU/5111	Nakayanja Teopista	Kalungu	Kalungu	Kalungu	Kalungu	Kalungu
89	BSU1/05369	Ssenfuka Jimmy	Kyankwanzi	Ntwetwe	Ntwetwe Town Council	Ntuuti	Ntiba
90	BSU1/05384	Tibategyeza Fred	Kyankwanzi	Ntwetwe	Gayaza	Kiryajjobyo	Kibanda Lc 1
91	BSU1/01201	Francis Tinkarugizire	Sheema	Sheema	Kyangyenyi	Rwibare	katooma 1
92	BSU/04807	Nyakira Eldard	Mbarara	Bubare	Bubare	Kashaka	Nsozi
93	BSU1/04604	Keneth Murangira Kiiza	Sheema	Sheema	Kagango	Kagango	Kanyaina
94	BSU/01025	Mbuubi Thomas	Hoima	Kiziranfumbi	Kiziranfumbi	Butimba	Butimba
95	BSU/00057	Magada Paul	Jinja	Jinja	Jinja	Jinja	Hill zone
96	BSU/00010	Osillo Sabela	Tororo	Tororo south	osukuru	osukuru	Asinge b
97	BSU1/01591	Ofwono Charles	Tororo	West Budama north	Paya	Paya	Padula
98	BSU1/01909	Odeke Michael	Amuria	Amuria	Asamuk	obur	Akumangor
99	BSU1/02389	Kuchana Fred	Mbale	Bunghokho	Namanyonyi	Aisa	Asia Teco
100	BSU1/02264	Magala Rukia	Mbale	Bunghokho	Namanyonyi	Nkoma	Kinyoli
101	BSUL/01556	Mudde Peter	Mbale	Bunghokho	Nkoma	Nkoma	Kanikwa
102	BSU1/01710	Nabitu Samuel	Butalejja	Bunyole west	Budumba	Budumba	Napindo
103	BSU1/04405	Christine Namubiru	Mukono	Mukono south	Nakisunga	Wankoba	Kisoroza
104	BSU/00208	Asiimwe Paddy/Asiimwe Francis	Bushenyi	Igara West	Bitooma	Bitooma	Bugomora
105	BSU/01628	Ntenge Andrew	Kyankwanzi	Mulagi	Mulagi	Mulagi	Mulagi
106	BSU/01452	Hasenyiri Ibrahim	Mbale	Bungokho North	Namanyonyi	Aisa	Mbiko 'B'
107	BSU/00984	Ngede Mubarak	Mbale	Bungokho North	Namanyonyi	Aisa	Namabwa
108	BSU/00979	Bisso Kalinaki	Mbale	Bungokho North	Namanyonyi	Nabweya	Nankobe

109	BSU/00967	Laurance Were`	Mbale	Bungokho North	Namanyonyi	Nkoma	Namatala
110	BSU/01325	Ndyabahinduka Deo	Bushenyi	Igara west	Kyabugyimbi	Bigyengye	Bigyengye A
111	BSU/03511	Okwana, Alfonse	Gulu	Omoro	Bobi	Palwo	Awimon A
112	BSU1/02018	Wanyama Deziranta	Bugiri	Bukooli Central	Buwunga	Bupala	Bupala
113	BSU/02122	Nabukwasi Fazira	Mbale	Namanyonyi	Namanyonyi	Aisa Techo	Aisa Teko
114	BSU1/04968	Major Isa Arisai Ecodu	Soroti	Dakabela	Arapai	Amoru	Amoru
115	BSU/02502	Gayaza High School Plant 1	Wakiso	Kyaddodo	Kasangati TC	Gayaza	Gayaza
116	BSU/02317	Bikangaga Yosam	Kamwenge	Kibale	Kahunge	Kahunge	Byabasita
117	BSU/04700	Ngabirano Bashiru	Kamwenge	Kibale	Kamwenge	Kamwenge	Nyanchwamba
118	BSU/04723	Binobwengye Eriabu	Kamwenge	Kitagewenda	Ntara	Ntara	Kyakasasira
119	BSU/04732	Muhumuza Stephen	Kamwenge	Kibaale East	Biguri	Malare	Kanyegaramire
120	BSU1/ 04733	Beragira John	Kamwenge	Kibale	Biguri	Kibuye	Makukuru
121	BSU/01833	Tweyongyere Sidi	Rukungiri	Rujumbura	Bugangari	Kazindiro	Nyankoro
122	BSU/06413	Tushabe Kitengye David	Mbarara	Kashari	Rwanyamahembe	Nyanja	Nyamirima
123	BSU/06561	Kizaji Beni	Rukungiri	Rukungiri municipality	West division	Kitimba	Maaya
124	BSU/07554	Haji Twaha Bakawonga	Mbarara	Mbarara Municipality	Biharwe	Nyakinengo	Rwemikunyu
125	BSU/06607	Tendo Andrew Andrew	Kiruhura	Nyabushozi	Rushere	Rushere	Rushere
126	BSU/06312	Kimono Florence	Busia	Sikuda	Sikuda	Sikuda parish	Syonga
127	BSU/06471	Namumpa Benon Benson	Isingiro	Bukanga	Endiizi	Endiizi	Endiizi
128	BSU/06474	Bahirayo Hope	Sheema	Sheema North	Masheruka	Mabare	Nyakambu
129	BSU/06667	Kaggwa Busingye winifred	Isingiro	Isingiro North	Masha	Nyamitsindo	Buyojwa
130	BSU/07603	Ahimbisibwe Robert	Isingiro	Isingiro	Birere	Kasana	Kiboona

131	BSU/06541	Batungwake Gaston	Kamwenge	Kitagewenda	Ntara	Ntara	Ntara tc
132	BSU/07412	Byamugisha Leogracious	Kamwenge	Bwiize	Nkoma	Ntonwa	Ntonwa
133	BSU/06542	Yamara Henry	Kamwenge	Kitagewenda	Ntara	Ntara	Ntara tc
134	BSU/07325	Pr. Musasizi Dawson (Plant 2)	Namutumba	Nsinze	Kibaale	Nambale	Bubago
135	BSU/012755	Guma Richard	Rubirizi	Bunyaruguru	Ryeru	Nyakiyanja	Nyakiyanja B
136	BSU/012774	Karangira Hope	Mbarara	Kashari	Rubaya	Rushozi	Nyatungu
137	BSU/012452	Muhoozi Alfred	kiruhura	kyabagyenyi	kyabagyenyi	kyabagyenyi	kyabagyenyi
138	BSU/012708	Kalyesubula Mathias	Mityana	kyabagyenyi	Banda	Banda Busujju	Mawanga
139	BSU/06236	Apollo, Willis Opoya	Pallisa	Butebo	Kabwagasi	Nasenyi	Doko
140	BSU/06223	Dr Godwin Julius	Mbale	Bunghokho South	Bumasakya	Musosto	Musoto
141	BSU/07812	Oriokot Tukei Alex	Soroti	Soroti	Soroti	Acetgwen	Orwadai
142	BSU/012354	Ebanu, Julius John	Amuria	Amuria	Asamuk	Atirir	Okoona
143	BSU/013405	Nankanjja Babra	Mukono	Ntenjeru	Mukono South	Ntanzi	Kisuga B
145	BSU/06971	Ntegakarija Chris	Bushenyi	IGARA WEST	KYAMUHUNGA	MASHONGA	KIBAZI
143	BSU/06970	Primary School, Kibirige Memorial	Buikwe	Buhikwe south	Ngogwe	Ndolwa	Kitenda
147	BSU/012425	Kubiriba, Kensi	Mbarara	Mbarara Municipality	Biharare	Nyakinengo	Migamba
148	BSU/08427	Cheptoek Stephen	Kapchorwa	Tingey	Tegeres	Kapchesy	Kapkurembe
149	BSU/014019	Rev. Tibamwenda, George	Kanungu	Kinkizi	Rugyeyo	Nyarurambi	Kyampungu
150	BSU/014167	Mugisha, Stephen	Kanungu	Kinkizi East	Kanungu T/C	Kinkizi East	Rumba
151	BSU/014031	Tukamushaba, Aggrey	Kanungu	Kinkizi East	Rugyeyo	Nyaruramba	Buhoro
152	BSU/012476	Kacwanisa, Michael	Kasese	Bukonzo West	Nyakatonzi	Kisasa	Muhumure
153	BSU/013759	Nyangan, Terreza	Nakapiripirit	Piani	Lorengdwat	Narisai	Lukwamor

154	BSU/09861	Twali, Julius	Mayuge	Bunya	Mayunge town council	Kasugu ward	Kasugu
155	BSU/07819	Lawerance, Etengu	Kaberamaido	Kalaki	Apapai	Amidakan	Ocukai
156	BSU/07126	Nakayima Mulongo, Suzan	Mukono	Mukono North	Nama	Katoogo	Katoogo
157	BSU/014330	Cheptoek Emmanuel	Kapchorwa	Tingey	Kapchesombe	Kapchesy	Chemuron
158	BSU/07771	Abele, Lino	Yumbe	Aringa south	Dragiini	Olivu	Katrini
159	BSU/ 018042	Tudyabagyenyi, Emmanuel (Emmy)	Rukungiri	Rujumbura	Western Division	Kabumba	Kibaare
160	BSU/013626	Alo, Jockson	Arua	Alivu	Aroi	Alivu	Alarava
161	BSU/013418	Wamukota, George	Mukono	Mukono Municipality	Goma Division	Seeta	Gwafu
162	BSU/018412	Katerega, Joseph Mulangira	Mityana	Mityana	Kiwawu	Kiwawu	Malangala
163	BSU/02511	Chiseveni Turyasingura	Mukono	Ntenjeru	Mpatta	Mawotto	Mawotto
164	BSU1/05241	Faridah Katalaga	Wakiso	Kyaddodo	Nakawa	Nakawa	Bukoto
165	BSU/2077	Ssalongo Yiga Isdore Plant 1	Wakiso	Kyaddodo	NANGABo	Kitagobwa	Kitagobwa
166	BSU1/03379	Mabirizi Kakande Angella	Kampala	Kyaddodo	Kawempe	Kyanja	Kyanja
167	BSU1/03801	Getrude Nakibinge	Kampala	Lubaga	Lubaga North	Lubya	Masanafu
168	BSU1/01062	Nasali Beatrice Mitaala	Mityana	Busujju	Kakindu	Ngugulo	Gombe
169	BSU/02303	Nkurikyiye Francis	Kamwenge	Kitagewenda	Kanara	Kanara 2	Ngoma II
170	BSU/03470	Ministry Limited, Shalom Restoration	Buikwe	Mukono south	Nakisunga	Namuyenje	Namuyenje

Addition Households Telephone Interview

List of randomly selected households.							
No.	**Plant Code**	**Householder Name**	**Location**				
1	BSU1/03379	Mabirizi Kakande Angella	Kampala	Kyaddodo	Kawempe	Kyanja	Kyanja

2	BSU/00215	Nakyembe Gertrude	Kampala	kawempe	kawempe	Mugulu	Mugulu Zone
3	BSU/01002	Leuben Mubuya Mambule	Kampala	Kyaddodo	Kanyanya	Kanyanya	Mugalu Zone
4	BSU1/03384	Nicholas Yiga	Kampala	Kyaddodo	Lubaga	Lubya	Masanafu
5	BSU/3948	Kawere Matia	Kampala	Lubwa	Lubaga	Lugala	Lugala
6	BSU1/03802	Abdu Kato Musigire	Kampala	Lubaga	Lubaga division	Lubya	Masanafu
7	BSU1/05158	David Nkata	Kampala	Kyaddodo	Lubaga	Nateete	Nateete
8	BSU/06915	Sendagire Edgar Kaggwa	Kampala	Lubaga South	Lubaga Division	Nateete	Nateete Church Zone
9	BSU/07083	Mukasa Faith	Kampala	Kyoobe	Lubaga	Lubaga	Lungujja
10	BSU/07880	Andrew, Kamya	Kampala	Kawempe	Bwaise	Bubajjwe	New Bubajjwe
11	BSU1/03385	Joseph Kibuuka	Kampala	Kyaddodo	Lubaga North	Lubya	Masanafu
12	BSU1/03801	Getrude Nakibinge	Kampala	Lubaga	Lubaga North	Lubya	Masanafu
13	BSU/07889	Ggita, Deborah Nakitende	Kampala	Kawempe North	Kawempe Div	Mpererwe	Mpererwe Ssekati zone
14	BSU1/03806	Mackline Sekimpi	Kampala	Makindye	Makindye	Lukuli	Lukuli konga
15	BSU1/05237	Roger Kiwanuka Edward	Kampala	Kyaddodo	Nakawa	Luzira	Kirombe
16	BSU/04303	Ssemakula Paul	Kampala	Kawempe North	Kawempe	Mpererwe	Namere
17	BSU1/00172	Serwawudde Daniel	Kampala	Kawempe	Kawempe Div	Komamboga	Komamboga
18	BSU/06919	Sonko Ayubu Waswa	Kampala	Kawempe North	Kawempe Div.	Kazo-Angola	Lugoba
19	BSU/07452	Hajati Mariam Nabukeera	Kampala	Kawempe 1	Kelizalawo zone	Kawempe 1	Kawempe
20	BSU/07456	Nsereko Christopher Ssajjabi	Kampala	Lubaga	Kabowa	Lubaga division	Wankulukuku
21	BSU/012706	Nsubuga Muhamed	Kampala	Kyaddodo	Nakawa	Bukoto 1 Namuli zone	Bukoto 1

22	BSU /017808	Kibira, Goefrey	Kampala	Kawempe	Kawempe North	Ssekati zone	Mpererwe
23	BSU/014512	Ssekyewa, George William	Kampala	Kyadondo	Jangu	Kibiri	Kibiri
24	BSU/07176	Kaate, James Lilian	Kampala	Makindye North	Kashanga	Kashanga	Mutesasira zone
25	BSU/17811	Dr. Rita, Kibuuka Musoke	Kampala	Lubega North	Lubega Division	Nakulabye	Masiro Zone III
26	BSU1/03392	Rita Nsamba	Wakiso	Kyaddodo	Nangabo	Gayaza	Kabanyolo
27	BSU1/05153	Wilson Mukasa Balibawo James	Wakiso	Kyaddodo	Nangabo	Gayaza	Gayaza
28	BSU1/05241	Faridah Katalaga	Wakiso	Kyaddodo	Nakawa	Nakawa	Bukoto
29	BSU1/05183	Hirome Sulaiman	Wakiso	Kyaddodo	Nangabo	Kiteezi	Kabuwoko
30	BSU1/03360	Makanga Musoke Samuel	Wakiso	Kyaddodo	Gombe	Mwererwe	Mabanga
31	BSU/1201	Kisarye Musísi Fred	Wakiso	Kyaddodo	nabwero	nabwero	maganja
32	BSU/2077	Ssalongo Yiga Isdore Plant 1	Wakiso	Kyaddodo	NANGABo	Kitagobwa	Kitagobwa
33	BSU1/03388	Margaret Kyazze	Wakiso	Kyaddodo	Nangabo	Kitagobwa	Jokolera
34	BSU/02505	Mukasa Moses	Wakiso	Kyaddodo	Kasangati TC	Katoozi	Kiteezi
35	BSU/07169	Charles Mwitanorwa	Wakiso	Kyaddodo	Kasangati	Nangabo	Nalya
36	BSU/06386	Hajji, Sebizizi	Wakiso	Kyadoddo	Kasangati TC	Kiteezi	Kiteezi
37	BSU/17925	Kaitura, Sarah	Wakiso	Kyaddondo	Kira	Kira	Mulawa
38	BSU/08352	Ssemayaba Fred	Wakiso	Gomba	Kasangati	Buwambo	Kigogwa
39	BSU1/03399	Willy Kiku	Wakiso	Katabi	Busiro	Katabi	Nkumba
40	BSU/07888	Ssempala, Ronnie	Wakiso	Nansana municipality	Busukuma	Kasizi	Kasozi
41	BSU/013021	Nkuba, Godfrey	Wakiso	Busiro	Gombe	Kavule	Kavule
42	BSU/013016	Senkindu, Isaac (Plant 1)	Wakiso	Busiro	Kakiri	Bukalango	Kikubampanga

43	BSU/018474	Hajjati, Ssula	Wakiso	Busiro	Wakiso	Kayunga	Senge
44	BSU/017911	Kiragga, James	Wakiso	Busiro	Kira	Kira	Kira
45	BSU/013049	Sengendo, Ritah	Wakiso	Busiro	Masuulita	Lwemwedde	Wabiyinga
46	BSU1/03773	Gonzanga Ssenkumba	Wakiso	Busiro	Nsangi	Nsangi	Maya
47	BSU/018488	Senyonga, Emmanuel	Wakiso	Busiro East	Kyengera	Kyengera	Mugongo
48	BSU1/03878	Niah Muweesi	Wakiso	Busiro	Wakiso	Lukwanga	Nabukalu
49	BSU1/02988	Ddamba Joseph	Mpigi	Mawokota North	Kituntu	Bukemba	Bukemba
50	BSU1/02939	Nkunyingi Rogers Kyeyune	Mpigi	Mawokota North	Muduma	Tiribogo	Nakyesanja
51	BSU1/02917	Namagembe Teddy	Mpigi	Mawokota North	Kiringente	Buvumbula	Nnama
52	BSU1/02937	Hajj Lukenge Badru	Mpigi	Mawokota North	Muduma	Tiribogo	Busaanyi
53	BSU1/02938	Kivumbi Vicent	Mpigi	Mawokota North	Muduma	Tiribogo	Busaanyi
54	BSU1/02919	Sematimba Godfrey Kasasa	Mpigi	Mawokota North	Kiringente	Kiwamirembe	Katende
55	BSU1/02936	Lutaya Livingstone	Mpigi	Mawokota North	Muduma	Lugyo	Buyala
56	BSU1/02916	Kasozi Josephine	Mpigi	Mawokota North	Kiringente	Kiwamirembe	Nsujjuwe
57	BSU1/02940	Nalongo Hasifa Ntengo	Mpigi	Mawokota North	Muduma	Tiribogo	Galabi
58	BSU/01222	Tamuzadde Esawo	Mpigi	Mawokota North	Muduuma	Muduuma	Njagi
59	BSU/00719	Kateregga, Charles Kiweewa	Mpigi	Mawokota North	Kiringente	Kiringente	Kizinda
60	BSU/07053	Kateregga Joseph	Mpigi	Mawokota North	Kiringente	Bulwanyi	Kyambizi
61	BSU/07089	Seguya Hajati	Mpigi	Mawokota North	Budde	Buwama	Kyabadaaza

62	BSU/07075	Kitimbo Linda Yiga	Mpigi	Mawokota North	Kamengo	Butooro	Kamusogonya
63	BSU/07070	Ssimbwa Tendo Alex	Mpigi	Mawokota North	Gombe	Gombe	Senene
64	BSU/07105	Buwule Francis	Mpigi	Mawokota North	Kamengo	Kibanga	Mpondwe
65	BSU/07102	Kiwanuka William	Mpigi	Mawokota North	Mpigi Town Council	Konkoma	Mpambire
66	BSU/07103	BMZ - GLS Project Farm	Mpigi	Mawokota North	Kamengo	Kibanga ward	Mpondwe
67	BSU/07659	Fahad Kyewalyanga Hajji Dean	Mpigi	Mawokota North	Kamengo	Butoro	Luwala
68	BSU/07863	Kasendwa, James	Mpigi	Mawokota North	Kyali	Mpigi Mutuba 1	Bubezi
69	BSU/07683	Katongole Joseph	Mpigi	Mawokota North	Ssisa	Bulwanyi	Bumpenjje
70	BSU/07895	Ssentamu, Charles Musisi Plant 2	Mpigi	Mawokota North	Kamengo	Kibanga	Kibanga
71	BSU/017903	Kakande, Godfrey	Mpigi	Mawokota North	Kamengo	Kamengo	Seeta-Ggoli
72	BSU/017905	Mulondo, William George	Mpigi	Mawokota North	Kamengo	Butoro	Butoro
73	BSU/17923	Nakalema, Councillor	Mpigi	Mawokota North	Kituntu	Nkasi	Magungu
74	BSU/17921	Bukenya, Simeo	Mpigi	Mawokota North	Nkozi	Nakibango	Nkozi-Nundu
75	BSU/17919	Makumbi, William George	Mpigi	Mawokota North	Nkozi	Muge	Ntinzi
76	BSU/17934	Makumbi, Badru Councillor	Mpigi	Mawokota North	Mpigi T.C	Mawoonve	Mawoonve
77	BSU/17935	Musoke, Twaha	Mpigi	Mawokota North	Nkozi	Kajagala	Bukoonoka
78	BSU/018402	Kalungi, Deo Plant 1	Mpigi	Mawokota North	Kamengo	Kiwumu	Luwala
79	BSU/018407	Kizza, David	Mpigi	Mawokota North	Muduuma	Buyala	Kisamula

80	BSU/18406	Nayiga, Salima	Mpigi	Mawokota North	Kiringente	Kavule	Kavule
81	BSU/017949	Nalugwa, Alizik	Mpigi	Mawokota North	Kyabadaaza	Budde	Lusanja
82	BSU/018434	Namugenyi, Mayi	Mpigi	Mawokota North	Kalamba	Kakalu	Seeta A
83	BSU/018428	Kajumba, Edward	Mpigi	Mawokota North	Mpigi TC	Mpigi	Lungala
84	BSU/5	Isha Nakilijja Ssenoga	Mukono	Mukono	Kyampisi	Dundu	Kasaayi
85	BSU/291	Hajjati Madinah Nantongo	Mukono	Mukono	Kyampisi	Dundu	Kasaayi
86	BSU/511	Nsubuga Ibrahim	Mukono	Mukono	Goma Division	Seeta	Kirowooza
87	BSU/460	Nabbosa Hamiyati Makaku	Mukono	Mukono	Kyampisi	Dundu	Kasaayi
88	BSU/161	John bosco Ssentoogo	Mukono	Mukono	Goma Division	Seeta	Kirowooza
89	BSU/208	Kawere Ali	Mukono	Mukono	Kyampisi	Dundu	Kasaayi
90	BSU/532	Perusi Nsajja	Mukono	Mukono	Kyampisi	Ddundu	Kasaayi
91	BSU/162	Wasswa Kalule John	Mukono	Mukono	Goma Division	Seeta	Gulama
92	BSU/00059	Musoke Solomon	Mukono	Ggoma	Goma	Seeta	Namyoya
93	BSU/00714	Kavuma Dannis	Mukono	Ggoma	Ggoma	Seeta	Seeta
94	BSU/00667	Nampewo Faith (Kirinya)	Mukono	Kyaggise	Nakisunga	Namuyenje	Wabulege
95	BSU/01650	Karyango Kintu	Mukono	Ggoma	Goma	Mukono Municipality	Kiwanga
96	BSU/06591	Kashungyera Lawrence	Mukono	Mukono	Naama	Katoogo	Namawata
97	BSU/01257	Mugisha John	Mukono	Mukono	Seeta	Seeta	Njerere
98	BSU/06951	Kabalega Emmanuel	Mukono	Mukono	Goma	Makindye	Makindye
99	BSU/06221	Muchilwa Barbara Bukwaya	Mukono	Katosi Kyaggwe	Ntengeru	Lugazi	Bukwaya Village

100	BSU/08057	Hajjat Aida Namatovu	Mukono	Mukono	Kigunga	Dundu	Nabuta
101	BSU/013453	Katale George	Mukono	Buikwe	Nakisunga	Namuyenje	Nakoosi
102	BSU/07691	Sendawula John	Mukono	Mukono	Ntenjeru	Nakisunga	Kilondo
103	BSU/08567	Wamabuya Anthony	Mukono	Mukono	Nakisungu	Wankoba	Kirwanyi
104	BSU/08572	Aunitah Hardware	Mukono	Goma	Goma	Seeta	Bugoba
105	BSU/08367	Sande, Fred	Mukono	Nagoje	Katoogo	Nakibano	Namiyagi
106	BSU/013992	Denis, Ssebabbi	Mukono	Goma	Goma division	Misindye	Misindye
107	BSU/013026	Baitwabusa, Annette	Mukono	Kyaddondo	Kira	Kitukutwe	Kitukutwe
108	BSU/013920	Nabisubi, Milly Kyerabirwa	Mukono	Kyagwe	Kyampisi	Ddundu	Nakumbo
109	BSU/018476	Kiwome, Christopher	Mukono	Kyagwe	Byafula	Nakisunga	Kitooke
110	BSU/17930	Muyise, Mzee	Mukono	Mukono	Nakisunga	Nakisunga	Byafula
111	BSU/17932	Luwalala, Solomon Kijaala	Mukono	Mukono	Nakisunga	Nakisunga	Kisozi

Due to the recent COVID-19 pandemic, travel restrictions were imposed by the country where the project is located. The team leader who is based in Malaysia was not able to participate the physical on-site inspection activity in Uganda.

On the basis of the COVID-19 Interim Measures publication v.4 dated 17/05/2021 rules update issued GS Secretariat to relax mandatory site visits by VVBs on an exceptional basis the VVB may apply alternative measures of verification to mandatory on-site inspections until 31/12/2021.

On this basis, the team leader undertook the following considerations:

- Conduct the verification remotely
- Discussion and interview via google meet with BSUL VPA Implementer and HIVOS carbon consultant.
- Review survey reports, outcome of survey results, photos of digester for households surveyed, interviewed and households GPS coordinates;

Telephone interviews of households supported by Technobrain the call centre

C.3. Sampling approach

The verification team has applied the sampling plan based on 90/10 confidence level to ensure the households interviewed are representative to meet GS requirements. At the time of the sampling there are 8,500 units as at 30/04/2021.

Using the link http://www.raosoft.com/samplesize.html to calculate the sample size, 96 households will be sufficient to obtain a confidence level of 90 with 10% margin error.

The households are randomly selected using a sampling generator at the link https://www.graphpad.com/quickcalcs/randomselect1/ for conservativeness.

For conservativeness, the verification team has selected a sample size of 225 households from the clusters in the different villages, different districts & different provinces for telephone interviews out of which 170 were reached to obtain more information of the project implementation and monitoring of the SDG indicators.

The initial preparation for onsite visits, 162 households were selected. However, due to movement control restrictions in Uganda started on 06/06/2021 for 42 days have affected onsite inspections. In this aspect, these selected households were telephone interviews to obtain information and 111 households were reached.

The sample size selected is representative and exceeds the proposed sample size of 96 households. Therefore, it could be concluded the sampling is sufficient to meet the minimum requirements.

From the results of the interviewed households, it could be confirmed the following:

1. Family size and members
2. Type and number of animals
3. Any usage of firewood and LPG
4. Any usage of Bio-slurry
5. Bio-slurry usage for what purposes
6. Do you sell bio-slurry
7. Do you compost the bio-slurry
8. Do you have time saved from collecting firewood with the digester
9. Do you used the saved time for other activities
10. Any training provided by CPO and mason
11. What is the main problem with the digester
12. Is the CPO, mason and YRE personnel can be contacted

A summary of interview questions and feedback received are presented in the below table:

Questions for households during telephone interviews	**Summary of feedback**
How many family members	The average family members of the interviewed households are 4
Type of animals	Out of the 128 households, 116 households have cows and 12 households have pigs.
Bio-slurry usage and any composting	Interview households informed bio-slurry apply to vegetable garden or rice fields or fruit trees around the house compound. The households are happy that using the bio-slurry has increased crop yield and brings significant financial savings due to the reduction in use of chemical fertilizers. Some of the households apply the bio-slurry directly to the fields and some kept in the bio-slurry huts / pits before taken for application in the fields. Households expressed that the bio-slurry does not produce unpleasant odour as compared to fresh dung since it has been processed in the biodigesters Some of them sell to neighbours who does not have a digester.
Are you using firewood or LPG	The interviewed households inform sufficient biogas for their daily cooking of 2 meals. Firewood will be used to boil water for milking or festive and when large family gathering. LPG is use as standby and supplement fuel.

Questions for households during telephone interviews	Summary of feedback
How much time saved for collecting firewood	The interviewed households informed with the digester they spend less time to collect firewood.
What other activities you do with the saved time	The interviewed households informed that they have time for other activities such as plant flowers, sell vegetables with the save time.
Are training provided by the masons or CPO?	After commissioning, training is provide in feeding dung to the digester, wash the mixing unit and remove bio-slurry for the discharge compartment. Cleaning of gas stove and removal of water in the gas pipe.
Any complaint and feedback	Interviewed householders informed no complaints. They know how to contact the masons, CPO and VPA implementer.

Interview of Masons

Questions during telephone interview	Summary of feedback
Do you received training in constructing digester	BSUL provide Contrustional Works old and New Design After Sales Training, Operation and Maintanance
What are the main concerns in constructing bio-digeste	Failure to pay by clients, Delay in payment by BCEs, Poor Materials provided by Clients, Transportis a problem
Do you provide training to households?	Yes. Operation and simply maintenance
How long does it take for you to respond to households for technical issues	1-2 days (some clients take long to send transport)
What type of complaints do you receive from households?	Plant is not working very well (some is that due to poor feeding) Reduction in gas production, leakages in the pipe line Lack of feeding materials so clients have ended leaving the plant.
Other comments	Observed that a client needs constant monitoring at least 3 times a years. Because some even fortget to do basic things like draining the water. Bio-gas is very good to people enjoying it. Mason have been able to get friendships, and earned a living through bio-disgester construction. Bio-gas is a very good system and he recommends it to anyone who can afford it. More technical support is needed

Interview of BCE

Questions during telephone interview	Summary of feedback
What type of training and support were you provided by BSUL?	Business Development, Refresher training on technical aspects, Bio-slurry (User and extension) Promotional & Users training, Operational and Maintenance, Bio-slurry , tarowork, QC
What are the main concerns in constructing bio-digester?	Some Mason lack ownership while doing their job, they have (don't care attitude) and this some times leads to poor contruction, negligence Material Quality especially those provided by client. Incomplete of payment by client. Poor treatment of mason by client especially when they are staying over. Failure by client

Questions during telephone interview	Summary of feedback
	to initial feed the plant due to personal plans to use the plant in future. Little materials purpased by the client, which slows down the work, Delay or no payment Quality of materials to used, Cost of bio-gas, & Poor construction site are rocky and water-logged areas.
Do you provide training to households?	Yes. Operation and simply maintenance
How long does it take for you to respond to households for technical issues	Average is 1 week depending on the distance, but households that are near always get a 1-day quick response. 1-2 days depending on the distance, and some tend to have specific days to visit the residence.
What type of complaints do you receive from households?	System is not producing gas, (But in most cases the main cause is from the users, due to poor feeding). Many households call especially those with lighting system, still want their system to work yet spare parts are hard to get. Little gas from the system, Leakages in piping, Refresher training especially when there is a change of household helper. High cost of the plant. Most household have a problem of water during dry season.
Other comments	Some households tend to ignore the technical advice share so they end up getting problems during the usage of the system Lock down has made the business slow

SECTION D. Verification findings

D.1. Description of Project

D.1.1 General Description of Project

Means of verification	An in-depth review of the MR section A was carried out during desk review to confirm whether the project purpose, description, location, applied methodology and crediting period are consistent with the approved GS4GG Transition Annex, registered PoA-DD and VPA-DD and registration details provided by HIVOS and Biogas Solutions Uganda LTd., (BSUL). This VPA003 is part of the African Biogas Carbon Programme (ABC) PoA GS2747 **Purpose and general description of project** Section A.1 describe the project purpose and description is crosschecked against the VPA-DD for consistency. **Location of Project:** The location of the project covers the entire Republic of Uganda. The GPS coordinates listed N 4°12'53.79" to -1°28'19.22", E 29°34'17.52" to 35°2'33.81" have been crosschecked with Google Earth for accuracy & correctness. **Reference of applied methodology** The applied methodology is according to GS methodology "*Technologies and Practices to Displace Decentralized Thermal Energy Consumption*" (Version 1.0) since registration. **Crediting period of project:** The 1st crediting period is a 7 years renewable from 19/04/2015 to 18/04/2022 inclusive both dates as defined in GS review during inclusion of this VPA The following sources of information have been used in this context:

	• /TA/ • /VPADD/ • /PoADD/ • /MR/ • /GS/ • /VR/	
Findings	☐	The project has been implemented as described in the latest version of the VPA-DD as well as in section B.1 of the monitoring report. No deviations thereof have been identified in the course of this verification.
	☒	The following deviations from the registered project design and or the project description in the MR have been identified in the course of this verification (for further details please refer to section E.4):
	☒	In this context the following CARs, CLs have been raised:
		CAR A.1
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 review of project documentation it can be confirmed that w.r.t. the realized project location, monitoring period and crediting period, the VPA is described in accordance to the Transition Annex and VPA-DD after the minor correction.	

D.2. Implementation of Project

D.2.1. Description of implemented project

Means of verification	The verification team conducted an in-depth review of the draft monitoring report and compared against the Transition Annex and registered VPA-DD related to information of the project on the digester specification, number installed for each size, post registration changes, corrections, change to crediting period and permanent changes. **Description of implemented project** The VPA is implemented in accordance to the description in the registered VPA-DD as Uganda Domestic Biogas Programme to disseminate domestic biogas in Uganda with the objective is to improve the livelihoods and quality of life of rural and peri-urban farmers through utilizing of domestic biogas as cooking and lighting fuel. The VPA implementer of this project is Biogas Solutions Uganda Ltd, responsible for coordinating, facilitating and monitoring the programme and supporting the technical, financial and institutional architecture. The capacities of the domestic biogas systems are 4 m^3, 6 m^3, 9 m^3, 12 m^3, 13 m^3 and 15 m^3 (other sizes may be included under the VPA). The common capacity installed are 6 and 9 m^3. Table 1 provide a breakdown of the size of digester and number per size and crosscheck with the database cor correctness. The technical specification is crosscheck with the digester design provided by VPA implementer. As at this monitoring period the installed capacity, the thermal capacity for the VPA is **28.255 MW_{th}** which is below the thermal threshold of 45 MW_{th}. **Forward Action Requests** During last verification, there are 2 FARs raised to be addressed in this verification. Section B.1.1 of MR address the actions taken. For further details of the assessment refer to Appendix 4. **Post-registration changes**

	There are no temporary deviations, corrections, change of crediting period and design change. This is crosscheck on documents and interview of CME, and VPA implementer A permanent change to the monitoring plan due to the transition from the initial GS standard v2.2 of the PoA to GS4GG Principles & Requirements v 1.0 with the monitoring parameters are update to SDG requirements. The transition annex was approved by GS on 23/07/2019 and implemented for this monitoring period. The following sources of information have been used in this context: • /TA/ • /VPADD/ • /PoADD/ • /MR/ • /CA/ • /GS4GG/ • /VR/ • /LHH/	
Findings	☒	The project has been implemented as described in the latest version of the VPA-DD as well as in section B.1 of the monitoring report. No deviations thereof have been identified in the course of this verification.
	☐	The following deviations from the registered project design and or the project description in the MR have been identified in the course of this verification (for further details please refer to section E.4):
	☒	In this context the following CARs, CLs have been raised: CL B-1; CL D-2; CAR B-3; CAR B-4;
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 verification was carried out remotely with support from carbon consultant and VPA implementer personnel. The review of project documentation could confirm that w.r.t. the realized technology, the project equipment, as well as the monitoring and survey, the project has been implemented and operated as described in the registered VPA-DD version after relevant corrections.	

D.2.2. Post-registration changes

D.2.2.1. Temporary deviations from Certified Key Project Information, Project Design Document, Monitoring & Reporting Plan, applied methodology of applied standardise baseline

It has been checked whether Temporary deviations from the registered monitoring plan (TDfrMP) or Temporary deviations from monitoring methodology or standardized baseline (TDfMM) have been applied during this monitoring period. The result is summarized in the table below.

☒	No Temporary deviations from the registered monitoring plan (TDfrMP) or Temporary deviations from monitoring methodology or standardized baseline (TDfMM).have been submitted to the GS prior to the current monitoring period.		
☐	The following TDfrMP or TDfMM have been approved or are under approval by GS.		
	1	Title	
		Status	☐ under approval; ☐ approved (approval No.:)
		Appr.date	

		Ref. No.	
	2	Title	
		Status	☐ under approval; ☐ approved (approval No.:)
		Appr.date	
		Ref.No.	
☒	During the verification of the current MP no need for a TDfrMP or TDfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the VPA		
☐	An approval of the following TDfrMP or TDfMM is to be requested from GS for the current MP as appendix 1 of the project standard does not apply. Please refer to the related PRC report submitted along with this issuance request for further details w.r.t. the assessment of the PRC.		
	1	Issue:	
	2	Issue:	
☐	The following TDfrMP or TDfMM for which appendix 1 of the PS is applicable have been applied:		
	1	Issue:	
	2	Issue:	

D.2.2.2. Corrections

It has been checked whether any corrections to VPA information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring report. The result is summarized in the table below.

☒	During the verification of the current MP no need for corrections has been identified.		
☐	The following corrections have been applied:		
	1.	Issue:	
	2.	Issue:	
	3.	Issue:	
	4.	Issue:	
	5.	Issue:	
	The VPA-DD has been revised accordingly: (New) version No.:		
	It is confirmed that the updated / corrected information is an accurate reflection of the actual project information and that the corrected parameters are in accordance with the applied methodology and the monitoring plan.		
	☐ A related post registration change has been submitted prior to the issuance request. No related approval numbers and dates are mentioned on the corresponding subpages of the PoA submitted to GS. The related documentation is accessible via: ☐ A related post registration change is submitted along with this issuance request. Please refer to the related PRC report submitted along with this issuance request for further details w.r.t. the assessment of the PRC.		

D.2.2.3. Changes to start date of crediting period

☐	N/A - as this is not the first verification within the crediting period
☒	The PPs do not intend to change the start date of the crediting period.

☐	The approval to change the start date of the crediting period on DD/MM/YYY

D.2.2.4. Permanent changes from registered monitoring plan, applied methodology, or applied standardized baseline

It has been checked whether any permanent changes from the registered monitoring plan (PCfrMP) or applied methodologies (PCfMM) including standardized baselines (PCfSB) have been approved prior or during this monitoring period or submitted with this monitoring report. The result is summarized in the table below.

☐	No PCfrMP, PCfMM or PCfSB have been submitted to GS prior to the current monitoring period		
☒	The following PCfrMP, PCfMM or PCfSB have been approved or are under approval by GS		
	1	Title	Transition from GS v 2.2 to GS4GG Principle & Requirements version 1.0
		Status	☐ under approval; ☒ approved
		Appr.date	23/07/2019
		Ref. No.	NA
☒	During the verification of the current MP no need for a PCfrMP, PCfMM or PCfSB has been identified. The monitoring plan is in accordance with GS4GG requirements and applied methodology.		
☐	An approval of the following PCfrMP, PCfMM or PCfSB is to be request from GS for the current MP as per GS4GG Annex 1.		
	1	Issue:	
	2	Issue:	

D.2.2.5. Changes to design of approved project

It has been checked whether any changes to the VPA design (CoPD) have been approved prior or during this monitoring period or submitted with this monitoring report. The result is summarized in the table below.

☒	No CoPD has been submitted to the GS to the current monitoring period		
☐	The following CoPD have been approved or are under approval by GS		
	1	Title	
		Status	☐ under approval; ☒ approved
		Appr. Date	
		Ref. No.	NA
	2	Title	
		Status	☐ under approval; ☐ approved
		Appr. Date	
		Ref. No.	
☒	During the verification of the current MP no need for a CoPD has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA		
☐	An approval of the following CoPD.is to be requested from the GS for the current MP as appendix 1 of the project standard does not apply.		
	1	Issue:	
	2	Issue:	
☐	The following CoPD for which appendix 1 of the PS is applicable have been applied:		
	1	Issue:	

	2	Issue:	

D.3. Description of monitoring system applied by the project

Means of verification	Section C of the MR present the organizational structure, manpower, task and responsibilities, competency assessment and a table describe the data flow for collecting, recoroding, quality check, calculations and reporting. The verification team has checked the monitoring system as described if is in compliance with the related requirements by means of comparison of the MR with applied methodology, Transition Annex and VPA-DD (i) applied GS methodology (ii) GS4GG Transition Annex (iii) VPA-DD The following sources of information have been used in this context: • /MR/ • /TA/ • /VPADD/ • /GSM/	
Findings	☒	The monitoring system is in accordance with the approved project monitoring plan and the applied methodology of the registered version of the VPA-DD.
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs / CLs / FARs 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 verification team could conclude the monitoring system complies with the approved project monitoring plan and the applied methodology.	

D.4. Data and Parameters

D.4.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification

The verification team has checked the ex-ante parameters and data stated in Section D.1 of MR and compared with section A.3 of the Transition Annex and Section D.6.2 of approved revised VPA-DD whether all parameters fixed ex-ante for the crediting period have been applied correctly.

The following parameters have been fixed at validation or at renewal of crediting period:

No.	SDG Indicator	Parameter	Value	Unit
1	13.2.1	$f_{NRB,y}$	82	%
2	13.2.1	$EF_{b,\ bio}$	112	tCO_2/TJ
3	13.2.1	$EF_{p,\ bio}$	112	tCO_2/TJ
4	13.2.1	$EF_{p,\ fuel}$	Kerosene = 71.9 LPG = 63.1	tCO_2/TJ
5	13.2.1	NCV_{bio}	0.015	TJ/tonne
6	13.2.1	$EF_{b,\ fuel}$	71.9 (Kerosene) 63.1 (LPG)	tCO_2/TJ
7	13.2.1	NCV_{fuel}	0.0438 (Kerosene) 0.0473 (LPG)	TJ/tonne

	8	13.2.1	V_{ST}	Dairy cows = 1.90 Other cattle = 1.50 Market and breeding swine = 0.30 Goats = 0.35 Sheep = 0.32 Poultry = 0.02	kg/head/day
	9	13.2.1	B_{OT}	Dairy cows = 0.13 Other cattle = 0.10 Market swine = 0.29 Breeding swine = 0.29 Goats = 0.13 Sheep = 0.13 Poultry = 0.24	m^3 CH_4/kg
	10	13.2.1	$\eta_{biogas\ stove}$	0.55	Fraction
	11	13.2.1	$MCF_{x,k}$	15.48	%
	12	13.2.1	$EF_{awms,T}$	Dairy cows = 0.0015 Other cattle = 0.0001 Market swine = 0.0026 Breeding swine = 0.0026 Goats = 0.0000 Sheep = 0.0000 Poultry = 0.0000	m^3CH^4/kg
	13	13.2.1	PL	10	%

The following sources of information have been used in this context:

- /MR/
- /TA/
- /VPADD/
- /IPCC/
- /IM01/

Findings	☒	The MR and the ER calculation have considered the parameters fixed ex-ante for the crediting period correctly, no deviations have been observed.
	☐	The following deviations from the parameters fixed ex-ante or at renewal of crediting period have been identified in the course of this verification:
	☒	In this context the following CARs, CLs, FARs have been raised: CAR D-2
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs / CLs / FARs 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 data and parameters listed in the section D.1 of the MR were crosschecked with the applied methodology, Transition Annex and VPA-DD are consistent. After minor correction, the section is filled accoding to the MR v1.1 template guidelines.	

D.4.2. Data and parameters monitored

Means of verification	During the verification all relevant monitoring parameters listed in Section C.1 of the approved Transition Annex and Section D.7.1 of approved revised VPA-DD have been verified with regard to the (i) appropriateness of the applied measurement / determination method,

	(ii) the correctness and accuracy of the values applied for ER calculation, (iii) applied QA/QC measures. The results as well as the verification procedure are described parameter-wise in the project specific verification checklist (Appendix 5). The following sources of information have been used in this context: • /MR/ • /TA/ • /VPADD/ • /ER/ • /BUS/ • /KPT/ • /L/ • /IM01/	
Findings	CAR D-3; CAR D-4; CAR D-5; CAR D-6; CAR D-7; CAR D-8; CAR D-9;	
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs / CLs / FARs 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.
	After appropriate corrections were carried out by the VPA Implementer it could be concluded that all monitoring parameters have been measured / determined without material misstatements and in line with VPA-DD and applied methodology	

D.4.3. Comparison of monitored parameters with last monitoring period

Means of verification

Section D.3 of monitoring report describe the comparison of monitored parameters with the last monitoring period are according to the GS4GG and Transition Annex and VPA-DD.

Data / Parameter	Value obtained in this monitoring period	Value obtained last monitoring period
Percentage of biogas users who use slurry as a fertilizer	95	92
Perceived improvement in health by the user (incidence of eye problems and respiratory illness)	Reduced 94% Not changed 6% Worsened 0%	88% of the user report perceived health improvement 12% report no change 0% report deterioration in health
Time savings	Yes, more time available than before having biogas: 96% No, just the same as before (between before and after having Biogas): 4% Yes, less time available than before having biogas: 0.0%	Yes, more time available than before having biogas: 94% No, just the same as before (between before and after having Biogas): 4% Yes, less time available than before having biogas: 1% Similar: 1%
Usage of saved time	Income generating including farming: 37% Education: 7%	Income generating including farming: 28% Education: 4%

	Leisure (chat, recreation, churck resting) 44% Other 12%	Leisure (chat, recreation, church resting) 58% Other 10%
Number of biogas plants installed	8,419	8,222
Number of masons and biogas enterprise staff attending training programmes	2	102
Employment generated	227,220	219,886
$U_{p1,y}$	67.78%	63.35%
$N_{p1,y}$	2,459,559	2,640,215
$O_{p1,y}$	292.14	321.15
$LE_{p1,y}$	0	0
$N_{T,h}$	**Number of animals** / **#/hh** Number of dairy cattle 6.12 Number of other cattle 1.40 Number of pigs (for market) 1.04 Number of pigs (for breeding) 1.10 Number of poultry 19.43 Number of sheep 0.30 Number of goats 1.88	**Number of animals** / **#/hh** Number of dairy cattle 5.63 Number of other cattle 0.89 Number of pigs (for market) 1.01 Number of pigs (for breeding) 0.59 Number of poultry 10.08 Number of sheep 0.86 Number of goats 2.88
$BB_{b\ ratio}$	Baseline scenario / % B1: Firewood used to meet (more than 50%) of my cooking needs 77.5 B2: Charcoal used to meet (more than 50%) of my cooking needs 13.4 B3: Firewood & charcoal used to meet (more than 50%) of my cooking 7.2 B4: Other fuels 1.9	**Baseline scenario** / **%** B1: Firewood used to meet (more than 50%) of my cooking needs 67.8 B2: Charcoal used to meet (more than 50%) of my cooking needs 19.7 B3: Firewood & charcoal used to meet (more than 50%) of my cooking 11.8 B4: Other fuels 0.7
$BB_{b1,bio}$	3.527	3.527
$BB_{b2,bio}$	7.042	7.042
$BB_{b3,bio}$	10.034	10.034
$BB_{b1,2,3,fuel}$	0	0
$BB_{p1,bio}$	2.846	2.846
$BB_{p1,fuel}$	0	0
$MS_{P,S,K}$	**Animal T** / **Fraction** Dairy cattle 13.15% Other cattle 16.43% Market swine 70.00% Breeding swine 49.38% Poultry 80.57% Sheep 100.00% Goat 95.83%	**Animal T** / **Fraction** Dairy cattle 12.5% Other cattle 13.1% Market swine 48.8% Breeding swine 67.5% Poultry 95.4% Sheep 92.9% Goat 95.0%
GWP_{CH4}	25 up to 31/12/2020	25

		28 as from 01/01/2021	
	Bio	**How do you apply bio-slurry** / **% of farmers**: Use directly for various purposes: 59; Store it first: 36; I don't use it / discarded: 5	**How do you apply bio-slurry** / **% of farmers**: Used as fertilizer: 47; Used as animal feed: 4; Bio-slurry is sold: 1; Used as an insecticide/pesticide: 2; Used as animal feed: ; Store it first: 39; I don't use it / discarded: 3%
	$N_{op1,y}$	8,419	8,222

The following sources of information have been used in this context:

- /MR/
- /ER/
- /BUS/
- /DB/
- /TA/
- /VPADD/

Findings	☐	No errors, omissions, misstatements or incomplete information has been identified.
	☒	There are identified mistakes.
	☒	In this context the following CARs, CLs, FARs have been raised:
		CAR D.-10
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs / CLs / FARs 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.
	Appropriate actions have been taken it could be concluded that the information are filled correctly.	

D.4.4. Implementation of sampling plan

Means of verification	The verification team has checked on the sampling plan and considered appropriate since an addition of 10% has been included to ensure the level of assurance and the number of households are representative - Survey A is user survey gather information on household socio-economic indicators, fuel use for cooking, renewability and non-renewability indicators, animal waste handling, use of bio-slurry on agricultural fields, perceived improvement of living conditions, financial and time savings, and user satisfaction with biogas, bio-slurry and trainings - Survey B is usage survey collect data about the actual functioning of the biogas digesters. - Survey C is project fuel test (PFT) collect fuel use data of households with a biodigester in operation in form of Kitchen Performance Tests (KPTs). Sampling Approach: The sampling approach is according to the monitoring requirements of the applied methodology '*Technologies and Practices to Displace Decentralized Thermal Energy Consumption*' (version 1.0).

<table>
<tr><td></td><td colspan="2">The VPA implementer applies a multi-stage sampling approach for selection of the households in a proportionate representation of different regions and counties in the sample.
Survey B: Usage Survey. The sampling is based on 11 age groups with 30 households per group.
Survey A: User survey a minimum of 100 households from survey B households.
Survey C: PFT survey was not conducted for this monitoring period since this is conducted once in 2 years with the last survey conducted in 2020.
Sampling methodology:
The survey consultant selected 70 households from each age group using the random sample generator.
This oversampling in lieu of some sampled households could not be reached or unwilling to be surveyed. These households will be replaced by other households from the list of 70 in each age group selected.
The outcome for the number of households reached for each survey are tabulated in table 5.
Survey B: 385 households were selected with 384 were reached out of which 264 (69%) were physically visited and 120 (31%) by telephone interviews. Therefore, meets the minimum requirements of 50% must be visited.
Survey A: 210 households selected and 143 were reached
The verification team has checked on the sampling plan and considered appropriate since oversampling is applied to ensure the minimum number of households for usage survey is met.
Further it has been checked whether the CME has correctly applied the implemented sampling plan including
(i) description of the implemented sampling design
(ii) collected data
(iii) analysis of collected data
(iv) demonstration on whether the required confidence / precision has been met.
The following sources of information have been used in this context:
• /MR/
• /BUS/
• /TA/
• /PFT/
• /GT/
• /ER/
• /VPADD/
• /DB/
• /IM01/IM02/</td></tr>
<tr><td rowspan="4">Findings</td><td>☐</td><td>The CME has not applied sampling approaches for the survey</td></tr>
<tr><td>☒</td><td>The CME has applied sampling approaches for the survey.</td></tr>
<tr><td rowspan="2">☒</td><td>In this context the following CARs, CLs, FARs have been raised:</td></tr>
<tr><td>CL D-4; CAR D-11;</td></tr>
<tr><td rowspan="3">Conclusion</td><td>☐</td><td>No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.</td></tr>
<tr><td>☒</td><td>The raised CARs / CLs / FARs have been addressed appropriately. For details, please refer to Appendix 4.</td></tr>
<tr><td colspan="2">After appropriate corrections, it could be concluded that the sampling method is plausible.</td></tr>
</table>

D.5. Calculation of SDG Outcomes

D.5.1 Calculation of baseline value or estimation of baseline situation of each SDG Impact

Means of verification	During the verification, the determination of the baseline situation has been checked. According to the GS4GG, SDG requirements are to be monitored as described in the Transition Annex. In the baseline scenario, the SDG requirements for: SDG Indicator 2.4.1: Proportion of agricultural area under productive and sustainable agriculture For parameter Percentage of biogas users who use slurry as a fertilizer is zero since there are no bio-digesters installed. SDG Indicator 3.9.1: Mortality rate attributed to household and ambient air pollution For parameter number of users with a reduced, increased or no change in the incidence of eye problems and respiratory illness that is zero for baseline scenario with no bio-digesters installed. SDG Indicator 5: Achieve gender equality and empower all women and girls For parameter 1) Percentage of women that report time-savings attributed to the installation of a biodigester and (2) usage of saved time. In the baseline scenario, both situation are zero since no bio-digester installed. SDG Indicator 7.1.2: Proportion of population with primary reliance on clean fuels and technology For parameters number of biogas units installed and number of masons and biogas enterprise staff attending training programmes. In the baseline scenario, both situations are zero with no biogas units installed and no training conducted without the digester. SDG Indicator 8.5 By 2030, achieve full and productive employment and decent work for all women and men For parameter number of man-days involved in the construction of biodigesters where in the baseline scenario there are no digesters installed therefore, zero man-days. SDG Indicator 13.2.1 generally the baseline emissions of the project to combat climate change The baseline emissions have two components: 1. The baseline emissions for fuel use consists of 4 types of fuel with 3 types are woody biomass and 1 for fossil fuel of LPG. These emissions are the comparing of fuel consumption in a project scenario to the baseline scenario according to the approved methodology, the Transition Annex and registered VPA-DD. The equation applied to determine the each of the scenario as follows: $BE_{bCO2,y} = (\sum_b BB_{b,fuel} * NCV_{fuel} * EF_{b,fuel}) + (BB_{b,bio} * NCV_{bio} * EF_{b1bio} * f_{NRB})$ The inputs for the fuel usage data derived from the baseline survey. Baseline emission for this component is **6.058 $tCO_2e/y/hh$**. 2. The baseline emissions from the handling of animal waste is determined with IPCC Tier 2. The equation applied: $BE_{b,CH4,y} = (V_{ST}*365) * (B_{o,T} *0.67lk/m^3 * MCFx,k * MST_{,x,k} * GWP_{CH4} * N_{T,h}) / 1000$ The inputs for the type of animals and average population of animals are from the usage survey. Baseline emissions for this component are **1.987 tCO_2/year/hh** for the period up to 31/12/2020 and 2.225 **tCO_2/year/hh** from 01/01/2021. Total baseline emissions are: 45,388 tCO_2e from methane avoidance and fuel switch for this monitoring period The following sources of information have been used in this context:

	• /MR/ • /ER/ • /BUS/ • /KPT/ • /DB/ • /TA/ • /VPADD/ • /GSM/	
Findings	☐	The baseline situation found compliant with the Transition Annex and VPA-DD No errors, omissions, misstatements or incomplete information has been identified.
	☒	The verification team has identified mistakes in the baseline emissions calculation or the underlying calculation approaches.
	☒	In this context the following CARs, CLs, FARs have been raised:
		CAR E-2
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs / CLs / FARs 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.
	With appropriate corrections, it could conclude the baselines valueshave been estimated in accordance to SDG requirements as correct and the emissions are conservatively determined.	

D.5.2 Calculation of project value or estimation of project situation of each SDG impact

Means of verification

Section E.2 of the MR has been reviewed for the project value and estimation of project situation for each SDG outcome.

The table demonstrates the non-carbon project situation of each SDG in accordance to the Transition Annex. The results are derived from the survey input, database and training records provided by VPA implementer.

SDG	SDG mpact	Project value
2	GS-3 Soil condition (Percentage of biogas users who use slurry as a fertilizer)	95%
3	GS-1 Air Quality (Perceived improvement in health by the user (incidence of eye problems and respiratory illness)	94%
5	Time savings	96%
	Usage of saved time	Income generating including farming: 37% Education: 7% Leisure (chat, recreation, church resting): 44% Other: 12%
7	GS-08 Access to affordable and clean energy services (Number)	8,419
	GS-12 Technology transfer and technological self-reliance (Number of masons and biogas enterprise staff attending training	2

		programmes)	
	8.	GS-10 Technology transfer and technological self-reliance (man-days_	227,220
	13	Emission reductions	22,154 tCO_2e

For SDG13, project value for this monitoring period.

ER = BE – PE

= 45,388 – 23,234

= **22,154 tCO_2e**

The following sources of information have been used in this context:

- /MR/
- /ER
- /TA/
- /BUS/
- /VPADD/
- /ER/
- /GSM/

Findings	☐	The baseline situation found compliant with the Transition Annex and VPA-DD No errors, omissions, misstatements or incomplete information has been identified.
	☒	The verification team has identified several mistakes in the project situation.
	☒	In this context the following CARs, CLs, FARs have been raised:
		CAR E-2
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs / CLs / FARs 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.
	After corrections, the calculations of project GHG emissions and SDG outcome are in accordance with the approved Transition Annex, applied methodology and registered VPA-DD.	

D.5.3 Calculation of leakage

Means of verification	Section E.3 of the MR is review for the leakage emissions of project situation. According to applied methodology, leakage will be assessed for any potential sources where applicable. According to the applied methodology “leakage risks deemed very low can be ignored as long as the case for their insignificance is substantiated” (p.11 – 12). Section 6.3.3 of the VPA-DD provides an overview of potential sources of leakage, including their applicability and justification for excluding the sources of leakage. Leakages considered, are bio-slurry, leakage from digester and leakage from incomplete combustion. Other sources of leakage were assessed when necessary. During the 1st verification, the verifying VVB did not discover any sources of leakage other than mentioned in the MR of physical leakage, incomplete combustions and bio-slurry. Similarly in the 2nd MP and 3rd MP, leakage are not considered as per Gold Standard email dated 20/10/2016, the risk of other leakages is negligible and can be ignore. Therefore, no leakage will be considered according to the registered VPA-DD addition comments and GS email.

	The following sources of information have been used in this context: • /MR/ • /ER/ • /L/ • /VPADD/ • /GSM/	
Findings	☒	No leakage emissions were to be considered (LE = 0).
	☐	Mistakes are identified
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs / CLs / FARs 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 leakage will be considered according to the registered VPA-DD addition comments and GS email.	

D.5.4 Calculation of net benefits or direct calculation for each SDG Impact

Means of verification

During the verification, Section E.4 of the MR is review for the respective SDGs listed are according to the Transition Annex for the outcome for this monitoring period.

SDG	SDG Impact	Baseline Estimate	Project Estimate	Net Benefit
2	GS-3 Soil condition (Percentage of biogas users who use slurry as a fertilizer)	0	95%	95%
3	GS-1 Air Quality (Perceived improvement in health by the user (incidence of eye problems and respiratory illness)	0	94%	94%
5	Time Saved	0	96%	96%
	Usage of saved time			
	Income generating including farming	0	37%	37%
	Education	0	7%	7%
	Leisure (chat, recreation, church resting)	0	44%	44%
	Other	0	12%	12%
7	GS-08 Access to affordable and clean energy services (Number)	0	8,419	8,419
	GS-12 Technology transfer and technological self-reliance (Number of masons and biogas enterprise staff attending training programmes)	0	2	2
8	GS-10 Technology transfer and technological self-reliance (man-days)	0	227,220	227,220

	13	Verified emission reductions	45,388	23,234	22,154

The following sources of information have been used in this context:

- /MR/
- /ER/
- /VPA-DD/

Findings	☐	The determination of the SDG outcomes are compliant with the Transition Annex. The calculations of emissions reductions have been carried out in accordance with the formulae and methods described in the registered monitoring plan and the applied methodology. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factors and other reference values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information have been identified.
	☒	During the verification, issues with impact on the ER calculation have been identified.
	☒	The following are identified in the course of this verification:
		CAR E-4
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs / CLs / FARs haves 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.
	After appropriate corrections, the SDG benefits and emissions reductions are considered correct.	

D.5.5 Comparison of actual SDG Impacts with estimates in approved PDD

Means of verification

The verification team has checked the MR Section E.5 includes a comparison of actual values of the monitoring period with the estimations in the registered VPA-DD and Transition Annex for the respective SDG indicators.

The table demonstrate the actual value of each SDG result derived from the survey input, database and training records provided by VPA implementer and ER calculations.

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values achieved during this monitoring period
2	Not estimated	95%
3	Not estimated	94%
5	Not estimated	96%
7	10,633	8,419
	Not estimated	2
8	Not estimated	227,220
13	**11,601 tCO_2e**	**22,154 tCO_2e**

The following sources of information have been used in this context:

- /MR/
- /ER/
- /VPADD/
- /TA/
- /DB/
- /BUS/
- /VER (MPIII)/
- /T/

Findings	☐	*Case 1:* The ex-ante estimated value was found to be proportionally higher than the ex-post determined value. No further action is deemed required.
	☐	*Case 2:* The ex-ante estimated value fits very good to the actually monitored value. No further justification is deemed required.
	☒	*Case 3:* The ex-ante estimated value was found to be proportionally lower than the ex-post determined value.
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☒	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs / CLs / FARs 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.
	It could conclude the ex-ante estimated value is proportionally lower than the ex-post determined value.	

D.5.6.1 Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

Means of verification	Section E.5.1 describe the estimated ex-ante calculation in accordance with the approved revised VPA-DD and Transition Annex. The description in the MR is verified by means of: 1. Review of the ex-ante values in VPA-DD applied for baseline data, the estimated BFT and PFT and MCF from the survey from Kenya conducted in 2014 with the projected number of units for this monitoring period. 2. The ex-ante units estimated in VPA-DD during registration. The number of days and date for this monitoring period applied to re-calculate the ex-ante value. 3. SDG 13 ex-ante ERs crosscheck in section E.5 for the value calculated for this monitoring period and crosscheck with the value in VPAD. The ex-ante ER for this MP presented in section E.5 is 11,601 tCO_2e consisting of 7,463 tCO_2e from period 01/05/2020 to 31/12/2020, both days inclusive and 4,138 tCO_2e from period 01/01/2021 to 30/04/2021, both days inclusive are correct. The following sources of information have been used in this context: • /MR/ • /ER/ • /VPADD/	
Findings	☐	The ex-ante estimated value in accordance to registered VPA-DD
	☒	In this context the following CARs, CLs, FARs have been raised:
		CAR E-5
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs / CLs / FARs 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.
	After correction, the section is filled appropriately. The approach to the calculation is reviewed and could verified is conducted appropriately.	

D.5.7 Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

Means of verification	Section E.6 of MR describe the increase in ex-post ERs for the monitoring period as compared to ex-ante ERs in the approved revised VPA-DD. The increase is due to change of ex-ante MCF of 3.59% wwhich is based on a survey conducted in Kenya in 2014 whilst the ex-post value of 15.48% conducted during MPI. Thus, the ER for fuel use was 0.666 tCO_2/hh/yr in the VPA03-DD whilst is **2.138 tCO_2/hh/yr** in this MR. In VPA03-DD there were no ex-ante values for b2 and b3. Therefore, fuel use for these scenarios were assumed as 0. There are other parameters ex-post values are higher than ex-ant values since there are no baseline ex-ante values for SDG 2, 3, 5 and 7.	
Findings	☒	No further justification or explanation is deemed required as actual emissions of this MP do not exceed the ex-ante calculated emission reductions
	☐	A related justification in the MR for the higher ex-post as compared to ex-ante.
	☒	In this context the following CARs, CLs, FARs have been raised:
		CAR E-6
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs / CLs / FARs 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.
	After appropriate corrections, it could conclude the ex-post ERs are lower than ex-ante estimation. There are no other ex-ante SDG indicators as compared to ex-post for this monitoring in lieu of the addition requirements for GS4GG in the Transition Annex.	

D.6. Safeguards Reporting

Means of validation	☒	Section F of MR, Safeguards reporting. There are no safeguarding principles required to be monitored. The PoA-DD, transition annex and VPA-DD were reviewed. The following sources of information have been used in this context: • /MR/ • /BUS/ • /DB/ • /TA/ • /PoADD/ • /VPADD/ • /IM01/ • /IM02/
Findings	☒	Information is sufficient and appropriate.
	☐	In this context the following CARs, CLs, FARs have been raised:
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☐	The raised CARs / CLs / FARs 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 verification team could conclude the section is filled appropriately.	

D.7. Stakeholder Inputs and Legal Disputes

Means of validation	☒	The verification team has checked Sections G.1 to G.3 of the monitoring report for the current and previous monitoring report on any complaints and issues raised. Section G.1: There are 686 cases reported this monitoring period with 569 cases resolved, 51 on-going, 1 on hold and 65 pending. There are open grievances of MPIII there are addressed as per FAR02. Refer MR section B.1.1. During the telephone interviews with households, they informed the main issues are gas leakage, brokern dome, not enough water, block gas pipe by water and broken stove. The interviewed households informed the Biogas Construciton Enterprise (BCE), mason and VPA implementer's supervisors to resolve the issues Section G.2: There are no mitigations were proposed for monitoring period. The VPA implementer is interviewed and grievance report is verified. Section G.3: There are no legal contest or dispute that has arisen with the project during the monitoring period. The following sources of information have been used in this context: • /MR/ • /TA/ • /VPADD/ • /GT/ • /IM01/ • /IM02/
Findings	☐	Information is sufficient and appropriate.
	☒	In this context the following CARs, CLs, FARs have been raised: CAR G1; FAR 01
Conclusion	☐	No CARs / CLs / FARs have been raised in this context. No correction was required. The project is in line with the respective requirements.
	☒	The raised CARs / CLs / FARs 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.
	After appropriate corrections by VPA Implementer the verification team could conclude the section is filled with appropriate information. FAR01 will be verified in the next verification by the verifying VVB.	

SECTION E. Internal quality control

Before the submission of the final verification report a technical review of the whole verification procedure was carried out. The technical reviewers are competent GHG auditors being appointed for the scope this project 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 verification opinion and the topic specific assessments as prepared by the verification 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 verification 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 issuance is conducted.

SECTION F. Verification opinion

Biogas Solutions Uganda Ltd (BSUL) has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 4th periodic verification of CPI of the VPA **"African Biogas Carbon Programme (ABC) – Uganda -VPA003 (GS4236)"** with regard to stimulate the use of biogas systems to replace traditional thermal energy generation methods by making biogas systems affordable and available to households. This verification covers the period from 01/05/2020 – 30/04/2021 (including both days).

As a result of this verification, the verifier confirms that:

- all operations of the VPA are implemented and installed as planned and described in the validated VPA-DD.
- the monitoring plan is in accordance with the applied approved GS methodology, i.e., Technologies and Practices to Displace Decentralized Thermal Energy Consumption version 1.0.
- the monitoring system is in place, functional and have generated GHG emission reductions.

As the result of this periodic verification, the verifier confirms that the GHG emission reductions have been calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above-mentioned reporting period as follows:

Emission reductions: **22,154 tCO_2e**

SECTION G. Certification statement

As a duly accredited VVB, TÜV NORD CERT confirms that the PoA

"African Biogas Carbon Programme (ABC) – Uganda VPA003"

registered under

GS ID.: 4236

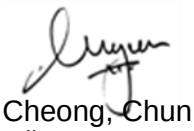
has achieved emission reductions in accordance with all applicable requirements for registered GS project activities during the current monitoring period

MP-No.:	CPI MR4
from:	01/05/2020
to:	30/04/2021

(including both days) as follows:

Emission reductions: **22,154 tCO_2e**

Puchong, 25/11/2021



Cheong, Chun Yuen (Robert)
TÜV NORD JI/CDM CP
Verification Team Leader

Appendix 1. Abbreviations

Abbreviations	Full texts
CAR	Corrective Action Request
CL	Clarification
VPA	Voluntary Project Activity
VPA-DD	Voluntary Project Activity Design Document
CME	Coordinating Managing Entity
CO_2eq	Carbon dioxide equivalent
CPO	Construction Partner Organisation
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GS	Gold Standard
IM	Interview
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
PoA	Programme of Activities
PoA-DD	Programme of Activities Design Document
PRC	Post Registration Changes
PS	CDM project standard for project activities
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

TÜV NORD Certification

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

Mr. David Lubanga

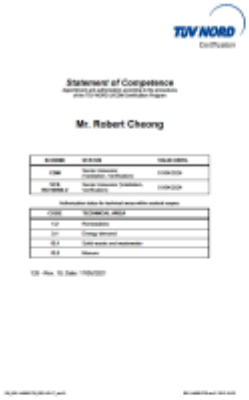
SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2021-10-20
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2021-10-20

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
3.1	Energy demand
13.2	Manure

251 - Rev. 7, Date: 2018-10-19

251_S01-VA060-F20_2018-10-19_rev7.doc S01-VA060-F20 rev3 / 2012-10-25



Statement of Competence

Mr. Robert Cheong

TÜV NORD Certification

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

Mr. Kunal Rami

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2023-03-26
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2023-03-26

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
2.1	Energy distribution
3.1	Energy demand
6.1	Construction
7.1	Transport
13.1	Solid waste and wastewater

224 - Rev. 9, Date: 2020-12-03

224_S01-VA060-F20_202020-12-03_rev9 S01-VA060-F20 rev3 / 2012-10-25

Appendix 3. Documents reviewed or referenced

No.	Author	Reference	Title	References to the document	Provider
1.	GS	**/GSM/**	Technologies and Practices to Displace Decentralized Thermal Energy Consumption (version 1.0)		Others
2	GS	**/GS4GG/**	Gold Standard for the Global Goals Principles & Requirements version 1.2		Others
3	UNFCCC	**/GT/**	Glossary "CDM terms" (version 10.0)	https://cdm.unfccc.int/Reference/Guidclarif/glos_CDM.pdf	Others
4	UNFCCC	**/KP/**	Kyoto Protocol (1997)	http://unfccc.int/kyoto_protocol/items/2830.php	Others
5	UNFCCC	**/MA/**	Decision 3/CMP. 1 (Marrakesh – Accords)	http://cdm.unfccc.int/Reference/COPMOP/index.html	Others
6	IPCC	**/IPCC/**	Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories: 1. Non-CO2 Stationery Combustion 2. Emissions from Livestock and Manure Management (Chapter 10) 1. 3. IPCC Second Assessment Report – Climate Change 1995: A Report of the Intergovernmental Panel on Climate Change	www.ipcc-nggip.iges.or.jp	Others
7	VVB	**/CPM/**	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)		VVB
8	CME	**/PoADD/**	Registered PoA Design Document for GS PoA: "African Biogas Carbon Programme (ABC)" version 07, dated 29/10/2015 Registered PoA Design Document for GS PoA: "African Biogas Carbon Programme (ABC)" version 8.1, dated 29/06/2020		CME
9	CME	**/VPADD/**	Registered VPA-Design Document for VPA003: "African Biogas Carbon Programme (ABC) – Uganda – VPA03" version 3.1, dated 02/05/2017		CME
10	GS	**/GSR/**	GS VPA Inclusion Review dated 16/04/2019		Others
11	CME	**/TA/**	Transition Annex version 2.2 dated 12/07/2019 GS Review dated 23/07/2019		CME

12	CME	**/VAL/**	Validation Report for African Biogas Carbon Programme (ABC) – Uganda – VPA003" version 02 dated 03/03/2017		CME
13	CME	**/VER/**	Documents of previous verifications (Monitoring report, verification report, ER calculation sheet) GS Issuance review		CME
14	BSUL	**/MR/**	Monitoring Report version 1.0 dated 18/05/2021 Monitoring Report version 1.1 dated 02/09/2021 Monitroing Report version 1.2 dated 17/09/2021 Monitoring Report version 1.3 dated 24/11/2021		VPA Implementer
15	BSUL	**/ER/**	SDG ER spreadsheet version 1.0 dated 06/06/2021 SDG ER spreadsheet version 1.1 dated 20/08/2021 SDG ER spreadsheet version 1.2 dated 17/09/2021 SDG Er spreadsheet version 1.3 dated 24/11/2021		VPA Implementer
16	CIRCODU	**/BUS/**	Carbon Data Collection for MPIV and Bus 2020 Report dated 23/02/2021 Questionnaires for Survey A & B		Others
17	BSUL	**/DB/**	Database and SDG 8 version 1.0 dated 06/06/2021 Database and SDG 8 version 1.1 dated 25/08/2021 Database and SDG 8 version 1.2 dated 24/11/2021		VPA Implementer
18	BSUL	**/AC/**	Agreements and Certificates of households for year 2020 and 2021		VPA Implementer
19	BSUL	**/PFT/**	Project fuel test for biomass and fossil fuels. Questionnaires for Survey C		VPA Implementer
20	BSUL	**/T/**	Training for Mason & BCEs		VPA Implementer
21	BSUL	**/GT/**	Grievance Tracker 2020		VPA Implementer
22	UNBS	**/C/**	Weigh Balance Calibration Certificates issued by Uganda National Bureau of Standards		Others
23	CME	**/TD/**	Technical Design of Digester		CME

24	CME	**/REC/**	Declaration of double counting dated 08/05/2018		
25	GS	**/L/**	GS Confirmation Leakage dated 20/10/2016		Others
Websites					
26		**/gs/**	http://www.goldstandard.org/		Others
27		**/ipcc/**	www.ipcc-nggip.iges.or.jp		Others
28		**/rs/**	http://www.raosoft.com/samplesize.html		Others
29		**/gp/**	https://www.graphpad.com/quickcalcs/randomselect1/		Others
30		**/ge/**	Google earth		Others

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

Table 1: Clarification requests, corrective action requests and forward action requests raised

Verification Topics	No. of CAR	No. of CL	No. of FAR
A: Description of project activity A.1. General description of project A.2. Location of project A.3. Reference of applied methodology A.4. Crediting period of project	1	0	0
B: Project Implementation B.1: Description of implemented project B.1.1. Forward Action Requests B.2: Post-registration changes B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline B.2.2. Corrections B.2.3. Changes to start date of crediting period B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline B.2.5. Changes to project design of approved project	1	2	0
C: Description of monitoring system applied by the project Article 1: Organisational Setup of the carbon and SDG monitoring Article II. Description of human resources Article III. Survey design Article IV. Biogas user survey (US + CMS) Article V. Survey implementation Article VI. Baseline Fuel Test (BFT) and the Project Performance Field Test (PFT) Article VII. KPT survey design Article VIII. KPT implementation	0	0	0

Verification Topics	No. of CAR	No. of CL	No. of FAR
D: Data and parameters D.1. Data and parameters fixed ex ante or at renewal of crediting period D.2. Data and parameters monitored D.3. Comparison of monitored parameters with last monitoring period D.4. Implementation of sampling plan	9	1	0
E: Calculation of SDG outcomes E.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact E.2. Calculation of project value or estimation of project situation of each SDG impact E.3. Calculation of leakage E.4. Calculation of net benefits or direct calculation for each SDG Impact E.5. Comparison of actual SDG Impacts with estimates in approved PDD E.5.1.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period E.6. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD	5	1	0
F: Safeguards Reporting	0	0	0
G. Stakeholder Inputs and Legal Disputes G.1. List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses / mitigations G.2. Report on any stakeholder mitigations that were agreed to be monitored G.3. Provide details of any legal contest that has arisen with the project during the monitoring period	0	1	0
FAR from previous verification	0	0	2
FAR from this verification	0	0	1
SUM	**16**	**5**	**3**

Table 3. Remaining FARs from validation and/or previous verification

FAR ID	01	**Section No.**	D.2	**Date:**	13/07/2021
Description of FAR					
Refer plant ID no. BSU/3087 that the owner has intention to reinstall the expansion chamber unit to restart unit. The VPA Implementer is to monitor when the expansion chamber will be installed to allow the plant restart prior to the next MP verification					
CME response				**Date:**	26/08/2021
The owners of this plants are no longer interested in using this digester. This plant consequently was removed from the carbon database[2] See See VPA03 MPIV database and SDG8 sheet 'removed plants' cell D123					
Documentation provided by project participant					
☒ Changes in MR		Section(s): B.1.1		New version No.:1.1	
☐ Changes in XLS		Worksheet(s):		New version No.	
☐ Other:					
VVB assessment				**Date:**	28/08/2021
The MPIV database is review to verifyt plant ID no. BSU/3087 has been removed due to the owner is no loner interested to use the digester.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

FAR ID	02	**Section No.**	F.2	**Date:**	13/07/2021
Description of FAR					
The VPA implementer has to track on the outstanding 33 cases to be resolved prior to the next MP verification.					
CME response				**Date:**	26/08/2021

All the 33 cases are closed and resolved – in total 29 units are removed, see the table below. Status	No.	Colour	Means of Verification
Temporarily Excluded	18	Grey	Check the colour code in the FAR02 33 open cases MP updated august 6th plant codes column L (in the reply package) and with the plant code you can check the database)
Excluded	6	Yellow	
Deleted	2	Red	
Included	4	Green	
Yet to be added to DB	3	Orange	To be checked as above, these units will be added next year in the DB
Total	33		
Total removed	29	Grey, yellow, red and orange	as above

Documentation provided by project participant			
☒ Changes in MR	Section(s):B.1.1	New version No.:1.1	
☒ Changes in XLS FAR02 33 open cases previous MP updated Aug 6th plantcodes	Worksheet(s):33 cases	New version No.n/a	
☐ Other:			
VVB assessment		**Date:**	28/08/2021
VPA Implementer above explanation 29 units are excluded as demonstrated in FAR02 33 spreadsheet. The DB is crosschecked for the 29 units are not listed.			

[2]See VPA03 MPIV database and SDG8 sheet 'removed plants' cell D123

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

Table 4. CLs from this verification

CL ID	B-1	Section no.	B.1	Date:	13/07/2021

Description of CL

MR version 1.0, Section B.1:

1. Table 3: According to the DB there are units with capacities of 16, 20, 30, 35, 40 and 45 m^3. As per footnote 3 "Larger digesters than 13 m^3 are also installed, but these comprise just 0.5% of all units installed and therefore not detailed. The performance of these digesters is proportional to the increase in digester volume. The 13 m^3 digester is relatively popular with 8.2% of all digesters installed. This digester has a comparable technical specification with the 12 m^3 as the size difference is small".
   - Clarification on the specification that the performance of these digesters is proportional to the increase in digester volume.
2. It is unclear of the thermal capacity for the total number of digesters installed is within the threshold requirement of 45MW_{th}.

Project participant response **Date:** 26/08/2021

1. The VPA implementer shared a file with the VVB on this. The specific biogas production is 0.04 m3/kg manure, this is independent on the volume. A larger plant will have a proportional larger feeding, i.e. 2 times larger allows for 2 times more feeding. Two times more feeding times the specific biogas production is 2 times more biogas. The table in the files shared (email communication 12 July 2021) is:

Specifics	Unit	13m3	16 m3	20 m3	35m3	35m3	40m3	45m3
Plant Volume	litre	13162.5	16380.0	20280.0	30420.0	35100.0	40170.0	45630.0
Gas Storage Volume	litre	3037.5	3780.0	4680.0	7020.0	8100.0	9270.0	10530.0
Digester Volume	litre	10125.0	12600.0	15600.0	23400.0	27000.0	30900.0	35100.0
Min. Feeding	Kg/day	84.4	105.0	130.0	195.0	225.0	257.5	292.5
Max. Feeding	Kg/day	126.6	157.5	195.0	292.5	337.5	386.3	438.8
Min. daily gas production	m3/day	3.4	4.2	5.2	7.8	9.0	10.3	11.7
Max. daily gas production	m3/day	5.1	6.3	7.8	11.7	13.5	15.5	17.6
Average daily feeding	Kg/day	105.5	131.3	162.5	243.8	281.3	321.9	365.6
Average gas production	m3/day	4.2	5.3	6.5	9.8	11.3	12.9	14.6
Min HRT	40							
Max HRT	60							
Specific gas prod.	0.04							

The specification of the other units are now also added in the MP

2. See sheet VPA03 MPIV database and SDG8 sheet thermal capacity cell C7 for the calculation of the thermal capacity and the updated MR section B.1 which is now expressed in MWth

Documentation provided by project participant

☒	Changes in the MR	Section(s): B.1	New version No.:1.1
☐	Changes in XLS	Worksheet(s):	New version No.:
☐	Other:		

VVB assessment **Date:** 28/082021

MR version 1.1, Section B.1:

1. Table 3 is updated to include units with capacities of 16, 20, 30, 35, 40 and 45 m^3 with information of the performance as describe. The digester technical specification is crosscheck for correctness.
2. The thermal capacity for the total number of digesters installed is 28.255MW_{tth} cell C7 of MPIV database and SDG8 sheet thermal capacity and within the threshold requirement of 45MW_{th}.

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CL ID	B-2	Section no.	B.1.1	Date:	13/07/2021

Description of CL

MR version 1.0, Section B.1.1:

1. Table in FAR02: It is unclear how many plants are removed from the database
2. Clarification for footnote 5, See file FAR02 33 open cases previous MP and VPA03 MPIV database and SDG8 sheet 'removed plants' for the removed plants.

Project participant response — **Date:** 26/08/2021

1. As depicted in section B1.1. 29 cases are removed from the database
2. The description is updated in the footnote (which is now footnote number 6) and consistent with FAR ID FAR02 in this PFR

Documentation provided by project participant

☒	Changes in the MR	Section(s): B.1.1	New version No.: 1.1
☐	Changes in XLS	Worksheet(s):	New version No.:
☐	Other:		

VVB assessment — **Date:** 28/08/2021

MR version 1.0, Section B.1.1:

1. Table in FAR02: 29 plants are removed from the database
2. Footnote 5 is change to footnote 6 with the reference link change to FAR02 33 open cases previous MP sheet 33 cases cell F38 to I44.

Conclusion *Tick the appropriate checkbox*	
	☐ Additional action should be taken (finding remains open)
	☒ The finding is closed

CL ID	D-1	Section no.	D.4	Date:	13/07/2021

Description of CL

MR version 1.0, Section D.4: Refer SDG ER, Survey B sheet, there are 130 HHs digester are not in operation. Clarification requested for those units with incomplete construction, no longer used or family issues, etc., will be maintained in the database.

Project participant response — **Date:** 26/08/2021

It is not necessary as per GS guidance to remove plants in this MP based on the MP findings as this will affect the usage rate (email to the SustainCert is shared with the VVB). In the MPIV database and SDG8 however, a list of 79 plants is available in sheet 'other excluded' which are temporarily removed and will be followed up by the VPA implementer in the next MP

Documentation provided by project participant

☒	Changes in the MR	Section(s): D.4	New version No.:1.1
☒	Changes in XLS MPIV database and SDG8	Worksheet(s): other excluded	New version No.:1.1
☐	Other:		

VVB assessment — **Date:** 28/08/2021

MR version 1.1, Section D.4: As explained above, 79 units were temporarily removed from database that will be followed up by VPA implementer in next MP.

FAR 01 is raised for the follow-up by the verifying VVB in the next verification.

Conclusion *Tick the appropriate checkbox*	
	☐ Additional action should be taken (finding remains open)
	☒ The finding is closed

CL ID	G-1	Section no.	G.1	Date:	13/07/2021

Description of CL

MR version 1.0, Section G.1:

1. Clarification on the status of the 33 complaints from MPIII monitoring that have not been rectified.
2. Referring the 65 pending cases, there are units that are not operating for various reasons. Clarification request are these units removed from DB and in ER claims?

Project participant response — **Date:** 26/08/2021

1. As per reply to FARID 02 in this report, 29 units are removed and 4 are added to the database. The reasons are:

#			Response from BSUL 12-July-2021
1	229	BSU1/01979	Working
2	162	BSU1/05198	Temporarily out of operation
3	168	Was deleted from dbase	Removed from carbon database
4	260	BSU/00092	Repaired by Okwii, its now under initial feeding
5	275	UG-EAS-1610-07791	Working
6	108	BSU/02016	Case allocated to QSP for physical visit
7	113	BSU1/05246	Removed from carbon database
8	124	BSU1/04424	Was able to reach client but he has no source of waste but has
9	134	BSU1/04941	Removed from carbon database
10	13	BSU/5309	Corrected the phone number and client says the plant
11	29	BSU1/05315	Removed from carbon database
12	39	BSU1/02003-Muzaala, Hajji Jami	Case allocated to QSP for physical visit
13	53	Was deleted from dbase	Removed from carbon database
14	296	BSU/06757	Case allocated to QSP for physical visit
15	306	BSU/01839	Repairs are underway
16	310	BSU/04674	Case allocated to QSP for physical visit
17	398	BSU/06539	Working
18	56	BSU1/03569	Removed from carbon database
19	69	UG-CEN-1305-BSU 02404	temporarily out of operation
20	71	BSU/3354	Repaired by Ucha, its under feeding
21	73	BSU1/04722	Removed from carbon database
22	419	BSU1/03788	Temporarily out of operation
23	428	BSU/06306	Case allocated to QSP for physical visit
24	431	BSU1/01521	Working
25	456	BSU1/02572	Repairs are underway
26	464	BSU/02303	Working
27	515	BSU/06634	After lockdown, he is planning to bring some animals close
28	169	UG-EAS-1510-02109	Client has got source of waste now, but he has no money for stc
29	571	BSU1/05192	Client has now got some animals now but he has no money
30	188	BSUL/01374	Temporarily out of operation
31	576	BSU1/03276	Removed from carbon database
32	605	BSU1/04808-Jenifer Muyama	Case was allocated to QSP for physical visit, QSP
33	622	BSU/07084	temporarily out of operation

The VVB can check this in the file FAR02 33 open cases previous MP updated Aug 6th with plant code cell A1 to S34

2. These cases are pending on action from the client – the plant is temporarily not in operation and are therefore not excluded from the database.

Documentation provided by project participant		
☒ Changes in the MR	Section(s): G.1	New version No.:1.1
☒ Changes in XLS FAR02 33 open cases previous MP updated Aug 6th plantcodes	Worksheet(s):33 cases	New version No.n/a
☐ Other:		

VVB assessment	**Date:**	28/06/2021

MR version 1.0, Section G.1:

1. VPA Implementer explain above 29 plants are removed and 4 plants remain in the DB. The FAR02 spreadsheet is verified and crosschecked with DB to confirm their removal.
2. VPA explain the 65 pending cases are temporarily out of operation and remain in the DB.

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CL ID	E-1	**Section no.**	SDG ER	**Date:**	13/07/2021
Description of CL					

SDG ER spreadsheet version 1.0:

1. Removed HH sheet: Clarification for the household removed is one as compared to DB has 121.
2. Analysis A sheet: The N_T value applied in cells C7 to C13 are derived from survey A sheet. Clarification in calculating the average on why the cells with NA are included?
3. Analysis B sheet:
   a. Clarification for the nomenclature applied in cell E14 is the same as in cell B50
   b. Clarification for the sentence in cell G47
   c. Clarification for the value applied in cell D23 is the total sampled instead of the description.
4. BE sheet: Clarification for the source in cell G35
5. SDG13 sheet: Clarification for the value 11149 in cell E48, 15690 in cell E49 and 10269 in cell C55 is derived.

Project participant response	**Date:**	26/0-8/2021

1. The removed hh sheet in the ER workbook is a sheet that was accidentally copied from the pervious MP. The unit involved was surveyed in March 2020 (see cell G9) which is in the previous MR (see workbook version 1.0). This sheet is removed in the MPIV survey SDG ER workbook 1.1.
2. The range C7:C13 are linked to the columns CA, CE, CI, CM, CQ, CU and CY in survey A sheet. In that sheet none of the cells contain NA
3. Analysis B sheet
   a. This is not the same and corrective action is taken. Cell E14 is now changed to % functioning digesters
   b. The sentence is corrected, the age-group is a bit smaller than 1 year
   c. This refers to C22 as per skype call – this is the number of plants in the sample and the period in the sample. The period * the number of plants give you the number of plant-years. Thus if 10 plants are in a sample of 1 year, the total number of plant-years are 1*10 = 10. This is how it is calculated
4. This is the same comment as received last year. The reference however is confusing and is now updated
5. E49 is from the VPA03-DD, the table A10 from that VPA-DD is copied in the same sheet at the right of E48 for transparency. The same applies to E49. The table is also copied here below

A.10. Estimated amount of GHG emission reductions

Emission reductions during the crediting period	
Years	Annual GHG emission reductions (in tonnes of CO_2e) for each year
01/04/2015 - 31/12/2015	4,493
01/01/2016 - 31/12/2016	6,621
01/01/2017 - 31/12/2017	7,349
01/01/2018 - 31/12/2018	8,616
01/01/2019 - 31/12/2019	9,882
01/01/2020 - 31/12/2020	11,149
01/01/2021 – 31/03/2022	15,690
Total number of crediting years	7
Annual average GHG emission reductions over the crediting period	7,975
Total estimated reductions (tonnes of CO_2e)	63,800

C55 is obtained table 1 of the VPA03-DD that table is copied under table A.10 in the excel sheet for transparency and also copied here below:

Table 1: Implementation schedule of the VPA[2]

Year	Number of new biogas digesters installed	Cumulative total
2009	1	1
2010	332	333
2011	1,032	1,365
2012	1,003	2,368
2013	1,631	3,999
2014	848	4,847
2015	664	5,511
2016	362	5,873
2017	1,099	6,972
2018	1,099	8,071
2019	1,099	9,170
2020	1,099	10,269
2021	1,099	11,368
2022	0	11,368

Documentation provided by project participant		
☒ Changes in the MR	Section(s): SDG ER and MPIV database and SDG8	New version No.:1.1
☒ Changes in XLS	Worksheet(s):SDG13	New version No.:1.1

☐ Other:	

VVB assessment	**Date:**	28/08/2021

SDG ER spreadsheet version 1.1:

1. VPA Implementer explain the removed HH sheet in ER spreadsheet is an error in updated SDG ER spreadsheet.
2. Analysis A sheet: As explained above, the N_T value applied in cells C7 to C13 are are linked to the columns CA, CE, CI, CM, CQ, CU and CY in survey A sheet where none of the cells contain NA
3. Analysis B sheet:
   a. The description in cell E14 is changed to Functioning digesters (%)
   b. The sentence in cell G47 is corrected as this age group is a bit smaller than one year
   c. The above explanation is appropriate that is based on the period * the number of plants give the number of plant-years to calculate, the total number of plant-years
4. BE sheet: The reference source in cell G35 is updated accordingly.
5. SDG13 sheet: The value 11,149 in cell E48, 15690 in cell E49 derived from the ex-ante emissions for the period 01/01/2020 to 31/12/2020 and 10,269 in cell C55 is derived from the ex-ante cumulative number of digester installed in 2020.

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

Table 5. CARs from this verification

CAR ID	A-1	**Section no.**	Cover page	**Date:**	13/07/2021

Description of CAR

MR version 1.0, Section key project information:

1. The project representative is incorrect.
2. Activity Requirements applied is incorrect checked
3. Table 1: SDG impact description for SDGs 2, 3, 5, 13 to be corrected according to the parameter description
4. Table 1: SDG 7 digesters constructed is not reported
5. Table 1: The SDG target for working-days labor created and Number of masons trained are inconsistent with section D.2
6. Table 2: The number of days are not described in accordance to the MR template guideline

Project participant response	**Date:**	26/08/2021

1. This is now updated to HIVOS
2. This is now corrected to community service activities
3. This is now updated conform the transition annex
4. This is now included
5. This is updated
6. The MR guideline is studied, and the amounts achieved is provided by calendar year. No inconsistency is observed and the table is aligned with the non-binding example of the guideline:

Table 2 – Product Vintages

Non binding example for illustration purposes

		Amount Achieved		
Start Dates	**End Dates**	**VERs**	**ADALYs**	**…**
03/06/2017	31/12/2017	21,252	146	
01/01/2018	31/12/2018	55,632	402	
01/01/2019	02/06/2019	19,111	114	

Referring to the monitoring period start and end dates in the KPI table, divide the monitoring period into calendar years and calculate the amount of Product generated in each calendar year. Certified impact statements do not have a per credit issuance fee and therefore do not require vintages. Pay special attention to microscale projects that cap emission reductions based on the scale – the cap must not be crossed either in a calendar year **or** in a monitoring year.

Documentation provided by project participant		
☒ Changes in MR	Section(s): Cover page	New version No.:1.1
Changes in XLS	Worksheet(s):	New version No.:
☐ Other:		

VVB assessment	**Date:**	28/08/2021

MR version 1.0, Section key project information:

1. The project representative is updated accordingly.
2. Activity Requirements corrected accordingly to reflect as per GS guidelines.
3. Table 1: SDG impact description for SDGs 2, 3, 5, 13 corrected according to the parameter description and according to transition annex.
4. Table 1: SDG 7 digester constructed is included
5. Table 1: The SDG target for working-days labor created and Number of masons trained are corrected and consistent with section D.2
6. Table 2: As per guidelines, the number of days need not to be described

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	B-3	**Section no.**	B.1	**Date:**	13/07/2021
Description of CAR					

MR version 1.0, Section B.1: During the telephones survey and interviews conducted by VVB, the following households were found the digesters are no longer in used. Therefore, shall be removed from database.

1. Unit No: BSU/03470
2. Unit No: BSU/2077

The SDG ER spreadsheet shall be updated accordingly.

Project participant response	**Date:**	26/08/2021

These 2 units are now removed from the sheet DB_MPIV and moved to the sheet removed plants in file VPA03 MPIV database and SDG8

Documentation provided by project participant		
☐ Changes in MR	Section(s):	New version No.:
☒ Changes in XLS	Worksheet(s): removed plants and DB_MPIV	New version No.:1.1
☐ Other:		

VVB assessment	**Date:**	28/08/2021

MR version 1.1, Section B.1: The 2 units are removed from database thus reducing the number of units.

The MPIV database and SDG8 spreadsheet has been crosschecked.

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	D-2	**Section no.**	D.1	**Date:**	13/07/2021

Description of CAR

MR version 1.0, Section D.1: Parameter $MCF_{x,k}$:

1. The value of 15.48% is inconsistent with the VPA-DD.
2. Footnote 7 is not accessible

Project participant response	**Date:**	26/08/2021

1. This comment was also received in MPI verification (MPI CAR04), the response was

   The Methane Conversion Factor (MCF): the ex-ante MCF was 3.59%, based on a survey of similar smallholder farmers in Kenya in 2014 (that is the VPA-DD value ex-ante). Ex-post, the MCF was 15.48%, based on the MPI which asked customers how they managed their animal's manure before receiving a biogas digester (that is the ex-post value used for this CP).

2. The footnote is removed and instead the source is changed to VPA03-DD for the temperature

Documentation provided by project participant		
☒ Changes in MR	Section(s):D.2	New version No.:1.1
☐ Changes in XLS	Worksheet(s):	New version No.:
☒ Other: no changes in project documentation		

VVB assessment	**Date:**	28/08/2021

MR version 1.1, Section D.1: Parameter $MCF_{x,k}$:

1. The above explanation for the value of 15.48% is based on ex-post obtained during MPI since the ex-ante value is based on survey conducted in Kenya in 2014 which is not applicable.
2. Footnote 7 is removed since no longer accessible. The source updated to refer the VPA-DD for the temperature. VPA-DD is review for the data.

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	D-3	**Section no.**	D.2	**Date:**	13/07/2021

Description of CAR

MR version 1.0, Section D.2, Parameter $U_{p1,y}$: Refer additional comments, the reference document to the cells should be describe.

Project participant response	**Date:**	26/08/2021

The source is now included in additional comments

Documentation provided by project participant		
☒ Changes in MR	Section(s):D2	New version No.:1.1

☐	Changes in XLS	Worksheet(s):	New version No.:
☐	Other:		

VVB assessment	**Date:**	28/08/2021
MR version 1.1, Section D.2, Parameter $U_{p1,y}$: Refer additional comments, the reference document to the cells is updated.		
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed	

CAR ID	D-4	**Section no.**	D.2	**Date:**	13/07/2021
Description of CAR					
MR version 1.0, Section D.2, Parameter $N_{p1,y}$: The nomenclatures for the reference parameters in Measurement methods and procedures section are incorrect presented					
Project participant response				**Date:**	26/08/2021
The nomenclature is now updated and made consistent					
Documentation provided by project participant					
☒	Changes in MR	Section(s):D2	New version No.:1.1		
☐	Changes in XLS	Worksheet(s):	New version No.:		
☐	Other:				
VVB assessment				**Date:**	28/06/2021
MR version 1.1, Section D.2, Parameter $N_{p1,y}$: The nomenclatures for the reference parameters in Measurement methods and procedures section are corrected accordingly.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	D-5	**Section no.**	D.2	**Date:**	13/07/2021
Description of CAR					
MR version 1.0, Section D.2, Parameter $BB_{p1,\,bio}$: The source of data should be made reference to the PFT test conducted.					
Project participant response				**Date:**	26/08/2021
Updated to the correct reference (PFT executed in 2020 for MPIII)					
Documentation provided by project participant					
☒	Changes in MR	Section(s): D.2	New version No.:1.1		
☐	Changes in XLS	Worksheet(s):	New version No.:		
☐	Other:				
VVB assessment				**Date:**	28/08/2021
MR version 1.1, Section D.2, Parameter $BB_{p1,\,bio}$: The source of data updated and made reference to the PFT test conducted in 2020.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	D-6	**Section no.**	D.2	**Date:**	13/07/2021
Description of CAR					
MR version 1.0, Section D.2, Parameter $BB_{p1,\,fuel}$: The source of data should be made reference to the PFT test conducted					
Project participant response				**Date:**	26/08/2021
Updated to the correct reference (PFT executed in 2020 for MPIII)					
Documentation provided by project participant					
☒	Changes in MR	Section(s):D2	New version No.:1.1		
☐	Changes in XLS	Worksheet(s):	New version No.:		
☐	Other:				
VVB assessment				**Date:**	28/08/2021
MR version 1.0, Section D.2, Parameter $BB_{p1,\,fuel}$: The source of data updated and made reference to the PFT test conducted in 2020.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	D-7	**Section no.**	D.2	**Date:**	13/07/2021
Description of CAR					
MR version 1.0, Section D.2, Parameter GWP_{CH4}: The source of data reference should be according to GS rules update.					
Project participant response				**Date:**	26/08/2021
Updated with the correct reference					
Documentation provided by project participant					
☒ Changes in MR		Section(s): D.2		New version No.:1.1	
☐ Changes in XLS		Worksheet(s):		New version No.:	
☐ Other:					
VVB assessment				**Date:**	28/08/2021
MR version 1.1, Section D.2, Parameter GWP_{CH4}: The source of data reference updated and made reference to GS rules update.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	D-8	**Section no.**	D.2	**Date:**	13/07/2021
Description of CAR					
MR version 1.0, Section D.2, Parameter Bio: Refer SDG ER spreadsheet, Bioslurry sheet, cell B1 describes the parameter, cells B2 to B11 describe the usage of bioslurry. However, the reference cells B14:B17 do not reflect description to cells B2 to B11.					
Project participant response				**Date:**	26/08/2021
The parameter Bio measures the use of bio-slurry for agriculture while B2 to B11 is for the calculation of the MCF and concerns the storage of the bio-slurry after the biodigester only, not the use for agriculture. Therefore, the results are different					
Documentation provided by project participant					
☐ Changes in MR		Section(s):		New version No.:	
☐ Changes in XLS		Worksheet(s):		New version No.:	
☒ Other: no changes in project documentation					
VVB assessment				**Date:**	28/08/2021
MR version 1.0, Section D.2, Parameter Bio: As explain above cells B2 to B11 is used for calculation of MCF and concerns on storage of bio-slurry whilst cells B14:B17 is for application of bio-slurry.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	D-9	**Section no.**	D.3	**Date:**	13/07/2021
Description of CAR					
MR version 1.0, Section D.3: According to GS Community Services Activity Requirements version 1.2, the VPA falls under this activity requirements. Therefore, the section to be filled as per MR guidelines.					
Project participant response				**Date:**	26/08/2021
Section D.3 is updated accordingly					
Documentation provided by project participant					
☒ Changes in MR		Section(s):D.3		New version No.:1.1	
☐ Changes in XLS		Worksheet(s):		New version No.:	
☐ Other:					
VVB assessment				**Date:**	28/08/2021
MR version 110, Section D.3: The section has been filled as per MR guidelines.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	D-10	**Section no.**	D.4	**Date:**	13/07/2021
Description of CAR					

MR version 1.0, Section D.4:

1. Table 5: The heading for Sample Reached Survey B and Sample Reached survey A is incorrect.
2. Footnote 10 cell reference is incorrect.

Project participant response	**Date:**	26/08/2021

1. This is now clarified, table 5 is the number sampled, the number reached is discussed under the table under heading ii. Collected data
2. The referenced cells are now corrected to the correct cells in the excel sheet. The footnote number is now 11

Documentation provided by project participant		
☒ Changes in MR	Section(s):D.4	New version No.:1.1
☐ Changes in XLS	Worksheet(s):	New version No.:
☐ Other:		

VVB assessment	**Date:**	28/08/2021

MR version 1.1, Section D.4:

1. Table 5: The heading for Sample Reached Survey B and Sample Reached survey A is corrected.
2. Footnote number is change to 11 and the reference cell is corrected.

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	E-2	**Section no.**	E.1	**Date:**	13/07/2021

Description of CAR

MR version 1.0, Section E.1: SDG 5: Achieve gender equality and empower all women and girls for Usage of saved time baseline is not describe clearly.

Project participant response	**Date:**	26/08/2021

This is now updated in line with the description in D.2

Documentation provided by project participant		
☒ Changes in MR	Section(s):E.1	New version No.:1.1
☐ Changes in XLS	Worksheet(s):	New version No.:
☐ Other:		

VVB assessment	**Date:**	28/08/2021

MR version 1.1, Section E.1: SDG 5: Achieve gender equality and empower all women and girls for Usage of saved time baseline is updated accordingly.

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	E-3	**Section no.**	E.2	**Date:**	13/07/2021

Description of CAR

MR version 1.0, Section E.2:

1. The project value for SDG13 is not presented according to the MR guidelines
2. Project emissions for methane avoidance GWP applied should be clearly define for the period before or after 31/12/2020.

Project participant response	**Date:**	26/08/2021

1. The project value is now included in the MR at the bottom of section E.2 as per MR guidelines. A table is added making it clear how the project value is derived (table 7 in the MR)
2. The is now described in the updated MR

Documentation provided by project participant		
☒ Changes in MR	Section(s):E.2	New version No.:1.1
☐ Changes in XLS	Worksheet(s):	New version No.:
☐ Other:		

VVB assessment	**Date:**	28/08/2021

MR version 1.1, Section E.2: 1. The project value for SDG13 is included and presented in a table as per guidelines. 2. Project emissions for methane avoidance GWP applied is define for the period before or after 31/12/2020.

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	E-4	**Section no.**	E.4	**Date:**	13/07/2021
Description of CAR					
MR version 1.0, Section E.4: The description for the SDG Impact 2, 3, 5, 7 and 8 shall be in accordance to the parameter description in Section D.2.					
Project participant response				**Date:**	26/08/2021
This is updated and made consistent with section D.2					
Documentation provided by project participant					
☒	Changes in MR	Section(s):D.2	New version No.:1.1		
☐	Changes in XLS	Worksheet(s):	New version No.:		
☐	Other:				
VVB assessment				**Date:**	28/08/2021
MR version 1.1, Section E.4: The description for the SDG Impact 2, 3, 5, 7 and 8 is updated according to the parameter description in Section D.2.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	E-5	**Section no.**	E.5.1	**Date:**	13/07/2021
Description of CAR					
MR version 1.0, Section E.5.1: The ex-ante ER calculation shall be described and demonstrated					
Project participant response				**Date:**	26/08/2021
The ex-ante calculation is now described and explained					
Documentation provided by project participant					
☒	Changes in MR	Section(s): E.5.1	New version No.:1.1		
☐	Changes in XLS	Worksheet(s):	New version No.:		
☐	Other:				
VVB assessment				**Date:**	28/08/2021
MR version 1.1, Section E.5.1: The ex-ante ER calculation is described and link to section E.5 for 2020 and 2021 values.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	E-6	**Section no.**	SDG ER	**Date:**	13/07/2021
Description of CAR					

SDG ER spreadsheet version 1.0:

1. Bioslurry sheet:
   a. Description in row 58 to be corrected for GWP value with the monitoring period cover 2 different period
   b. Cell G63 to be corrected without decimal points
   c. Bioslurry emissions are considered as project emissions. Description in cell H69 description as leakage emissions which is incorrect.
2. BE sheet:
   a. The source for GWP value should be stated clearly for cells E8, E9, G37 and G64
   b. The date for GWP 25 should be before 31/12/2020 and GWP 28 after 01/01/2021. All such reference dates to be corrected
3. PE sheet:
   a. The source for GWP value should be stated clearly for cells D4 and D5
   b. The GWP source for all other PE shall be described clearly
   c. The date for GWP 25 should be before 31/12/2020 and GWP 28 after 01/01/2021. All such reference dates to be corrected
4. SDG13 sheet:
   a. The date for GWP 25 should be before 31/12/2020 and GWP 28 after 01/01/2021. All such reference dates to be corrected.
   b. The vintage year for 2020 and 2021 ERs are not demonstrated.
   c. The GHG emission reductions or net anthropogenic GHG removals did not include from 01/01/2021

Project participant response	**Date:**	26/08/2021

1. Sheet bio-slurry
   a. The description is updated by removing the reference as it is confusing and not material
   b. Updated by removing the digits
   c. Updated to PE
2. BE sheet
   a. Updated with the correct reference
   b. This is updated as requested
3. PE sheet
   a. Updated with the correct reference
   b. the GWP is now described clearly, see cells B5:F6 for the values, the description and the sources
   c. This is updated as requested
4. SDG13
   a. This is updated as requested in SDG 13
   b. The vintage ER is demonstrated in sheet SDG13 cell E48 for 2020 and E49 for 202
   c. In cell A46:B46: it is now made clear it is both dates inclusive

Documentation provided by project participant		
☐ Changes in MR	Section(s):	New version No.:
☒ Changes in XLS	Worksheet(s): SDG13	New version No.:1.1
☐ Other:		

VVB assessment	**Date:**	28/08/2021

SDG ER spreadsheet version 1.1:

1. Bioslurry sheet:
   a. The description in row 58 tis corrected with GWP value deleted to avoid confusion
   b. Cell G63 corrected with decimal points removed.
   c. Bioslurry emissions are considered as project emissions. Description in cell H69 is updated as project emissions.
2. BE sheet:
   a. The source for GWP value for cells E8, E9, G37 and G64 updated to reflect GS rules update.
   b. The date for GWP 25 and GWP 28 updated according to reflect the period.
3. PE sheet:
   a. The source for GWP value for cells D4 and D5 updated to reflect GS rules update.
   b. The GWP sources described and link clearly.
   c. The date for GWP 25 and GWP 28 after 01/01/2021 updated according to GS rules and dates are updated
4. SDG13 sheet:
   a. The date for GWP 25 and GWP 28 after 01/01/2021 are updated according to GS rules. Reference dates are updated.
   b. The vintage year for 2020 and 2021 ERs are demonstrated correctly.
   c. The GHG emission reductions or net anthropogenic GHG removals as in cells A46::B46

Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

Table 6. FARs from this verification

FAR ID	FAR 01	**Section No.**	D.4	**Date:**	28/08/2021
Description of FAR					
Refer CL D-1, there are 79 households have been temporarily removed from the database. The VPA Implementer is to follow up on these households for reporting in the next monitoring period.					
CME response				**Date:**	
Documentation provided by project participant					
☐ Changes in MR		Section(s):		New version No.:	
☐ Changes in XLS		Worksheet(s):		New version No.	
☐ Other:					
VVB assessment				**Date:**	

Appendix 5. Monitored Parameters

Table A-5: Periodic Verification Checklist – Monitored Parameters

1. SDG 2.4.1: GS-03 Soil condition		**Description: Percentage of biogas users who use slurry as a fertilizer**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the VPADD and the applied methodology.*	/MR/ /ER/ /BUS/ /VPADD/ /TA/ /LHH/	*Description:* The number of households used bio-slurry for farming activities reported is 95%. The data derived from the Usage Survey conducted by a 3rd party. *Verifier´s action:* The usage survey results are review and crosscheck. During the telephone interviews of households the percentage of households applies bio-slurry for farming and vegetable gardening is approx. 90%. *Conclusion:* The monitoring of the indicator is according to the VPA-DD and Transition Annex. ☐ In this context the following findings have been raised: ☐ ☐	OK	OK
2. SDG 3.9.1: GS-01 Air quality		**Description: Perceived improvement in health by the user. (incidence of eye problems and respiratory illness)**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level*	/MR/ /BUS/ /VPADD/	*Description:* The chosen parameter monitors users report a perceived improvement in health through reduced smoke inhalation derived from the usage survey conducted by a 3rd party.	OK	OK

<table>
<tr><td>(ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).
Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.
Assess whether the measurement / determination method is in line with the registered monitoring plan of the VPADD and the applied methodology.</td><td>/TA/
/LHH/</td><td>The situation as at 30/04/2020 as below:<table><tr><td>Perceived health improvement</td><td>94%</td></tr><tr><td>No changed</td><td>6%</td></tr><tr><td>Deterioration in health</td><td>0%</td></tr></table>Verifier´s action:
The usage survey results are review and crosscheck.
During telephone interviews of households, they informed using biogas does not cause eyes problem and respiratory health issues of the family as compared to using firewood.
Conclusion:
The monitoring of the indicator is according to Transition Annex and VPA-DD.
☐ In this context the following findings have been raised:
☐
☐</td><td></td><td></td></tr>
<tr><td>3. SDG 5: Achieve gender equality and empower all women and girls</td><td></td><td>Description: Time savings</td><td></td><td></td></tr>
<tr><td>Measurement / Determination method (VVS, §§ 363-367)
Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).
Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.
Assess whether the measurement / determination method is in line with the registered monitoring plan of the VPADD and the applied methodology.</td><td>/MR/
/BUS/
/TA/
/LHH/
/ER/</td><td>Description:
The chosen parameter monitors time-savings of households attributed to the installation of a biodigester.<table><tr><td>Yes, more time available than before having biogas</td><td>96%</td></tr><tr><td>No, just the same as before (between before and after having Biogas)</td><td>4%</td></tr></table>The data derived from the Usage Survey conducted by a 3rd party.
Verifier´s action:
The usage survey results are review and crosscheck.
During telephone interviews of households 90% responded they have more time available using biogas.</td><td>OK</td><td>OK</td></tr>
</table>

		Conclusion: The monitoring of the indicator is according to the Transition Annex. ☐ In this context the following findings have been raised: ☐ ☐		
4. SDG 5: Achieve gender equality and empower all women and girls		**Description: Usage of saved time**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the VPADD and the applied methodology.*	/MR/ /BUS/ /ER/ /TA/ /LHH/	*Description:* The chosen parameter monitors usage of saved time. Income generating including farming 37% Education 7% Leisure (chat, recreation, church resting) 44% Other 12% The data derived from Usage Survey conducted by a 3rd party. *Verifier´s action:* The survey results are review and crosscheck. During the telephone interviews of households most of them informed the saved time is generally for leisure chat. *Conclusion:* The monitoring of the indicator is according to the Transition Annex. ☐ In this context the following findings have been raised: ☐ ☐	OK	OK
5. SDG7.1.2: GS-08 Access to affordable and clean energy services		**Description: Number of biogas units installed**		
Measurement / Determination method	/MR/	*Description:*	OK	OK

(VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the VPADD and the applied methodology.*	/DB/ /VPADD/ /TA/ /IM01/ /IM02/	The number of bio-digesters implemented as at 30/04/2021 is 8,419 units The data derived from the project database with the number of digesters commissioned with the data captured by the VPA Implementer. *Verifier´s action:* The project database is review and interview with VPA implementer and CME consultant. *Conclusion:* The monitoring of the indicator is according to the Transition Annex and VPA-DD ☐ In this context the following findings have been raised: ☐ ☐		
6. SDG7.1.2: GS-12 Technology transfer and technological self-reliance		**Description: Number of masons and biogas enterprise staff attending training programmes**		
Measurement / Determination method ***(VVS, §§ 363-367)*** *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the VPADD and the applied methodology.*	/MR/ /T/ /GSP/ /VPADD /IM01/ /IM02/	*Description:* The data is derived from the annual training records of the VPA implementer, Biogas Solutions Uganda Ltd (BSUL) provided to the masons and biogas enterprise staff. During this monitoring period, the reported data is 2 traiing conducted. *Verifier´s action:* The training records and results are verified and through interview of the VPA implementer *Conclusion:* The monitoring of the indicator is according to the Transition Annex and VPA-DD. ☐ In this context the following findings have been raised:	OK	OK

			☐		
			☐		
7. SDG 8.5: GS-10 Technology transfer and technological self-reliance		**Description: Man-days**			
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the VPADD and the applied methodology.*	/MR/ /DB/ /ER/ /TA/ /VPADD/ /IM01/ /IM02/	*Description:* The parameter monitored the number of man days required to install a digester. The data is determined by multiplying the number of days required to install a digester times the number of units installed by size. The calculated data for this monitoring period is 227,220 man days. *Verifier´s action:* Sheet SDG8 of DB was reviewed to crosscheck the reported man-days required to build each size of digester. The calculated data for this monitoring is crosscheck for correctness. The CME consultant and VPA implementer are interviewed on the man days required to install the digester. *Conclusion:* The monitoring of the indicator is according to the Transition Annex, and registered VPA-DD.		OK	OK
		☐	In this context the following findings have been raised:		
			☐		
			☐		
Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)		**Draft Concl.**	**Final Concl.**
8. SDG 13.2.1: $U_{p1,y}$		**Description: Cumulative usage rate for technologies in project scenario p1 in year y, based on cumulative adoption rate and drop off rate (fraction)**			

Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/MR/ /BUS/ /TA /ER/ /VPADD/ /GSM/ /IM01-IM02/	*Description:* The cumulative usage rate of bio-digesters for the monitoring period is **67.78%.** The data is consolidated from the usage survey results conducted by the 3rd party consultant. The data is applied to calculate the emission reductions. *Verifier´s action:* The usage survey report is verified on the cumulative results. The data applied for ER calculations is crosschecked against the survey report for consistency. CME consultant and VPA implementer are interviewed. *Conclusion:* The parameter is monitored in accordance with the Transition Annex, registered VPA-DD and applied methodology. ☒ In this context the following findings have been raised: ☒ CAR D-3 ☐	~~CAR D-3~~	OK
9. SDG 13.2.1: $N_{p1,y}$		**Description: Cumulative number of project technology-days included in the project database for project scenario p1 against baseline scenario b1 in year y**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.*	/MR/ /TA/ /BUS/ /ER/ /VPADD/ /GSM/ /IM01-IM02/	*Description:* The cumulative number of project technology days during the monitoring period is 2,459,559 The data is calculated from the survey results conducted by an independent consultant. The data is calculated with the number of installed system (parameter $N_{op,y}$) and the average operational days of the system (Op,y). *Verifier´s action:*	~~CAR D-4~~	OK

Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.		The survey results are reviewed on the data applied in the calculation and crosscheck the value applied in the ER spreadsheet for consistency. The data applied in the equation are verify for correctness. CME consultant and VPA implementer are interviewed. *Conclusion:* The parameter is monitored in according to the Transition Annex, registered VPA-DD and applied methodology. ☒ In this context the following findings have been raised: ☒ CAR D45 ☐		
10. SDG 13.2.1: $N_{Op1,y}$		**Description: Cumulative number of project technologies included in the project database for project scenario p1 in year y**		
0) ***Measurement / Determination method (VVS, §§ 363-367)*** *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/MR/ /TA/ /DB/ /ER/ /VPADD/ /GSM/ /IM01-IM02/	*Description:* The number of units installed as of 30/04/2021 is 8,419. The data is derived from the database based on commissioning reports collated by VPA implementer from the BCEs and masons. *Verifier´s action:* The project database is review and crosschecked with the selected households for the onsite visits and telephone interviews to confirm the data in the database are correct. VPA Implementer and CME consultant were interviewed. *Conclusion:* The parameter is monitored in accordance to the Transition Annex, registered VPADD and applied methodology. ☐ In this context the following findings have been raised: ☐	OK	OK

		☐		
11. SDG 13.2.1: $O_{p1,y}$		**Description: The average technology-days during which the bio digesters are operational for project scenario p1 against baseline scenario b1 in year y**		
1) ***Measurement / Determination method (VVS, §§ 363-367)*** *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/MR/ /BUS/ /TA/ /ER/ /VPADD/ /GSM/ /IM01/ /IM02/	*Description:* The data is calculated using the surveyed results from 3rd party For this monitoring period, the average number of technology days which the digesters in operation is 292.14 days. *Verifier´s action:* The survey results are review to crosscheck on the number of units not functioning are replicate for correct calculation. The ER spreadsheet is crosscheck on the operation days applied. The interviewed households informed on operation of the units. The 3rd party surveyor is interview on the survey results. VPA implementer and CME consultant interview on data. *Conclusion:* The parameter is monitored according to the Transition Annex, registered VPADD and applied methodology. ☐ In this context the following findings have been raised: ☐ ☐	OK	OK
12. SDG 13.2.1: $LE_{p1,y}$		**Description: Leakage in project scenario p1 during year y**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).*	/MR/ /VPADD/ /GSM/ /IM02/ /IM01/	*Description:* According to the registered VPA-DD, the value of the parameter is zero. In the addition comments: According to the methodology applied “leakage risks deemed very low can be ignored as long as the case for their insignificance is	OK	OK

<table>
<tr><td>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.
Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</td><td></td><td>substantiated” (p.11 – 12). Section 6.3.3 of the VPA-DD provides an overview of potential sources of leakage, including their applicability and justification for excluding the sources of leakage. This approach was approved by the Gold Standard on 20 October 2016.

There is no survey conduct to determine the leakage besides physical leakage, leakage from combustion and emissions from bioslurry.

Therefore, leakage is considered zero.

Verifier´s action:

The registered VPA-DD is review to crosscheck the addition comments and GS email dated 20/10/2016 that no leakage will be considered.

The value in the MR and ER spreadsheet was crosscheck for consistency.

The VPA implementer and CME is interview on the data.

Conclusion:

The parameter is monitored according to the Transition Annex, registered VPA-DDs and applied methodology.

☐ In this context the following findings have been raised:
☐
☐</td><td></td><td></td></tr>
<tr><td>13. SDG 13.2.1: $N_{T,h}$</td><td></td><td>Description: Number of animals of livestock category T in premise h</td><td></td><td></td></tr>
<tr><td>Measurement / Determination method (VVS, §§ 363-367)
Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).
Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been</td><td>/MR/
/ER/
/BUS/
/TA/
/VPADD/
/GSM/</td><td>Description:

The data for the number of animals for each category is derive from the usage survey report.

For this monitoring period, the average number of animals per household as below:

<table><tr><th>Number of animals</th><th>#/hh</th></tr><tr><td>Number of dairy cattle</td><td>6.12</td></tr><tr><td>Number of other cattle</td><td>1.40</td></tr></table></td><td>OK</td><td>OK</td></tr>
</table>

<table>
<tr>
<td>used. Furthermore, verify the frequency of measurements as per the requirements.
Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</td>
<td>/IM01/
/IM02/</td>
<td>
<table>
<tr><td>Number of pigs (for market)</td><td>1.04</td></tr>
<tr><td>Number of pigs (for breeding)</td><td>1.10</td></tr>
<tr><td>Number of poultry</td><td>19.43</td></tr>
<tr><td>Number of sheep</td><td>0.30</td></tr>
<tr><td>Number of goats</td><td>1.88</td></tr>
</table>
Verifier´s action:
The results from the usage survey data was crosschecked with the ER spreadsheet for consistency.

Conclusion:
The parameter is monitored in accordance with the Transition Annex, registered VPA-DD and applied methodology.

☐ In this context the following findings have been raised:
☐
☐
</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. SDG 13.2.1: $BB_{b\ ratio}$</td>
<td></td>
<td>Description: Baseline scenario ratios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement / Determination method
(VVS, §§ 363-367)
Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).
Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.
Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</td>
<td>/MR/
/ER/
/BUS/
/TA
/VPADD/
/IM01/
/IM02/
/LHH/</td>
<td>Description:
The baseline scenarios are the type of fuel used prior to biogas.
<table>
<tr><th>Baseline scenario</th><th>Percentage</th></tr>
<tr><td>B1: Firewood used to meet (more than 50%) of my cooking needs</td><td>77.5%</td></tr>
<tr><td>B2: Charcoal used to meet (more than 50%) of my cooking needs</td><td>13.4%</td></tr>
<tr><td>B3: Firewood & charcoal used to meet (more than 50%) of my cooking</td><td>7.2%</td></tr>
<tr><td>B4: Other fuels</td><td>1.9%</td></tr>
</table>
The data derived from the usage survey conducted by 3rd party.

Verifier´s action:
The data in the ER was crosschecked with the results from the usage survey.</td>
<td>OK</td>
<td>OK</td>
</tr>
</table>

		During the telephone interviews, the household informed firewood, charcoal and combination of firewood and charcoal are the main fuel used prior to the installation of the biogas digester. *Conclusion:* The parameter is monitored in accordance with the Transition Annex, registered VPADD and applied methodology ☐ In this context the following findings have been raised: ☐ ☐		
15. SDG 13.2.1: $BB_{b1,bio}$		**Description: Amount of woody biomass used in the baseline scenario b1**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/MR/ /ER/ /BFT/ /VPADD/ /IM01/ /IM02/ /LHH/	*Description:* The firewood is the woody biomass in the baseline scenario b1. The amount of firewood used by the households in the baseline scenario survey conducted in April 2017. The reported value is 3.527 t/y *Verifier´s action:* The BFT b1 survey results are verify for correctness The data in the ER is crosscheck with the results from the BFT survey value for consistency. During the remote telephone interview, it could be confirmed firewood is one of the woody biomass used prior to the bio-digester is installed. *Conclusion:* The parameter is monitored in accordance with the registered VPA-DD and applied methodology ☐ In this context the following findings have been raised: ☐	OK	OK

		☐		
16. SDG 13.2.1: $BB_{b2,bio}$		**Description: Amount of woody biomass used in the baseline scenario b2**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)). Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/MR/ /ER/ /BFT/ /VPADD/ /IM01/ /IM02/ /LHH/	*Description:* The charcoal is one of the woody biomass in the baseline scenario b2. The amount of charcoal used by the households in the baseline scenario is based on the BFT survey conducted in April 2017. The reported data is 7.042 t/y.	OK	OK
		Verifier´s action: The BFT b2 survey results are verify for correctness The data in the ER is crosscheck with the results from the BFT survey value for consistency. During the remote telephone interviews it could be confirmed charcoal is one of the woody biomass used prior to the bio-digester is installed.		
		Conclusion: The parameter is monitored in accordance with the registered VPA-DD and applied methodology		
		☐ In this context the following findings have been raised:		
		☐		
		☐		
17. SDG 13.2.1: $BB_{b3,bio}$		**Description: Amount of woody biomass used in the baseline scenario b3**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).*	/MR/ /ER/ /BFT/ /VPADD/	*Description:* The firewood and charcoal are the woody biomass in the baseline scenario b3. The amount of firewood and charcoal used by the households in the baseline scenario is based on the BFT conducted in April 2017	OK	OK

Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements. *Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/IM01/ /IM02/ /LHH/	The value reported is 10.034 t/y according to the survey results. *Verifier´s action:* The BFT b3 survey results are verify for correctness. The data in the ER is crosscheck with the results from the BFT survey data for consistency. During the remote telephone interviews, it could be confirmed firewood and charcoal are the woody biomass used prior to the bio-digester is installed. *Conclusion:* The parameter is monitored in accordance with the registered VPA-DD and applied methodology ☐ In this context the following findings have been raised: ☐ ☐		
18. SDG 13.2.1: $BB_{b1,2,3,fuel}$		**Description: Amount of fossil fuel used in the baseline scenarios b1, b2 and b3**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/MR/ /ER/ /BFT/ /TA/ /GSM/ /VPADD/ /IM02/ /IM04/ /HH/	*Description:* The amount of fossil fuel used by the households in the baseline scenario is based on the BFT conducted during MPI and fixed for the crediting period. The value applied is zero (0) *Verifier´s action:* The BFT survey data are review for correctness. The data in the ER was crosschecked with the results from the BFT primary data and analysis for consistency. During the telephone interview, households informed firewood and charcoal is the fuel used prior to the bio-digester is installed. *Conclusion:*	OK	OK

		The parameter is monitored in accordance with the Transition Annex, registered VPA-DD and applied methodology ☐ In this context the following findings have been raised: ☐ ☐		
19. SDG 13.2.1: $BB_{p1, bio}$		**Description: Amount of woody biomass used in the project scenario p1 (one value)**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/MR/ /BUS/ /ER/ /PFT/ /VPADD/ /TA/ /IM01/ /IM04/ /HH/	*Description:* The quantity of biomass used by the households in the project scenario is measured by means of PFT conducted once in every 2 years. The quantity of biomass used during the monitoring period is 2.846 t/y The biomass consumed in the project scenario is firewood and charcoal. *Verifier´s action:* The reported value was crosschecked with the PFT survey for correctness. The data in the ER is crosscheck with the results from the PFT survey results for consistency. During the telephone interviews, the households informed firewood and charcoal are used as supplement fuel. *Conclusion:* The parameter is monitored in accordance with the Transition Annex, registered VPA-DD and applied methodology. ☒ In this context the following findings have been raised: ☒ CAR D-5 ☐	~~CAR D-5~~	OK

<table>
<tr><td>20. SDG 13.2.1: $BB_{p1,fuel}$</td><td></td><td>Description: Quantity of fossil fuel consumed in project scenario p1</td><td></td><td></td></tr>
<tr><td>Measurement / Determination method
(VVS, §§ 363-367)
Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).
Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.
Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</td><td>/MR/
/ER//TA/
/GSM/
/PFT/
/VPADD/
//IM02/
/IM04/
/HH/</td><td>Description:
The quantity of fossil fuel used by the households in the project scenario is based on the PFT survey conducted once in every 2 years.
The fossil fuel in the project scenario is LPG and Kerosene.
The survey results reported zero usage.
Verifier´s action:
The PFT survey results verified and found zero usage.
The data in the ER is crosscheck with the results from the PFT survey results for consistency.
During the telephone interviews households informed they do not use LPG and kerosene as supplementary fuel.
Conclusion:
The parameter is monitored in accordance with the Transition Annex, registered VPA-DD and applied methodology.
☒ In this context the following findings have been raised:
☒ CAR D-6
☐</td><td><s>CAR D-6</s></td><td>OK</td></tr>
<tr><td>21. SDG 13.2.1: $MS_{T,S,k}$</td><td></td><td>Description: Fraction of livestock category T's manure fed into the bio-digester, S in climate region k</td><td></td><td></td></tr>
<tr><td>Measurement / Determination method
(VVS, §§ 363-367)
Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).
Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been</td><td>/MR/
/BUS/
/ER/
/VPADD/
/GSM/
/IM04/</td><td>Description:
The fraction of manure fed in the biodigesters for respective animal category as follows:
<table><tr><th>Animal T</th><th>Average</th></tr><tr><td>Dairy cow</td><td>86.9%</td></tr><tr><td>Other cattle</td><td>83.6%</td></tr><tr><td>Market swine</td><td>30.0%</td></tr><tr><td>Breeding swine</td><td>50.6%</td></tr></table></td><td>OK</td><td>OK</td></tr>
</table>

used. Furthermore, verify the frequency of measurements as per the requirements. *Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/IM02/ /LHH/	<table><tr><td>Poultry</td><td>19.4%</td></tr><tr><td>Sheep</td><td>0.0%</td></tr><tr><td>Goat</td><td>4.2%</td></tr></table> The data is derived from the usage survey conducted by an independent consultant. *Verifier´s action:* The usage survey results are reviewed and crosschecked with the date applied in the ER spreadsheet. During the telephone interviews, it could be confirmed that the type of animal waste fed into the digester are generally cattle and swine. The survey consultant is interviewed on the survey results. *Conclusion:* The parameter is monitored according to the Transition Annex, registered VPA-DD and applied methodology. ☐ In this context the following findings have been raised: ☐ ☐		
22. SDG 13.2.1: $MS_{P,S,K}$		**Description: Fraction of livestock category T's manure not fed into the bio-digester, in climate region k**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.*	/MR/ /BUS/ /VPADD/ /GSM/ /TA/ /IM01/ /IM02/ /LHH/	*Description:* The fraction of manure not treated in the biodigesters for respective animal category as follows: <table><tr><th>Animal T</th><th>Average</th></tr><tr><td>Dairy cow</td><td>13.1%</td></tr><tr><td>Cattle</td><td>16.4%</td></tr><tr><td>Market swine</td><td>70.0%</td></tr><tr><td>Breeding swine</td><td>49.4%</td></tr><tr><td>Poultry</td><td>80.6%</td></tr><tr><td>Sheep</td><td>100.0%</td></tr><tr><td>Goat</td><td>95.8%</td></tr></table>	OK	OK

Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.		The data is derived from the usage survey conducted by an independent consultant. *Verifier´s action:* The usage survey results are review and crosschecked with the date applied in the ER spreadsheet. During the telephone interviews, it could confirm animals waste of cow, other cattles and pig are fed into the digester. Other animals and poultry wastes are not fed. The survey consultant is interview on the results. *Conclusion:* The parameter is monitored according to the Transition Annex, registered VPA-DD and applied methodology. ☐ In this context the following findings have been raised: ☐ ☐		
23. SDG 13.2.1: GWP_{CH4}		**Description: Global Warming Potential of methane**		
Measurement / Determination method (VVS, §§ 363-367) *Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).* *Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.* *Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.*	/MR/ /TA/ /ER /VPADD/ /IPCC/ /GSR/	*Description:* The GWP is the methane content applicable during the monitoring period is 25 for emissions generated up to 31/12/2020 and 28 as from 01/01/2021 as from 01/01/2013. *Verifier´s action:* The GWP data applied in the MR and ER spread-sheet were verified with GS rules and IPCC for consistency *Conclusion:* The parameter is monitored in accordance to the registered VPA-DD and applied methodology. ☒ In this context the following findings have been raised: ☒ CAR D-7	~~CAR D-7~~	OK

<table>
<tr><td></td><td></td><td></td><td>☐</td><td></td><td></td><td></td></tr>
<tr><td>24. SDG 13.2.1: Bio</td><td></td><td colspan="3">Description: Use of bio-slurry</td><td></td><td></td></tr>
<tr><td rowspan="4">Measurement / Determination method (VVS, §§ 363-367)
Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).
Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.
Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</td><td rowspan="4">/MR/
/TA/
/BUS/
/ER/
/VPADD/
/GSM/
/IM01 – IM02/
/LHH/</td><td colspan="3">Description:
The bio-slurry used by households for farming and vegetables gardening activities.
<table><tr><th>How do you apply bio-slurry</th><th>% of farmers</th></tr><tr><td>Use directly for various purposes</td><td>59%</td></tr><tr><td>Store it first</td><td>36%</td></tr><tr><td>I don’t use it / discarded</td><td>5%</td></tr></table>The data derived from the usage survey conducted by the 3rd party independent consultant.
The VPA Implementer had calculated the emission from the use of bio-slurry per household per year.
The emissions will not be considered when less than 1% of baseline emissions.</td><td rowspan="4">~~CAR D-8~~</td><td rowspan="4">OK</td></tr>
<tr><td colspan="3">Verifier´s action:
The survey result was reviewed to crosscheck on the percentage of households apply bio-slurry for farming activities.
From the telephone interviews of households 51.9% of the farmers informed that they apply bio-slurry for farming or gardening activities.
The data applied in the ER spreadsheet is verify that the project emissions calculation for bio-slurry and excluded in the ER calculations since it is less than 1% of baseline emissions</td></tr>
<tr><td colspan="3">Conclusion:
The parameter is monitored according to the Transition Annex, registered VPA-DD and applied methodology</td></tr>
<tr><td>☒</td><td colspan="2">In this context the following findings have been raised:
☒ CAR D-8
☐</td></tr>
</table>

Appendix 6. Calibration dates and validity of weighing scale

Table A-6: Periodic Verification Checklist – Calibration details

Monitoring equipment	Purpose	Serial number	Manufacturer	Capacity	Calibration date
NA					

Note: There is no KPT / PFT conducted during this monitorin period. Therefore, no calibration conducted.