GS VERIFICATION AND CERTIFICATION REPORT

- 7TH PERIODIC –

NATIONAL BIODIGESTER PROGRAMME

NATIONAL BIODIGESTER PROGRAMME, CAMBODIA

GS REF. NO. : GS 751

Monitoring Period: 01/01/2018 to 31/12/2018 (incl. both days)

Report No: MY-PVerGS 19/01 <19/002> GS751

Date: 13/06/2019

Verification Report:	***Report No.***	***Rev. No.***	***Date of 1st issue:***	***Date of this rev.***
	MY-PVerGS 19/01 <19/002>	1.0	28/06/2019	28/06/2019
Project:	***Title:***		***Registration date:***	***UNFCCC-No.:***
	National Biodigester Programme, Cambodia		N/A	N/A
			Registration date:	***GS-ID.:***
			24/05/2011	GS751
			Verification No.:	
			7th periodic verification	
	Crediting period:		***From:***	***To:***
	☒ *Renewable (7y)* ☐ *Fixed (10y)*		01/01/2012	31/12/2018
	Project Scale:			

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	☒ *Large Scale* ☐ *Small Scale*				
Project Participant(s):	***Client:***				
	National Biodigester Programme				
	Non Annex 1 country:			***Annex 1 country:***	
	Cambodia			N/A	
	PP from non-Annex 1 country:			***PP from Annex 1 country:***	
	National Biodigester Programme			N/A	
Applied methodology/ies:	***Title:***			***No.:***	***Scope(s) / TA(s)***
	Technologies and practices to displace decentralized thermal energy consumption			Ver. 2.0	1, 3, 13 / 1.2, 3.1, 13.2
Monitoring period and monitoring report	***Monitoring period (MP):***			***Monitoring Report:***	
	From:	***To:***	***No. of days:***	***Draft version:***	***Final version:***
	01/01/2018	31/12/2018	365	10/03/2019, v1.0	03/06/2019, v1.3
Verification team / Technical Review and Final Approval:	***Verification Team:***			***Technical review:***	***Final approval:***
	Cheong, Chun Yuen (Robert) (RC) – TL/TE			Lubanga, David	Rami, Kunal
Key dates of verification:	***Publication of the work plan:***			***On-site (to):***	***On-site (to):***
	15/03/2019			24/04/2019	26/04/2019
Summary of Verification opinion	National Biodigester Programme has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 7th periodic verification of the project: "National Biodigester Programme, Cambodia", with regard to the relevant requirements for GS project activities. 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 validated project design document, ☒ the carbon monitoring plan is in accordance with the applied approved GS methodology, ☒ the Sustainable Development Indicators have been monitored in accordance with the registered GS Sustainability Monitoring Plan, ☒ the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately, ☒ the monitoring system is in place and functional. The project has generated GHG emission reductions, and ☒ the GHG emission reductions are 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 listed below (verified amount).				
Emission reductions: [t CO_{2e}]	***Total verified amount***		***As per draft MR:***	***As per GSPDD:***	
	103,000		102,987	102,117 /a	
			ER achieved up to 2012-12-31	***ER achieved from for this MP***	
			N/A	103,000	
Document information:	*Filename:*				*No. of pages:*
	19-002 NBP CPII MR76 GS 751 FVerR 2019-06-28				102

Abbreviations:

CA	**Corrective Action / Clarification Action**
CAR	**Corrective Action Request**
CDM	**Clean Development Mechanism**
CDM M&P	**Clean Development Mechanism Modalities and Procedures**
CER	**Certified Emission Reduction**
CI	**Confidence Interval**
CO_2	**Carbon dioxide**
CO_{2eq}	**Carbon dioxide equivalent**
COP	**Conference of the Parties**
CP	**Crediting Period**
CL	**Clarification Request**
DOE	**Designated Operational Entity**
DVerR	**Draft Verification Report**
EB	**UNFCCC CDM Executive Board**
ER	**Emission Reduction**
FAR	**Forward Action Request**
GHG	**Greenhouse gas(es)**
GS	**Gold Standard**
MP	**Monitoring Plan**
MR	**Monitoring Report**
PA	**Project Activity**
PRC	**Post Registration Changes**
PDD	**Project Design Document**
PP	**Project Participant**
QA/QC	**Quality Assurance / Quality Control**
RECs	**Renewable Energy Credits**
SD	**Sustainable Development**
UNFCCC	**United Nations Framework Convention on Climate Change**
VVS	**Validation and Verification Standard**
XLS	**Emission Reduction Calculation Spread Sheet**

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INTRODUCTION

National Biodigester Programme has commissioned the TÜV NORD JI/CDM Certification Program (CP) to carry out the 7th periodic verification of the 2nd crediting period of the project

"National Biodigester Programme, Cambodia"

with regard to the relevant requirements for GS/CDM project activities. The verifiers have reviewed the implementation of the carbon monitoring plan (MP) and the Sustainability Monitoring Plan in the registered GS project activity.

GHG data for the monitoring period was verified in detailed manner applying the set of requirements, audit practices and principles as required under the Validation and Verification Standard of the UNFCCC.

Sustainable Development Indicators for the monitoring period was verified in detailed manner applying the set of requirements, audit practices and principles as required under the GS Validation and Verification Manual of the GS as well as relevant GS Annexes (GSv2.1)

This report summarizes the findings and conclusions of this 7th periodic verification of the above mentioned GS registered project activity.

Objective

The objective of the verification is the review and ex-post determination by an independent entity of the GHG emission reductions and sustainable development attributable to the project activity. It includes the verification of the:

implementation and operation of the project activity as given in the GSPDD,

compliance with applied approved methodology and the provisions of the both the carbon and sustainability monitoring plans,

data given in the monitoring report by checking the monitoring records, the emissions reduction calculation and supporting evidence,

accuracy of the monitoring equipment,

quality of evidence,

significance of reporting risks and risks of material misstatements.

Scope

The verification of this registered project is based on the validated project design document, the registered GS Passport, the monitoring report, emission reduction calculation spread sheet, GS Annexes and supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore, publicly available information was considered as far as available and required.

The verification is carried out on the basis of the following requirements, applicable for this project activity:

- Article 12 of the Kyoto Protocol,
- Guidelines for the implementation of Article 12 of the Kyoto Protocol as presented in the Marrakech Accords under decision 3/CMP.1, and subsequent decisions made by the Executive Board and COP/MOP,
- Other relevant rules, including the host country legislation,
- CDM Validation and Verification Standard,
- GS Validation and Verification Manual,
- Monitoring plan as given in the revised GSPDD,
- Sustainability monitoring plan as given in the revised GS Passport,
- Approved GS Methodology(ies).
- Gold Standard version 2.1

GHG PROJECT DESCRIPTION

Technical Project Description

The project activity is aimed to install biodigesters at household level to treat animal manure to generate biogas as cooking and lighting fuel and the bio-slurry from the systems will be used as organic fertilizer.
Animal manure is fed into the biodigester and anaerobically degraded by microbes to produce biogas. The biogas is captured in an integrated gasholder and stored for various household thermal energy services, mainly for cooking and lighting.
A typical system shall be comprised of a biodigester, an overflow pit, a biogas lamp, number of biogas stoves and the necessary piping. A toilet is connected to the biodigester is optional (recommended by the programme). The installation of a slurry compost facility for the effluent from a biodigester will further decompose the slurry under aerobic conditions. The composted slurry will be utilized as an organic fertilizer and/or fish feed.
The technology of the project activity will reduce GHG emissions with (1) displacement of firewood used for cooking; (2) avoidance of methane emissions from the animal waste; and (3) displacement of chemical fertilizers.
The key parameters of the biodigesters are given in table below:

Table 0-1: Technical data of the biodigesters

Plant size	**2m^3**	**3m^3**	**4 m^3**	**6 m^3**	**8 m^3**	**10 m^3**	**15 m^3**
Dung requirements (kg/day)	10-20	20-30	20-40	40-60	60-80	80-100	100-150
Estimated biogas production (m^3/day)	0.4-0.8	0.2-1.2	0.8-1.6	1.6-2.4	2.4-3.2	3.2-4.0	4.0-6.0

Estimated firewood savings (kg/day)	2-4	6-8	4-8	8-12	12-16	16-20	20-30

Project Location

The details of the project location are given in Table 0-2:

Table 0-2: Project Location

Description	Project Location
Host Country	Cambodia
Region:	16 active out of 20[1] provinces in Cambodia during the monitoring period VII of crediting period II/O1/
Project location address:	16 / 20 provinces in Cambodia during crediting period II (active from MP VII of CP II)
Latitude: Longitude:	

#	Province	Latitude (xx° xx' xx » N)	Longitude (xx° xx' xx" E)
1	Kampong Cham	11° 59' 00" N	105° 27' 00" E
2	Kandal	11° 78' 30" N	104° 81' 70" E
3	Svay Reang	11° 05' 00" N	105° 48' 00" E
4	Takeo	10° 59' 00" N	104° 47' 00" E
5	Kampong Speu	11° 27' 00" N	104° 30' 00" E
6	Kampong Chhnang	12° 00' 00" N	104° 30' 00" E
7	Kampot	10° 36' 00" N	104° 10' 00" E
8	Kampong Som	10°38′00" N	103°30′00" E
9	Kep	10°29′00" N	104°18′00" E
10	Prey Veng	11° 29' 00" N	105° 19' 00" E
11	Pursat	12°32′00" N	103°55′00" E
12	Battambang	13°06′00" N	103°12′00" E
13	Kampong Thom	12°42′00" N	104°53′00" E
14	Siem Reap	13°21′44″ N	103°51′35″E
15	Tbong khmum	11°54′34″N	105°38′49″E
16	Phnom Penh	11°33'43'' N	104°53'18'' E

Project Verification History

Essential events since the registration of the project are presented in the following Table 0-3.

Table 0-3: Status of previous Monitoring Periods

#	Item	Time	Status
1	Date of GS registration	24/05/2011	Registered

[1] During the MP II of crediting period II, there were 19 provinces, there figure now is 20 since Kampong Cham now is divided into 2 provinces, namely Kampong Cham and Tbong Kmum.

#	Item	Time	Status
2	Crediting period I (CPI)	24/05/2009 to 31/12/2011[2]	Completed
3	Monitoring period 1 (CPI)	24/05/2009 to 31/08/2010	Issued
4	Monitoring period 2 (CPI)	01/09/2010 to 31/12/2011	Issued
5	Renewed and revised crediting period II (CPII)	01/01/2012 to 31/12/2018[3]	Approved
6	Monitoring period 1 (CPII)	01/01/2012 to 31/12/2012	Issued
7.	Monitoring period 2 (CPII)	01/01/2013 to 31/12/2013	Issued
8.	Monitoring period 3 (CPII)	01/01/2014 to 31/12/2014	Issued
9.	Monitoring period 4 (CPII)	01/01/2015 to 31/12/2015	Issued
10.	Monitoring period 5 (CPII)	01/01/2016 to 31/12/2016	Issued
11	Monitoring period 6 (CPII)	01/01/2017 to 31/12/2017	Issued
12	Monitoring period 7 (CPII)	01/01/2018 to 31/12/2018	Issuance request

An overview of all Post Registration Changes is given in the following table.

Table 0-4: Overview Post Registration Changes

#	Applicable from – to / as of	MP	Type of post registration change [1)]	Description	Status[2)] / Date
1	19/10/2015	N/A	CoPD	Updated of methodology version Update of technology Revision of ex-ante parameters Revision of SD parameters in Passport	GS approved on 19/10/2015
2.	04/08/2016	MPIV	PCfMM	Inclusion of monitoring parameter W(site) Average pig weight at the project site by pig type (sow, boar, fattening pig and piglet (kg) Inclusion of ex-ante parameter W(default) Default average pig weight by pig type (sow, boar, fattening pig and piglet (kg)	Acceptance by DOE 08/08/2016

1) TDfrMP : Temporary deviation from registered monitoring plan
TDfMM : Temporary deviation from the monitoring methodology
CrPDD : Corrections to the registered GSPDD
PCfrMP : Permanent changes from registered Monitoring Plan
PCfMM : Permanent changes from Monitoring Methodology
CoPD : Changes to the project design of a registered project activity

2) Approval (by GS) or Acceptance (by DOE)

[2] The end date of the crediting period I has been changed from 2014-03-12 to 2011-12-31

[3] The crediting period II has been renewed and approved by GS from 2012-01-01 to 2018-12-31

METHODOLOGY AND VERIFICATION SEQUENCE

Verification Steps

The verification consisted of the following steps:

Contract review

Appointment of team members and technical reviewers

Publication of the monitoring report

A desk review of the Monitoring Report submitted by the client and additional supporting documents with the use of customised verification protocol,

Verification planning,

On-Site assessment,

Background investigation and follow-up interviews with personnel of the project developer and its contractors,

Draft verification reporting

Resolution of corrective actions (if any)

Final verification reporting

Technical review

Final approval of the verification.

Contract review

To assure that

the project falls within the scopes for which accreditation is held,

the necessary competences to carry out the verification can be provided,

Impartiality issues are clear and in line with the CDM accreditation requirements

a contract review was carried out before the contract was signed.

Appointment of team members and technical reviewers

On the basis of a competence analysis and individual availabilities a verification team, consisting of one team leader was appointed.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the Table 0-1 below.

Table 0-1: Involved Personnel

	Name	Company	Function [1]	Qualification Status [2]	Scheme competence [3]	Technical competence [4]	Verification competence [5]	Host country Competence	On-site visit
☒ Mr. ☐ Ms.	Cheong, Chun Yuen (Robert)	TUV NORD Malaysia	TL	SA	☒	1, 3.1, 13.2	☒	☒	☒
☒ Mr. ☐ Ms.	Lubanga, David	-	TR	SA	☒	3.1, 13.2	☒	☐	-
☒ Mr. ☐ Ms.	Stefan Winter	TUV NORD Cert GmbH	TR[B]	SA	☒	3.1,13.2	☒	☐	-
☒ Mr. ☐ Ms.	Rami, Kunal	TUV NORD Cert GmbH	TR/FA[B]	SA	☒	3.1	☒	☐	-

[1] TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

[2] GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

[3] GHG auditor status (at least Assessor)

[4] As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, …)

[5] In case of verification projects

[A] Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

[B] No team member

The team member contributed to the review of documents, the assessment of the project activity and to the preparation of this report under the leadership of the team leader.

Statements of competence for the above mentioned team member is enclosed in annex 2 of this report.

Publication of the Monitoring Report

The draft monitoring report, as received from the project participants by the DOE, prior to the verification activity commenced.

Verification Planning

In order to ensure a complete, transparent and timely execution of the verification task the team leader has planned the complete sequence of events necessary to arrive at a substantiated final verification opinion.

Various tools have been established in order to ensure an effective verification planning.

Risk analysis and detailed audit testing planning

For the identification of potential reporting risks and the necessary detailed audit testing procedures for residual risk areas table A-1 is used. The structure and content of this table is given in Table 0-2 below.

Table 0-2: Table A-1; Identification of verification risk areas

Table A-1: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing				
Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**	**Additional verification testing performed**	**Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)**
The following potential risks were identified and divided and structured according to the possible areas of occurrence.	*The potential risks of raw data generation have been identified in the course of the monitoring system implementation.* *The following measures were taken in order to minimize the corresponding risks.* *The following measures are implemented:*	*Despite the measures implemented in order to reduce the occurrence probability the following residual risks remain and have to be addressed in the course of every verification.*	*The additional verification testing performed is described. Testing may include:* *Sample cross checking of manual transfers of data* *Recalculation* *Spreadsheet 'walk throughs' to check links and equations* *Inspection of calibration and maintenance records for key equipment* *Check sampling analysis results* *Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.*	*Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties are highlighted.*

The completed table A-1 is enclosed in Annex 1 (table A-1) to this report.

Project specific periodic verification checklist

In order to ensure transparency and consideration of all relevant assessment criteria, a project specific verification protocol has been developed. The protocol shows, in a

transparent manner, criteria and requirements, means and results of the verification. The verification protocol serves the following purposes:

It organises, details and clarifies the requirements a GS project is expected to meet for verification
It ensures a transparent verification process where the verifying DOE documents how a particular requirement has been proved and the result of the verification.
The basic structure of this project specific verification protocol for the periodic verification is described in Table 0-3.

Table 0-3: Table A-2; Structure of the project specific periodic verification checklist

Table A-2: Periodic verification checklist				
Checklist Item	***Reference***	***Verification Team Comments***	***Draft Conclusion***	***Final Conclusion***
The checklist items in Table A-2 are linked to the various requirements the monitoring of the project should meet. The checklist is organised in various sections as per the requirements of the topic and the individual project activity. It further includes guidance for the verification team.	*Gives reference to the information source on which the assessment is based on.*	*The section is used to elaborate and discuss the checklist item in detail. It includes the assessment of the verification team and how the assessment was carried out. The reporting requirements of the VVS shall be covered in this section.*	*Assessment based on evidence provided if the criterion is fulfilled (OK), or a CAR, CL or FAR (see below) is raised. The assessment refers to the draft verification stage.*	*In case of a corrective action or a clarification the final assessment at the final verification stage is given.*

The periodic verification checklist (verification protocol) is the backbone of the complete verification starting from the desk review until final assessment. Detailed assessments and findings are discussed within this checklist and not necessarily repeated in the main text of this report.

The completed verification protocol is enclosed in Annex 1 (table A-2) to this report.

Desk 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 last revision of the GSPDD & GS Passport including the monitoring plan,
the last revision of the GS validation report,
documentation of previous verifications
the monitoring report, including the claimed emission reductions and achieved sustainable development for the project,
the emission reduction calculation spreadsheet.
Other supporting documents, such as publicly available information on the GS website(s) and background information were also reviewed.

On-site assessment

As most essential part of the verification exercise, it is indispensable to carry out an inspection on site in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore, the on-site assessment is necessary to check the monitoring data with respect to accuracy to ensure the calculation of emission reductions. The main tasks covered during the site visit include, but are not limited to:
The monitoring data were checked completely.
An assessment of the implementation and operation of the registered project activity as per the registered GSPDD or an approved revised GSPDD;
A review of information flows for generating, aggregating and reporting the monitoring parameters;
Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the GSPDD;
A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records, sales database, or similar data sources;
A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the GSPDD and the selected methodology and corresponding tool(s), where applicable;
A review of calculations and assumptions made in determining the GHG data and emission reductions;
Possibility of leakage was also checked.
Investigating whether all relevant GS SD aspects as reported in the monitoring report are achieved.
An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.
Before and during the on-site visit the verification team performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.
Representatives of National Biodigesters Programme and Mr. Eric Buysman (project consultant) including the operational staff were interviewed. The main topics of the interviews are summarised in Table 0-4.

Table 0-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project Participant & Operations Personnel: National Biodigesters Programme Consultant:	General aspects of the project Technical equipment and operation Changes since validation / previous verification Monitoring and measurement equipment Remaining issues from validation/ previous verification

Interviewed Persons / Entities	Interview topics
	Calibration procedures Quality management system Involved personnel and responsibilities Training and practice of the operational personnel Implementation of the monitoring plan Monitoring data management Data uncertainty and residual risks GHG emission reduction calculation Procedural aspects of the verification Maintenance Environmental aspects Sustainability indicators Mitigation/compensation measures of any project impacts GS Issuance Review Report

The list of interviewees is included in chapter 7.4.

Draft verification reporting

On the basis of the desk review, the on-site visit, follow-up interviews and further background investigation the verification protocol is completed. This protocol together with a general project and procedural description of the verification and a detailed list of the verification findings form the draft verification report. This report is sent to the client for resolution of raised CARs, CLs and FARs.

Resolution of CARs, CLs and FARs

Nonconformities raised during the verification can either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CARs) are issued, if:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- Issues identified in a FAR during validation or previous verifications requiring actions by the project participants to be verified during verification have not been resolved.

The verification team uses the term Clarification Request (CL), which is be issued if:

- information is insufficient or not clear enough to determine whether the applicable GS requirements have been met.

Forward Action Requests (FAR) indicate essential risks for further periodic verifications. Forward Action Requests are issued, if:

- the monitoring and reporting require attention and / or adjustment for the next verification period.
- For a detailed list of all CARs, CLs and FARs raised in the course of the verification pl. refer to chapter 4.

Final reporting

Upon successful closure of all raised CARs and CLs the final verification report including a positive verification opinion can be issued. In case not all essential issues could finally be resolved, a final report including a negative verification opinion is issued.

The final report summarizes the final assessments w.r.t. all applicable criteria.

Technical review

Before submission of the final verification report a technical review of the whole verification procedure is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is 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 be confirmed or revised. Furthermore reporting improvements might be achieved.

Final approval

After successful technical review an overall (esp. procedural) assessment of the complete verification will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

After this step the request for issuance can be started.

VERIFICATION FINDINGS

In the following paragraphs the findings from the desk review of the monitoring report/MR/, the calculation spreadsheet/ER1/, GSPDD/GSPDD/, the Validation Report/GSVAL/ and other supporting documents, as well as from the on-site assessment and the interviews are summarised.

The summary of CAR, CL and FAR issued are shown in Table 0-1:

Table 0-1: Summary of CAR, CL and FAR

Verification Topics	No. of CAR	No. of CL	No. of FAR
Description of project activity (A): Project characterises Technical project description Units disseminated and summary Of emission reductions GHG emission reductions Summary of VERs claimed CPI MPVI and CPII MPI Double Counting FAR from previous monitoring period	1	0	0
Monitoring Activities (B) Organisational setup of carbon and SD monitoring Description of Human Resources Survey Design Biogas User Survey (US & CMS) Survey Implementation Baseline Fuel Test (BFT) and Project Performance Fuel Test (PFT) KPT Survey, KPT Implementation	1	0	0
Results (C) Survey results Parameters monitored and not monitored Emission reduction component 1 Emission reduction component 2 Baseline methane emissions Project methane emissions Leakage emissions Emissions from Bio-slurry Ex-post estimate of emission reductions Justification for ER difference with PDD	7	1	0
Sustainability Monitoring (D) Safeguarding principles Sustainability Development Assessment	3	0	0
Stakeholder Feedback (E)	0	0	0
Data Quality Control and Assurance (F)	0	0	0
Project Participants (G)	0	0	0

Verification Topics	No. of CAR	No. of CL	No. of FAR
SUM	**12**	**1**	**0**

The following tables include all raised CARs, CLs and FARs and the assessments of the same by the verification team. For an in depth evaluation of all verification items it should be referred to the verification protocols (see Annex).

CL from this verification

CL ID	C-1	**Section no.**	ER Database	**Date:**	25/04/2019
Description of CL					
ER database version 1.0, ER database sheet: Clarification for cell Q135 data applied in cell Q148					
Project participant response				**Date:**	26/04/2019
This was a mistake – it is now correct with the correct cumulative additions					
Documentation provided by project participant					
☐ Changes in the MR		Section(s):		New version No.:	
☒ Changes in ER		Worksheet(s): ER database		New version No.:v1.1	
☐ Other:					
DOE assessment				**Date:**	30/04/2019
ER database version 1.1, ER database sheet: Correction is made to the cumulative cell with deletion of Q135.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR from this verification

CAR ID	A-1	**Section no.**	1.1	**Date:**	25/04/2019
Description of CAR					
MR version 1.0, Section 1.1, Table 1: The CP for this monitoring period VII is incorrect.					
Project participant response				**Date:**	26/04/2019
This is updated to the correct MP					
Documentation provided by project participant					
☒ Changes in MR		Section(s):table 1		New version No.:v1.1	
☐ Changes in ER		Worksheet(s):		New version No.:	
☐ Other:					
DOE assessment				**Date:**	30/04/2019
MR version 1.1, Section 1.1, Table 1: The CP for this monitoring period VII is corrected.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	B-1	**Section no.**	2.5.2	**Date:**	26/04/2019
Description of CAR					
MR version 1.0, Section 2.5.2: The month for the training conducted should be February instead of March.					
Project participant response				**Date:**	26/04/2019
This is corrected to February					
Documentation provided by project participant					
☒ Changes in MR		Section(s): 2.5.2		New version No.:v1.1	
☐ Changes in ER		Worksheet(s):		New version No.:	
☐ Other:					
DOE assessment				**Date:**	30/04/2019

MR version 1.1, Section 2.5.2: The month for the training conducted is corrected to February.	
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	C-2	**Section no.**	3.1	**Date:**	26/04/2019
Description of CAR					
MR version1.0, Section 3.1: The weighted average of units in operation of 75.52% is inconsistent with the usage survey analysis data. UPTIME plants that stopped working during MPVII: The data in the sentences in this section should corrected according to the usage survey analysis spreadsheet Table 18 data to be updated accordingly as per usage survey analysis spreadsheet.					
Project participant response				**Date:**	26/04/2019
This is updated section 3.1 and is now consistent As above and made consistent Table 18 is updated and made consistent					
Documentation provided by project participant					
☒	Changes in MR	Section(s): 3.1		New version No.:	
☒	Changes in ER	Worksheet(s): usage survey sheet analysis		New version No.:	
☐	Other:				
DOE assessment				**Date:**	30/04/2019
MR version1.0, Section 3.1: The weighted average of units in operation of 75.52% is updated and consistent with the usage survey analysis data. UPTIME plants that stopped working during MPVII: The data in the sentences in this section are undated and consistent with the usage survey analysis spreadsheet Table 18 data updated and according to usage survey analysis spreadsheet.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	C-3	**Section no.**	3.22	**Date:**	25/04/2019
Description of CAR					
MR version 1.0, Section 3.22 table 22: The following are to be updated: Quantity of fuel that is consumed in the baseline scenario in year y: This should be project scenario. The value for charcoal in wood equivalent and firewood to be corrected according to ER fuel sheet cells M13 to M15. The reference should be specific for the sheet in the ER database. Effective usage rate: The value of 75.54% is not consistent with the reference of Section 3.1 The source for Fraction of livestock category T's manure fed in the biodigester and other MS is incorrect.					
Project participant response				**Date:**	26/04/2019

Table 22 has been updated Quantity of fuel that is consumed in the baseline scenario in year y is corrected to project scenario. The value for charcoal in wood equivalent and firewood has been updated according to ER fuel sheet cells M13 to M15. All references refer now to specific sheets in the ER database The effective usage rate is now made consistent with section 3.1 The source is updated and now correct			
Documentation provided by project participant			
☒	Changes in MR	Section(s): table 22	New version No.: V1.1
☐	Changes in XLS	Worksheet(s):	New version No.:
☐	Other:		
DOE assessment		**Date:**	30/04/2019
MR version 1.1, Section 3.22 table 22: The following are to be updated: Quantity of fuel that is consumed in is corrected as project scenario in year y. The value for charcoal in wood equivalent and firewood corrected and consistent with ER fuel sheet cells M13 to M15. The reference are updated to refer the specific sheet of ER database spreadsheet. Effective usage rate is updated as 75.53% and consistent with the reference of Section 3.1 The source for Fraction of livestock category T's manure fed in the biodigester and other MS is corrected accordingly.			
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CAR ID	C-4	**Section no.**	3.2.7	**Date:**	25/04/2019
Description of CAR					
MR version 1.0, Section 3.27 table 49: The year in the column Period, begin and end date inclusive should be 2018 The ER for month of program 132 to be corrected.					
Project participant response				**Date:**	26/04/2019
Table 49 has been updated accordingly The month numbering has been updated likewise					
Documentation provided by project participant					
☒	Changes in MR	Section(s):table 49	New version No.:v1.1		
☐	Changes in XLS	Worksheet(s):	New version No.:		
☐	Other:				
DOE assessment				**Date:**	30/04/2019
MR version 1.1, Section 3.27 table 49: The year in the column Period, begin and end date inclusive is updated as 2018 The ER for month of program 132 corrected.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	C-5	**Section no.**	ER database	**Date:**	25/04/2019
Description of CAR					

ER database version 1.0, MRVII sheet: The following to be corrected Source for Row J148: CMS survey, see chapter 3.24 Source Row J152: See table 37 Table 22 data for cells I142 to I144 to be corrected in according to ER fuel sheet cells M13 to M15			
Project participant response		**Date:**	26/04/2019
Row J148 has been updated to: source: 'CMS data' sheet This has been updated to: Sheet ER_AWMS This has been corrected and now refers to ER-fuel sheet cells M13 to M15			
Documentation provided by project participant			
☐ Changes in MR	Section(s):	New version No.:	
☒ Changes in XLS	Worksheet(s): MRVII report	New version No.: 1.1	
☐ Other:			
DOE assessment		**Date:**	30/04/2019
ER database version 1.1, MRVII sheet: The following are corrected Source for Row J148 updated to refer CMS data sheet Source Row J152 updated to refer ER-AWMS sheet. Table 22 data for cells I142 to I144 in updated referring to ER fuel sheet cells M13 to M15			
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CAR ID	C-6	**Section no.**	ER database	**Date:**	26/04/2019
Description of CAR					
ER database spreadsheet version 1.0, ER database sheet: Cell Q149 to be corrected					
Project participant response				**Date:**	26/04/2019
This has been updated, as a result the ERs have slightly changed.					
Documentation provided by project participant					
☒ Changes in MR		Section(s): table 49, table 5 and related text	New version No.: v1.1		
☒ Changes in ER		Worksheet(s): ER_database	New version No.: v1.1		
☐ Other:					
DOE assessment				**Date:**	30/04/2019
ER database spreadsheet version 1.1, ER database sheet: Cell Q149 is corrected.					
Conclusion *Tick the appropriate checkbox*	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	C-8	**Section no.**	Usage Survey	**Date:**	26/04/2019
Description of CAR					
Usage survey spreadsheet, analysis sheet: The year stated should be 2018.					
Project participant response				**Date:**	26/04/2019
Usage survey spreadsheet, analysis sheet: The year stated has been updated to 2018.					
Documentation provided by project participant					
☐ Changes in MR		Section(s):	New version No.:		
☒ Changes in ER (usage survey sampling and data entry)		Worksheet(s): analysis	New version No.:v1.1		
☐ Other:					
DOE assessment				**Date:**	30/04/2019
Usage survey spreadsheet, analysis sheet: The year is updated as 2018					

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

CAR ID	D-1	**Section no.**	4.2.1	**Date:**	25/04/2019
Description of CAR					
MR version 1.0, Section 4.2.1, SD indicator 1: The year for PFT MPVI should be 2017.					
Project participant response				**Date:**	26/04/2019
MR version 1.1, Section 4.2.1, SD indicator 1: The year for PFT MPVI is 2018 and valid for both MPVI and MPVII. The PFT was executed in the first quarter of 2018 using the sampling frame of MPVI.					
Documentation provided by project participant					
☒	Changes in MR		Section(s): table 52	New version No.:v1.1	
☐	Changes in ER		Worksheet(s):	New version No.:	
☐	Other:				
DOE assessment				**Date:**	30/04/2019
MR version 1.1, Section 4.2.1, SD indicator 1: The year for PFT is conducted in year 2018 which is correct and applicable for MPVI and MPVII.					
Conclusion *Tick the appropriate checkbox*	☐	Additional action should be taken (finding remains open)			
	☒	The finding is closed			

CAR ID	D-2	**Section no.**	4.2.1	**Date:**	25/04/2019
Description of CAR					
MR version 1.0, Section 4.2.1, SD indicator 4: The Situation at 31/12/2018 should be MPVII.					
Project participant response				**Date:**	26/04/2019
This is updated accordingly					
Documentation provided by project participant					
☒	Changes in MR		Section(s): 4.21	New version No.: v1.1	
☐	Changes in ER		Worksheet(s):	New version No.:	
☐	Other:				
DOE assessment				**Date:**	30/04/2019
MR version 1.1, Section 4.2.1, SD indicator 4: The Situation at 31/12/2018 is corrected as MPVII.					
Conclusion *Tick the appropriate checkbox*	☐	Additional action should be taken (finding remains open)			
	☒	The finding is closed			

CAR ID	D-3	**Section no.**	4.2.1	**Date:**	25/04/2019
Description of CAR					
MR version 1.0, Section 4.2.1, table 11: The reported balance of payment is inconsistent with cash in and outflow document.					
Project participant response				**Date:**	26/04/2019
MR version 1.0, Section 4.2.1, table 11: The reported balance of payment is made consistent with the cash in and outflow document.					
Documentation provided by project participant					
☒	Changes in MR		Section(s): table 63	New version No.:v1.1	
☐	Changes in ER		Worksheet(s):	New version No.:	
☐	Other:				
DOE assessment				**Date:**	30/04/2019
MR version 1.1, Section 4.2.1, table 11: The reported balance of payment is corrected and consistent with cash in and outflow document.					
Conclusion *Tick the appropriate checkbox*	☐	Additional action should be taken (finding remains open)			
	☒	The finding is closed			

SUMMARY OF VERIFICATION ASSESSMENTS

The following paragraphs include the summary of the final verification assessments after all CARs and CLs are closed out. For details of the assessments pl. refer to the discussion of the verification findings in chapter 4 and the verification protocol (Annex 1).

Involved Parties and Project Participants

The following parties to the Kyoto Protocol and project participants are involved in this project activity.

Table 5-1: Project Parties and project participants

Characteristic	Party	Project Participant
Non-Annex 1	Cambodia	National Biodigester Programme
Annex 1	N/A	N/A

The PPs have submitted a declaration that the VERs issued for this project will not be traded under the Environmental Benefits on double counting in the context of RECs. /O1/ The verification team has cross checked at the Voluntary Carbon Standard registry, California Carbon Registry, RECS International registry and could not trace the project name is in these trading platforms. The project is only found in Markit Meta Registry listed under the Gold Standard platform. It could be concluded the project activity is not involved in RECs.

Implementation of the project

During this 7th verification, a site visit was carried out from 24/04/2019 to 26/04/2019. On the basis of this site visit and the reviewed project documentation it can be confirmed that w.r.t. the realized technology, the project equipment, as well as the monitoring, the project has been implemented and operated as described in the revised GSPDD version 2.1 and revised GS Passport version 2.1.

Refer CAR A1 raised and closed out.

Project history

During the validation the validating DOE might have raised issues that could not be closed or resolved during the validation stage. For this purpose FARs might have been raised. No such issues were identified for this project.

During the verification of MPIII CPII, FAR SD8, FAR SD9 and FAR SD10 were raised.

FAR SD8 (FAR 01): SD Indicator 1: According to finding FAR SD1, the PP proposed to organise another PFT during MPIV.
The PP conducted PFT for MPIV on March 2016 with the results are applied appropriately in this MPIV.
FAR SD9 (FAR 02): SD Indicator 6: The PP applied for a design change and submitted a revised GS Passport to GS for approval to remove the monitoring of this parameter in the next MP.
The PP submitted the revised GS Passport version 2.1 and approval by GS on 2015-10-19 to remove the monitoring of this parameter number of households that benefit from biogas lamps.
FAR SD10 (FAR 03): SD Indicator 7: The PP applied for a design change and submitted a revised PDD to GS for approval to remove the monitoring of the indicator lighting saving in this parameter in the next MP. GS has approved the change on 09/10/2015.

The PP has include justification in section 1.8 of MR. The verification team could confirm the responses are appropriate and all FARs were closed out.

Refer CAR A5 was raised at the time and closed out.

During MPIII GS issuance review, FAR 01 was raised as follows: The PP is requested to conduct outlier analysis for the future field test and monitoring survey result to ensure the representativeness of the sample household i.e. the selected household shall be typical and consume fuel normally.

The PP has responded in section 1.8 of revised MR as follows:

The selected survey consultant was asked as per the terms of reference to double check any value that is 3 times higher or lower than the average.

The PP has conducted an outlier analysis on the PFT results. The outcome was that all the households that continue to use fuel are considered outliers and should be removed as per statistical analysis. This was not deemed conservative. Based on this the PP observed that the application of outlier analysis to heterogeneous groups is not possible. For example, the smallest digester is 4 m^3 and the largest 15 m^3. The feeding of these 2 digesters is a factor 7.5 difference at maximum (20 and 150 kg per day respectively). An outlier analysis would consider these differences as outliers and would remove these. This is not realistic and as a consequence it was decided not keep the original values and to take into account the emissions from project fuel use that have been double checked by the survey consultant.

The above explanation by the PP that the survey is based on the terms of reference between PP and consultant to check on any values that are 3 times higher or lower than average the household will be contacted to verify the results.

In the PFT results there are outliers as most of the value are 0 and some are not 0. The application of the analysis would mean that all values above 0 will be rejected.

All values below 0 or higher than 0 are considered outliers and if removed would result in an increase in ERs which is not conservative.

There are variations of the biodigesters size, animal population, family size, usage of biogas varies and not homogenous therefore the outlier analysis is not applicable. In this aspect, it is not realistic and as a consequence not to keep the original values but take into account the emissions from project fuel use and considered to be conservative to ensure the ERs will not be overestimated.

During MPIV GS issuance review, the follow FARs were raised:

Forward Action Request # 1: The PP shall monitor the exact LPG quantum in project scenario in future monitoring period and clarify if it shall be accounted in the project emissions.

As reported in MPV MR,

The average LPG consumption in MPV was 6.69 kg/year, lower than the baseline of 7.3 kg/year. The project results therefore in a net GHG emission reduction due to LPG savings. This is not accounted in lieu this is conservative.

The carbon monitoring survey data sheets were verified for the above average LPG consumption. During the DOE onsite inspection, the 45 households visited and 75 telephone interviews no households used LPG for cooking and as standby fuel.

Forward Action Request # 2: The DOE shall verify the justification of VS value in next monitoring report and check if it's rational and in accord with local situation. The value and ER in this monitoring period shall be adjusted if the outcome demonstrates that VS=0.61 is not that conservative
During the CMS, the sow measurement was taken and applied for the weight calculation and the weight was found lower than MPIV. In MPIV the sow weight was 150.36 kg whilst in MPV the calculated sow weight is 133.08 kg. The calculated VS for MPV was 0.58 and MPIV was 0.61. The VS value of MPIV is therefore not conservative.

By applying the lower VS to MPIV ER calculations the emissions for baseline AWMS was changed from 2.98 to 2.86 tCO_2/hh/year and the project AWMS from 0.13 to 0.12 tCO_2/hh/year. Thus the equivalent VERs were deducted in MPV.

There were no FARs raised by DOE and GS for MPVI.

Post registration changes

The below post registration changes were submitted and approved by GS on 19/10/2015 for the following:

GSPDD version 2.1:

Inclusion of biodigesters of capacity 2, 3 m^3 and 20m^3 for future installation;
Charcoal consumption is expressed in wood equivalents in the ER calculations according to applied methodology version 2.0 TPDDTEC on page 16

GS Passport version 2.1:

SD Indicator 1: Air quality: Chosen Parameter: Reduction in wood consumption for cooking in the project compared to the baseline instead of Reduction in wood and charcoal consumption for cooking in the project compared to the baseline;
SD Indicator 2: Water quality and quantity: Chosen parameter: Cumulative number of toilets connected to the biodigesters instead of Number of toilets connected to the biodigester
SD Indicator 3: Soil condition: Chosen Parameter: Cumulative number of households that use bio-slurry instead of Cumulative number of households that use bio-slurry as fertilizer
SD Indicator 6: Livelihood of the poor: Removal of chosen parameter Cumulative number of biogas lamps in use and replaced with Number of household members that benefit from having an improve waste management system;
SD Indicator 7: Access to affordable and clean energy services: Chosen parameter: Total reduction in cooking fuel expenditure compared to the baseline calculated at current prices instead of Reduction in cooking and lighting fuel expenditure compared to the baseline calculated at current prices.
SD Indicator 9: Quantitative employment and income generation: The chosen parameter is revised to Cumulative number of masons working years instead of Cumulative number of masons working days.

The following parameters are included in revised GS PDD version 2.2 dated 04/08/2016 and updated in this monitoring period MRIV.

Inclusion of monitoring parameter W(site) in section B.7.1 of revised GS PDD version 2.2 dated 04/08/2016 for monitoring of the pig weight by pig type as described in the parameter.

The method of measurement is described in MR section 3.24 VS from pigs and could be assessed as appropriate. Therefore, the inclusion of this parameter is relevant to determine the pig type weight in the project scenario.

Inclusion of ex-ante parameter W(default) in section B.6.2 of revised GS PDD version 2.2 dated 04/08/2016 for the default value of pig weight derived from 2006 IPCC guidelines.

The default data is cross-checked with Volume 4 2006 IPCC Guidelines for National Greenhouse Gas Inventories, chapter 10 and are consistent.
The PP has applied the above changes in the current MPIV MR correctly.

Compliance with the monitoring plan

The monitoring system and all applied procedures are in compliance to monitoring plan of the GS renewed registered GSPDD for both carbon and SD indicators monitoring plans. Evidence was available to the verification team to check the compliance of the monitoring plan.

The reporting procedures reflect the requirements of the monitoring plan for the carbon monitoring and sustainable development criteria. All relevant data is stored during the whole monitoring period and traceable to the computer server at the PP office.

The PP has conducted the recalibration of the weight stone conducted by DTW on 01/07/2016./O3/ The PP verify the weight scale by using the calibrated weight stone prior to the start of the PFT.

Refer CAR B.1 raised and closed out.

Compliance with the monitoring methodology

The monitoring system is in compliance with the applied monitoring methodology "Technologies and practices to displace decentralized thermal energy consumption", version 2.0.

Monitoring parameters

During the verification all relevant monitoring parameters as listed in the revised GSPDD version 2.1 have been verified with regard to the appropriateness of the applied measurement / determination method, the correctness of the values applied for ER calculation, the accuracy and applied QA/QC measures. The results as well as the verification procedure are described parameter-wise in the project specific verification checklist.
After appropriate corrections were carried out by the project participant it can be confirmed that all monitoring parameters have been measured / determined without material misstatements and in line with all applicable standards and relevant requirements.
The calibration for the weight stone was verified as listed in Annex II of the MR. /OM2/
Data and parameters monitored:
Refer Annex 1, table A-2, section D.2 for the assessment of parameter wise.

<table>
<tr><th>Parameter</th><th>Value</th><th>Verification opinion</th></tr>
<tr><td>$P_{p,y}$: Quantity of fuel that is consumed in the project scenario in year y</td><td><table><tr><th>Fuel</th><th>Kg/y/hh</th></tr><tr><td>LPG</td><td>18.77</td></tr><tr><td>Charcoal in wood equivalent</td><td>10.353</td></tr><tr><td>Firewood</td><td>72.491</td></tr></table></td><td>The data was based on the KPT,/ER1/ which was conducted by a third party. According to Annex 4 of the applied methodology TPDDTEC version 2.0, /GSM/ it recommends a minimum test period of 3 days. However, the KPT survey was conducted for one day only. The PP has</td></tr>
</table>

Parameter	Value	Verification opinion
		demonstrated the representativeness of the survey properly in Table 27 of the Monitoring Report appropriately. The verification team has sought confirmation from the GS representative that one day survey is possible if representativeness is sufficiently demonstrated. Hence, it can be assessed the one day test period is appropriate and plausible. An excel worksheet on the calculation of these values has been reviewed. /ER1/ In the project scenario, LPG usage was 18.77kg/year which higher than baseline scenario of 7.3kg/year. As observed during the onsite inspection and interviewed of households the used of firewood for cooking food for pigs or grill meat or special family occasions or festive events. LPG is used as alternative fuel for cooking more food when more family members return home The data and calculations in the excel worksheet could be confirmed as correct. The survey was conducted by a third party at a frequency in accordance with the carbon monitoring plan in the revised GSPDD.
f_{NRB}: Fraction of Non-Renewable Biomass	77.00%	76% is the default value applied in accordance with Section B.7.1 of the GSPDD and Annex 20, 35th Meeting of the CDM Small-Scale Working Group (SSC WG). /NRB/. However, this has been updated to 77% in accordance with the SSC WG 43 Annex 4 as approved in EB77 meeting report paragraph 58./NRB/ The value was checked and could be confirmed as correctly applied.
$U_{p,y}$: Effective usage rate	75.53%	The value was derived from the usage survey, which was conducted by internal personnel of NBP. /S2/ER1/ The excel worksheet of the usage survey has been checked and the calculation of the percentage of bio-digesters in use could be confirmed as correct.
$LE_{p,y}$: Leakage emission in project scenario during year y	0.106 $tCO_2e/hh/y$	The physical leakage emission in the project scenario within the current monitoring period is comprised of physical leakage from bio-digesters and leakage from incomplete combustion of biogas in the stoves. /ER1/ Leakage from bio-digesters: 4.199 $kgCH_4$/year or 0.105 $tCO_2e/hh/year$. Leakage from biogas stoves: 0.023 $kgCH_4$/year or 0.001 $tCO_2e/hh/year$.

<table>
<tr><th>Parameter</th><th>Value</th><th>Verification opinion</th></tr>
<tr><td></td><td></td><td>The IPCC default physical leakage of the bio-digesters of 10% was applied according to the applied methodology. /IPCC/
The combustion efficiency of the biogas stoves of 99.4% was applied based on study report conducted by the SNV. /O2/
Tab AWMS of the excel worksheet /ER1/ has been checked and the calculations and data could be confirmed as correct and in line with the monitoring plan of the revised GSPDD.</td></tr>
<tr><td>$N_{p,y}$: Number of biogas plants commissioned</td><td>27,231</td><td>The value was based on the project database which has been reviewed by the verification team. /ER1/ New biodigesters constructed and commissioned are reported by the BCCs to the database officer situated in the NBP central office in Phnom Penh.</td></tr>
<tr><td>$MS_{(P,s,k)}$: Fraction of livestock category T's manure fed in the biodigester and other MS</td><td>Refer details in table 37 of MR (the table data cnould fit into this column)</td><td>The data was based on the carbon monitoring survey (CMS), which was conducted by a third party. /S1/ The excel worksheet on the calculation of these values has been reviewed./ER1/
The data and calculations in the excel worksheet could be confirmed as correct. The survey was conducted by a third party at a frequency in accordance with the carbon monitoring plan in the revised GSPDD.</td></tr>
<tr><td>N(T): Number of animals of livestock category T</td><td><table><tr><th>Category T</th><th>LC_T</th></tr><tr><td>Non-dairy cow</td><td>4.988</td></tr><tr><td>Pig</td><td>2.465</td></tr><tr><td>Buffalo</td><td>0.685</td></tr></table></td><td>The data was based on the carbon monitoring survey (CMS), which was conducted by a third party. The excel worksheet on the calculation of these values has been reviewed. /ER1,/S1/
The data and calculations in the excel worksheet could be confirmed as correct. The survey was conducted by a third party at a frequency in accordance with the carbon monitoring plan in the revised GSPDD.</td></tr>
<tr><td>$EF_{awms,T}$: $kgCH_4$ per animal per year for livestock type T in the project</td><td><table><tr><th>Category T</th><th>EF ($kgCH_4$/head/y)</th></tr><tr><td>Cow</td><td>3.990</td></tr><tr><td>Pig</td><td>7.241</td></tr><tr><td>Buffalo</td><td>6.187</td></tr></table></td><td>The value was calculated. Tab ER_AWMS , section of the excel worksheet on the calculation of these values have been reviewed. /ER1/
The data and calculations in the excel worksheet could be confirmed as correct. The survey was conducted by a third party at a frequency in accordance with the carbon monitoring plan in the registered GSPDD.</td></tr>
</table>

<table>
<tr><th>Parameter</th><th>Value</th><th>Verification opinion</th></tr>
<tr><td>Bio-slurry: The end-use systems of bio-slurry</td><td>Storage systems of slurry by the households:
<table><tr><th>DMS</th><th>Percentage</th></tr><tr><td>Direct use</td><td>5.5%</td></tr><tr><td>Anaerobic lagoon</td><td>0.4%</td></tr><tr><td>Slurry system</td><td>10.7%</td></tr><tr><td>Solid storage</td><td>47.3%</td></tr><tr><td>sun dry</td><td>1.7%</td></tr><tr><td>in Compost hut with roof</td><td>9.6%</td></tr><tr><td>in compost hut no roof</td><td>22.0%</td></tr><tr><td>I sell it</td><td>0.3%</td></tr><tr><td>run off</td><td>1.6%</td></tr><tr><td>other</td><td>0.8%</td></tr></table>End use of bio-slurry:
- 20,233 households use bio-slurry for their farming and/or gardening activities
- emission from the bio-slurry was 0.084 tCO_2/year/hh</td><td>Referring to the SD indicator No. 3 – Soil condition, chosen parameter is the cumulative number of households that use bio-slurry as fertilizer. The CMS results show the number of households that use bio-slurry was 20,230 by the end of current monitoring period. /S1/
The emission source from the use of bio-slurry was not covered by the applied methodology. Therefore, the PP had calculated the project emission from the end-use of bio-slurry (digestate) to account for the project emission in case the bio-slurry was handled aerobically. The value was 0.084 tCO_2/year/hh which is lower than 1% of the emission reductions per household per year 5.154 tCO_2e/hh/year in current monitoring period.
Tab Bio-slurry of the excel worksheet has been checked, the data and calculations could be confirmed as correct. /ER1/
Based on the CDM VVS, version 01.0, paragraph 74,/VVS/ only emission source results in emissions that contribute more than 1% of the total average annual emission reduction will be considered. Therefore, this emission source can be considered as negligible and can be excluded from the ER assessment for this monitoring period. However, for conservativeness, the PP has included as project emissions.</td></tr>
<tr><td>PL</td><td>10%</td><td>The 10% is the default value derived from IPCC guidelines and any future changes will be updated accordingly. /IPCC/</td></tr>
<tr><td>W (site)</td><td><table><tr><th>Pig type</th><th>W (site) kg</th></tr><tr><td>Sow</td><td>131.59</td></tr><tr><td>Boar</td><td>160.44</td></tr><tr><td>Fattening pig bought as piglet</td><td>34.44</td></tr><tr><td>Fatting pig born at farm</td><td>36.10</td></tr><tr><td>Piglet producer</td><td>3.40</td></tr></table></td><td>The weight of the pigs of different type measured at site during the survey /ER1/
The measurement method is described in MR section 3.24.</td></tr>
</table>

Data and parameters not monitored:

Parameter	Value	Verification opinion / Data source

<table>
<tr><th>Parameter</th><th>Value</th><th>Verification opinion / Data source</th></tr>
<tr><td>VS_T - Volatile solids excretion of animal category T</td><td><table><tr><th>Category T</th><th>Default VS (kg/day)</th></tr><tr><td>Cow</td><td>2.3</td></tr><tr><td>Pig</td><td>0.3 (0.51)</td></tr><tr><td>Buffalo</td><td>3.9</td></tr></table></td><td>The IPCC default value has been applied. Volume 4 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, chapter 10 The VS of pigs is based on the IPCC default and adjusted to reflect the real situation in Cambodia. /IPCC/</td></tr>
<tr><td>B_o - Maximum Biochemical Methane Potential</td><td><table><tr><th>Category T</th><th>Bo (m^3.kg VS)</th></tr><tr><td>Cow</td><td>0.1</td></tr><tr><td>Pig</td><td>0.29</td></tr><tr><td>Buffalo</td><td>0.1</td></tr></table></td><td>The IPCC default value has been applied. Volume 4 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, chapter 10 The VS of pigs is based on the IPCC default and adjusted to reflect the real situation in Cambodia. /IPCC/</td></tr>
<tr><td>GWP_{CH4} - Global Warming Potential of Methane</td><td>25 $tCO_2e/tCH4$</td><td>The value indicated in Section B.6.2 of the revised GSPDD for the 2nd commitment period from 01/01/2013.</td></tr>
<tr><td>GWP_{N2O} - Global Warming Potential of Nitrous Oxide</td><td>298 tCO_2e/tN_2O</td><td>The value indicated in Section B.6.2 of the revised GSPDD for the 2nd commitment period from 01/01/2013.</td></tr>
<tr><td>MCF - Methane conversion factor for each manure management system</td><td>Lagoon: 80%
Liquid/Slurry: 78%
Solid Storage: 5%
Compost: 1.5% (passive windrow assumed as mixing is often infrequent)
Dry lot: 2%
Pasture/Range/Paddock: 2%
Daily spread: 1%
Digester: 10%
Burned for fuel: 10%
Other: 1%</td><td>Default value from IPCC has been applied. Volume 4 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, chapter 10. /IPCC/</td></tr>
<tr><td>$\eta_{biogasstove}$ - Combustion efficiency of the biogas stove</td><td>99.40%</td><td>Data from a study report conducted and completed in 2001 by the Centre for Energy Studies, Institute of Engineering for the Nepal Biogas Support Programme was applied.
http://www.snvworld.org/sites/www.snvworld.org/files/publications/efficiency_measurement_of_biogas_kerosene_and_lpg_stoves_nepal_2001.pdf
The value estimated ex-ante in the revised GSPDD was 98%. However, during the current monitoring period, the PP had applied the value 99.40% from the study report. Higher efficiency value applied resulted in less methane emission from the stoves used. The</td></tr>
</table>

<table>
<tr><th>Parameter</th><th>Value</th><th>Verification opinion / Data source</th></tr>
<tr><td></td><td></td><td>difference is between 0.016kgCH_4/hh/y (efficiency 99.40%) and 0.055kgCH_4/hh/y (efficiency 98%).
Based on the GS methodology Indicative programme, baseline, and monitoring methodology for Small Scale Biodigester, the combustion efficiency of the stoves can be obtained from literature or a default value of 98%. According to the methodology Technologies and practices to displace decentralized thermal energy consumption, version 2.0 does not specify any default value for biogas stove combustion efficiency. Since the most recent data source is applied, the difference in leakage emission is negligible, therefore, the verification team considered it as appropriate.</td></tr>
<tr><td>EF_{awmsT} - kgCH_4 per animal per year for livestock type T</td><td><table><tr><th>Category T</th><th>EF (kgCH_4/head/y)</th></tr><tr><td>Cow</td><td>8.139</td></tr><tr><td>Pig</td><td>17.372</td></tr><tr><td>Buffalo</td><td>15.173</td></tr></table></td><td>IPCC default values for the region Asia from volume 4 of the 2006 IPCC
Guidelines for National Greenhouse Gas Inventories, chapter 10
However, this parameter has been recalculated in the project scenario using the IPCC Tier 2 approach using default values for the maximum methane potential (Bo), volatile solids excretion (VS) and methane density and the manure management category biodigester. The results are as shown in Data and Parameters Monitored above.</td></tr>
<tr><td>W(default)</td><td><table><tr><td>Pig type</td><td>W (default)</td></tr><tr><td>Sow</td><td>28</td></tr><tr><td>Boar</td><td>28</td></tr><tr><td>Fattening pig</td><td>28</td></tr><tr><td>Piglet</td><td>28</td></tr></table></td><td>Default average pig weight by pig type (sow, boar, fattening pig and piglet (kg) derived from Volume 4 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, chapter 10</td></tr>
</table>

Refer CL C-1, CAR C-2, CAR C-3 and CAR C-4 were raised and closed out.

Monitoring report

A Gold Standard Monitoring Report along with relevant supporting documents was submitted to the verification team by the project participants. These documents form the basis for the verification opinion of TÜV NORD.

During the verification, mistakes and needs for clarification were identified. The PP has carried out the requested corrections so that it can be confirmed that the Monitoring report is complete and transparent and accordance with the revised GSPDD version 2.1, revised GS Passport version 2.1 and relevant GS requirements.

Sampling

Implementation of the sampling plan

The PP has taken the approach for the sampling plan by adopting EB69 Annex 05 which includes level of assurance. /SSS/

The CMS has a design confidence precision level of at least 90/10 and the KPT at 90/30.

The CMS sample size is 165 and the usage survey sample size is 385.

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 is representative.

Sampling approaches during verification

The verification team has applied the sampling approach based on 90/30 confidence level according to GS recommendation to ensure the households interviewed are representative. The sample size is 116 households from the different villages in different districts and provinces. /LHH/

The verification team has cross checked with the below link to ensure the sample size of 116 is sufficient. With the number of households, the sample size for 90/10 CI is 68. Therefore, the 120 sample of households is sufficient and meets the GS sampling requirements. http://www.raosoft.com/samplesize.html /SZ/. In total, 46 households were visited and 70 households were telephone interviewed.

ER Calculation

During the verification mistakes in the ER calculation were identified. Corresponding findings were raised. A revised ER calculation was prepared by the PP and presented to the verification team. All raised issues were addressed appropriately so that the corresponding findings could be closed out. Thus it is confirmed that the ER calculation is overall correct.

Baseline Emissions:
The baseline emissions have 2 components as follows:
Component 1: Fuel Switch. Emissions from displacement of fossil fuels and non-renewable biomass fuel.
These emissions are the comparing of fuel consumption in a project scenario to the baseline scenario according to the approved revised GSPDD.
In the baseline scenario the fossil fuel is LPG whilst the non-renewable fuel is firewood and charcoal.
The equation applied:

$$BE_{b,y} = B_{p,y} \times ((f_{NRBy} \times EF_{b,fuel,CO2}) + EF_{b,fuel,CO2}) \times NCV_{b,fuel}$$

See details in ER spreadsheet, ER fuel sheet.
The baseline emission for this component is 3.1170 $tCO_2e/y/hh$.
Component 2: emissions from the animal waste management system from manure handling using the IPCC 2006 Tier 2 approach.
The equation applied:

$$BE_{(awms,h)} = N_{T,h} \times (VS_{\mathrm{T}} \times 365) \times GWP_{CH_4} \times \left[Bo_{\mathrm{T}} \times D_{CH4} \times \sum \frac{MCF_{BL,k}}{100} \times MS_{\mathrm{T}} \right]$$

The inputs for the type of animals and average population of animals are from the usage survey.
The baseline emission for this component is 2.340 $tCO_2e//y/hh$.
Project Emissions:
The project emissions are contributed from:
Continue use of baseline scenario LPG, charcoal and firewood in the project scenario;
The equation applied:
$PE_{p,y} = B_{p,y}$ x ((f_{NRBy} x $EF_{b,fuel,CO2}$) + $EF_{b,fuel,CO2}$) x $NCV_{b,fuel}$
For details refer to ER spreadsheet, ER fuel sheet.
The project emission for this situation is 0.1974 $tCO_2e/y/hh$.
Physical leakage of biogas from the biodigester and incomplete combustion of biogas;
The equation applied:
$PE_{awms,h,y} = GWP_{CH4} * \sum (N_{T,h,y} * EF_{awms,T}) * PL_y + \sum (N_{T,h,y} * EF_{awms,T}) * (1- \eta_{biogasstove}) (1- PL_y)$
The input for the type of animals and number of animals are from the usage survey.
The default value of 10% applied for physical leakage of biodigester.
The animal waste not treated in the bio-digester in the project scenario is considered as zero since the non-treated animals in the project scenario will have the same situation as they would have had in the baseline.
The project emission for this situation is 0.106 $tCO_2e/y/hh$.
Emissions from bio-slurry:
In the ER spreadsheet, the PP has demonstrated the steps for the calculating the emissions for bio-slurry. The data applied in the calculation are derived from:
2006 IPCC default value for animal excretion amount, MCF and methane potential;
The average head count of animal type is based on the usage survey results; /S2/
The digester efficiency is based on the study report and IPCC data; /IPCC/O2/
The calculated emission from bio-slurry is 0.084 $tCO_2e/hh/y$.
Emission Reduction:
The emission reduction for one household is calculated for this monitoring period as follows:
Emission reductions from fuel switch.

$ER_{thermal}$ = $BE_{thermal} – PE_{thermal} – LE_{thermal}$
= 3.1170 – 0.1974 – 0
= 2.9196 $tCO_2e/hh/y$

Emission reductions from AWMS.

$ER_{AWMS,y}$ = $BE_{AWMS,y} – PE_{awms,y} – LE_{bioslurry,y}$
= 2.3401 – 0.1055 – (-0.084)
= 2.3186 tCO_2e/hh/y

Thus the ER for this monitoring period:

$ER_{y,h}$ = $U_{y,h}$ x ($BE_{y,h} – PE_{y,h}$) x $N_{p,y}$
= **103,000 tCO_2e**

For details of ER calculations, refer ER spreadsheet, ER database sheet. The ERs are calculated on monthly basis due to the monthly addition of units. Therefore, is appropriate.

The above ERs summation for the monitoring period.

Vintage Year	Period	VER (tCO_2e)
2018	01/01/2018 to 31/12/2018	103,000
Total VER claimable for this monitoring period		**103,000**

To conclude, from the reviewed and replication of data input to the ER calculation, it can be confirmed the data stated in the MR is overall correct.

Refer CAR C-5, CAR C-6 and CAR C-7 were raised and closed out.

Quality Management

Quality Management procedures for measurements, collection and compilation of data, data storage and archiving, calibration, maintenance and training of personnel in the framework of this GS project activity have been defined. The procedures defined can be assessed as appropriate for the purpose. No significant deviations thereof have been observed during the verification.

Actual emission reductions during the first commitment period and the period from 1 January 2013 onwards

The MR includes actual ER values achieved during the period from 2013-01-01 onwards as follows:

Table 5-2: Emission reductions after 2013

	During the period up to 31/12/2012	Achieved during the period from 01/01/2013 onwards
Emission reductions [tCO_2e]	**N/A**	**103,000**

Comparison with ex-ante estimated emission reductions

The MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the registered GS-PDD for the MRVI of CP II.

Ex-Ante ERs: 113,827 tCO_2e

Ex-Post ERs: 103,000 tCO_2e

Difference: 10,826 tCO_2e

The ex-ante calculated value was found to be higher than the ex-post determined value.

In section 1.2 of the MR, the PP has justified the lower ex-post ERs are due to:

The ex-post ER per unit of 5.07 tCO_2e/hh/y as compared to ex-ante of 3.93 tCO_2e/hh/y is higher.

The number of units installed are 27,231 which is less than ex-ante of 33,287 units.

The verification team has cross-checked the data and could consider as correct.

Contribution to Sustainable Development

The SD indicators as per the GS matrix are monitored and reported appropriately and cross-verified by means of desk review of supporting documents, interviews with the PP and relevant stakeholders. The monitoring system and all applied procedures are in compliance to the sustainability monitoring plan in the revised GS Passport version 2.1 and Gold Standard principle.

During the site visit, the verification team has randomly selected 120 households to conduct interviews by means of personal visits and telephone calls in several provinces of Cambodia. In total 46 households were visited and 70 were telephone interviewed. The questions asked were basically based on requirements of the Annex I, Rules and Toolkit to the Gold Standard version 2.1.

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

Questions for households during the site interviews	Summary of feedback
What do you use the biogas from the biodigesters for?	The households reported that they are using the biogas primarily for their daily cooking. In general, the biogas from their biodigesters is sufficient with no technical issues for the digester.
What do you do with the bio-slurry from the biodigesters and how it is stored?	The interviewed households said they are using bio-slurry for their rice fields and vegetable gardens. Most 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 it is 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. This could be observed from the onsite visits and inspection of selected households.
How are the biogas stoves	The interviewed households reported using biogas have

Questions for households during the site interviews	Summary of feedback
and rice cookers as compared with using firewood and charcoal before?	resulted in cleaner kitchen and savings from spending on firewood or charcoal. This could be observed during the onsite visits to the selected households. Using biogas has improve indoor air quality.
Are you using firewood and / or charcoal now?	The visited households have sufficient biogas for their daily cooking. They only use firewood when they need to cook large amount of food during festive events or water for making tea or grill meat like fish, pork or beef or cooked pig food or make palm sugar or cakes in the business. The visited households do not used charcoal.
What are the benefits brought to you by this biodigesters program?	Have clean and free-of-charge gas for cooking. Households can save time and money in the absence of the program. The houses and villages roads have become cleaner, improve environmental & hygiene conditions and free of unpleasant smell as compared before biodigesters were introduced. This could be observed during the site visits to the household villages and interview conducted.
What are your concerns regarding the operation of biodigesters in your home?	In general, the biodigesters have help to the villagers to reduce cooking time and do not need to spend money to buy or time to collect firewood. We have extra time to do some small businesses.
How do you find the salary working as masons under this program?	Masons working for NBP projects found themselves satisfied with the income earned. They hope more biodigesters to be built to increase the income.
Do you have any person in your family involved in the construction of biodigesters in your village?	Households recognized that a lot of local residents have been employed for the construction of biodigesters in their villages.
Do you think that this project could provide more permanent jobs?	Those households involved in the building of biodigesters reported that they are having a better and permanent job from this biodigesters project. Two BCCs and supervisors were interviewed and said their income have increased with the programme.

Sustainable Development Indicators:

The SD indicators are as follows:

Air quality

Water quality and quantity

Soil condition

Biodiversity

Quality of employment

Livelihood of the poor

Access to affordable and clean energy services

Human and institutional capacity

Quantitative employment and income generation

Balance of payments and investments

Technology transfer and technological self-reliance

During this monitoring period, the PP has revised the chosen parameters and approved by GS the revised GS Passport version 2.1 on 19/10/2015.

Table 5-1: Assessment of monitored SD Indicators

Indicator	Parameter	Value	Verification Opinion
Air Quality	Reduction in wood consumption for cooking in the project compared to the baseline.	Firewood: 95% reduction	The value was derived from the Kitchen Performance Test (KPT) conducted in year 2018 indicate there was a reported 95% reduction in firewood usage for this monitoring period. During the onsite visit, the verification team had randomly selected 116 households to conduct interviews. /LHH/ It was revealed that households do not use firewood for their daily cooking. Firewood is only used in cases for cooking a lot of food for family or festive events or grill meat, cook pigs' food and make cakes or palm sugar for business. As compared with the baseline scenario, the usage of charcoal and firewood has reduced significantly. However, as compared with the situation at the end of previous MR, there was reduction in the usage of firewood. Nevertheless, the reductions archived are still significant hence, the score of this SD indicator is positive.
Water quality and quantity	Number of toilets connected to the biodigester	3,028	The value was derived from the project database. The verification team had checked the database kept on computer at the NBP central office in Phnom Penh/ER1/ and interview the database manager. The total number of toilets connected to biodigesters system reported were 3,028 units as at 31/12/2018. Based on the interviews conducted via onsite visits and telephone with the randomly selected households/LHH/, some households have constructed their toilets with proper pits to store the waste. Out of the 116 interviewed households, 3 households have toilets connected to the biodigesters. Those

Indicator	Parameter	Value	Verification Opinion
			households do not have toilets connection because they prefer to have separate septic tanks for the human waste and some of the toilets were constructed before the installation of the biodigesters or the toilet is located too far from the biodigesters and thus connection is not feasible. Based on the project database and onsite interviews with local residents, it is assumed that there is progressive improvement in water quality and quantity due to increasing of toilets connected to the biodigesters. Thus, the score for this SD indicator is positive.
Soil condition	Cumulative number of households that use bio-slurry as fertilizer	20.230	The value was derived from the Carbon Monitoring Survey (CMS) /ER1/ The survey results were checked by the verification team on randomly selected households said that they used and found bio-slurry is a much better fertilizer for their crops, as compared with the traditional chemical fertilizers prior to the implementation of the programme. Most of households use bio-slurry in their rice field and other crops reported considerable savings from buying chemical fertilizers and have better yield. From the onsite visit, the verification team observed the soil condition and soil hygiene have been significantly improved due to the usage of bio-slurry. The use of bio-slurry for this monitoring period has decreased as compared to the last monitoring period. Since in the baseline scenario, none of the households used bio-slurry, the score for this SD indicator is positive.
Biodiversity	Cumulative savings of wood	27.7 Gg for MPVII, and 257.3 Gg from start of the project	The value was calculated from the difference between the baseline and project fuel usage, multiplied by the number of biodigester units installed during this monitoring period. The baseline and project fuel usage were based on the Carbon Monitoring Survey (CMS), which has been checked by the verification team.

Indicator	Parameter	Value	Verification Opinion
			/ER1/S2/S1/ The savings of firewood for this monitoring period is higher than last monitoring period MRIV. Since in the baseline scenario, firewood is commonly used for daily cooking by households, the score for this SD indication is positive.
Quality of Employment	Number of trained masons and supervisors (quality inspectors of biodigesters)	Total certified masons: 801 Supervisors: 154	The value was based on the records of training of masons in the project database. /ER1/,/T1/ During this monitoring period the total number masons and supervisors certified continue to increase when compared to the last monitoring period MRVI. Prior to the programme implementation, there was no such vocational training; therefore, the score for this SD indicator is positive.
Livelihood of the Poor	Cumulative number of users that use biogas for cooking	19,943 households	The value was derived from the Carbon Monitoring Survey (CMS). /ER1/S1/S2/ The verification team has checked the CMS data worksheet to confirm this information. /ER1/ Over the last MPs, the rate of using biogas for cooking is consistently reported at 100%. According to the usage survey the daily usage is 97%. During the interviews of visited household every household uses biogas for their daily cooking except for some special family or festive events where they need intensive fuel to cook a lot of food or to stew food or grill meat or cook pig food firewood will be used. In the baseline scenario, there is usage of biogas for cooking therefore, the score for this SD indicator is positive.
	Number of household members that benefit from having an improve waste management system	94,607	The value is calculated using the number of plants x share of plants in use x number of household members. During this monitoring period there was drop of usage rate. The drop is demonstrated in section 1.5.

Indicator	Parameter	Value	Verification Opinion
			In the baseline scenario, the number of people that benefit is zero, therefore, the score for this SD indicator is positive.
Access to affordable and clean energy services	Reduction in cooking fuel expenditure compared to the baseline calculated at current prices	Cooking fuels: $13.32 per month	The value was derived from the Carbon Monitoring Survey. /ER1/ The baseline scenario estimated an expenditure of 36,366 Riel (about $9) of the target population per month. For this monitoring period, the programme has achieved an expenditure savings of $13.32 per month per household for cooking fuel. During the visit to the households, the price of firewood was cross checked with local shop selling wood and charcoal and households, the savings calculated by the PP can be assessed as reasonable. It could be confirmed from the onsite inspection the households have better quality life in terms of access to low-cost and clean energy (biogas) for their daily cooking. In the baseline scenario it is zero savings. Therefore, the score for this SD indicator is positive.
Human and institutional capacity	Cumulative number of established Biogas Construction Companies (BCC)	107 of which 53 are in operation	The value was based on the records of BCC established in the project database. /ER1/ The number has increased as compared with the monitoring period of MPVI. These Biogas Construction Companies have created employment for local residents and promoted local related business. During the site visit, three BCCs were interviewed and they were confident that they can construct more biodigesters in 2019. /IM04/ Since the BCCs are specific for this programme only, the score for this SD indicator is positive.
Qualitative employment and income generation	Cumulative number of masons working years	2,550 man-years	The value was based on the records of constructing biodigesters from the project database. /ER1/ It was calculated based on the number

Indicator	Parameter	Value	Verification Opinion
			of digesters built as per total sales records times the default number of days required for the construction divided by the number of days worked per year (220) During this monitoring period the number of man-years achieved is higher than MPV. With the number of man years have increased during this MPVII, which led to improvement in qualitative employment and income generation. Therefore, the score for this SD indicator is positive.
Balance of payments and investments	Net cash inflow	US$546,629.75	The value was based on the accounting records of the project cash inflow and outflows. /SD1/ The net cash inflow for this monitoring period has decreased due to reduce in donor funding in addition to lower VERs price and increased in GS fees have cause the funding is lower than the target of USD1 million. In the baseline scenario the value was zero. Hence, the score for this SD indicator is positive.
Technology transfer and technological self-reliance	Number of biodigesters built	27,231	The data was based on the records of constructed biodigesters in the project database. /ER1/ The no. of digesters for this monitoring period is 646 units lower than MPVI, CPII. In the baseline scenario, there was no biodigester built, the score for this SD indicator is positive.

The verification team could confirm that the project has achieved the mitigation / compensation measures as per the revised monitoring plan.

For further details concerning the sustainability indicators please refer to Annex 2.

Refer CAR D-1, CAR D-2 and CAR D-3 raised and closed out.

Overall Aspects of the Verification

All necessary and requested documentation was provided by the project participants so that a complete verification of all relevant issues could be carried out.

Access was granted to all installations of the plant which are relevant for the project performance and the monitoring activities.

The verification team has checked on the agreements between the PP and householders for the construction of the biodigester signed between householder (Party A) and PP (Party B) joining the program was verified the include the below statement. /O4/

Party A agreed to give up the right to the use the carbon emission reductions to National Biodigester Programme the organiser of National Biodigester Program, Cambodia and use it for the programme.

No issues have been identified indicating that the implementation of the project activity and the steps to claim emission reductions are not compliant with the GS and relevant guidance provided by the COP/CMP and the CDM EB (clarifications and/or guidance).

Grievances

NBP has setup a facebook to receive comments and no negative comments were received so far. The verification team has checked the facebook and comments received were positive. Some of the comments received are request for price of the digesters and technical information. /O5/

Hints for next periodic Verification

No FAR raised for consideration in the netx verificaiton.

VERIFICATION AND CERTIFICATION STATEMENT

National Biodigester Programme has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 7th periodic verification of the CPII of the project: “National Biodigester Programme, Cambodia”, with regard to the relevant requirements for GS/CDM project activities. The project reduces GHG emissions due to displacement of non-renewable cooking and lighting fuel by biogas, avoidance of methane emission from animal and human waste by capturing and destroying methane for thermal energy used and displacement of chemical fertilizers by bio-slurry. This verification covers the period from 01/01/2018 to 31/12/2018 (including both days).

In the course of the verification, 12 Corrective Action Requests (CAR) and 1 Clarification Requests (CL) were raised and successfully closed. No FARs were raised to improve the monitoring system in the future. The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in

the revised GSPDD, revised GS Passport, validation report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

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 validated project design document.

the monitoring plan is in accordance with the applied approved GS methodology, i.e., Technologies and practices to displace decentralized thermal energy consumption, version 2.0

the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately.

the monitoring system is in place and functional. The project has generated GHG emission reductions.

the project contributes to sustainable development

As the result of the 7th periodic verification, the verifier confirms that the GHG emission reductions are 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: **103,000** **tCO_2e**

Puchong, 28/06/2019	Essen, 28/06/2019
Cheong, Chun Yuen (Robert)	Rami, Kunal
TÜV NORD JI/CDM Certification Program	TÜV NORD JI/CDM Certification Program
Verification Team Leader	Final Approval

REFERENCES

Table 0-1: Documents provided by the project participant(s)

Reference	Document
Monitoring Report	
/MR/	Monitoring Report version 1.0 dated 13/03/2019 Monitoring Report version 1.1 dated 26/04/2019 Monitoring Report version 1.2 dated 25/05/2019 Monitoring Report version 1.3 dated 03/06/2019
ER spreadsheet	
/ER1/	ER database spreadsheet version 1.0 dated 13/03/2019 ER database spreadsheet version 1.1 dated 27/04/2019 ER database spreadsheet version 1.2 dated 25/05/2019
Survey	
/S1/	ER spreadsheet: CMS final data district and household sampling Questionnaire Carbon Monitoring Survey Questionnaire Cooking Fuel Prices
/S2/	USAGE survey final data dated 01/03/2019 Usage Survey questionnaire V3-Final Questionnaire Biodigester User Survey 2018 - Khmer & English (FINAL) v2
SD Indicators	
/SD1/	Cash inflow and outflow statement for year 2018
/SD2/	Fuel Prices for coal and wood spreadsheet
/SD3/	BCC, Supervisors and Mason data
Operation Manual	
/OM1/	Operations Manual for Private Biodigester Construction Companies (BCCs)
Training	
/T1/	Usage survey training dated 04/01/2019 CMS training report dated 15/02/2019 to 17/02/2019
Others	

Reference	Document
/O1/	Declaration on units not sold under Environmental Benefits dated 09/06/2017
/O2/	Study on biogas combustion efficiency by the Center for Energy Studies, Institute of Engineering for the Nepal Biogas Support Programme
/O3/	Statement of Conformity by DTW dated 01407/2016
/O4/	Construction Agreement between NBP & Householders
/O5/	Comments and responses from facebook 2018

Table 0-2: Background investigation and assessment documents

Reference	Document
/AT/	Tool for the demonstration and assessment of additionality, version 6.1
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/GSAI/	Annex I, Rules and Toolkit to the Gold Standard version 2.1
/GSDDR/	Gold Standard Design Change Review last round feedback dated 2015-10-19
/GSM/	Technologies and practices to displace decentralized thermal energy consumption, version 2.0 (TPDDTEC)
/GSPDD/	Registered GS PDD Version 1.9 dated 06/02/2013
/GSPDD1/	GS PDD version 2.1 dated 15/10/2015
/GSPDD2/	GS PDD version 2.2 dated 04/08/2016 GSPDD version 2.3 dated 22/08/2016
/GSR/	Gold Standard Requirements (GSv2.1)
/GSS/	Guidelines for Sampling and Surveys for CDM Project Activities and Programme Of Activities, EB 69, Annex 5
/GST/	Gold Standard Toolkit (GSv2.1)
/IPCC/	Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories: Non-CO_2 Stationery Combustion Emissions from Livestock and Manure Management (Chapter 10)

Reference	Document
	IPCC Second Assessment Report – Climate Change 1995: A Report of the Intergovernmental Panel on Climate Change
/LSC/	Local Stakeholder Consultation Report Version 8 dated 2010-10-27
/NRB/	Default values of fNRB for LDCs and SIDs, Annex 20, 35th Meeting of CDM Small Scale Working Group (76%) Default value of fNRB for LDCs and SIDs, Annex 4, 43rd Meeting of CDM Small Scale Working Group (77%)
/PLEAD/	Tool "Project and leakage emissions from anaerobic digesters" version 01.0.0 EB 66, Annex 32
/RGSP/	Revised GS Passport version 2.1 dated 15/10/2015
/RRCPII/	Review Report for Renewal of 2nd Crediting Period by the Gold Standard Foundation, undated
/SSS/	Standard for Sampling and Surveys for CDM Project Activities and Programme Of Activities, EB 74, Annex 06, version 04.0
/SZ/	http://www.raosoft.com/samplesize.html
/VAL/	Sustainability Validation Report, by TUV-Rheinland, Version 01.6 dated 06/02/2013 (renewal of 2nd crediting period)
/VVS/	CDM Validation and Verification Standard (Version 01.0)

Table 0-3: Websites used

Reference	Link	Organisation
/dnaHP/	http://www.camclimate.org.kh/	DNA of Cambodia
/gs/	http://www.goldstandard.org/	Gold Standard
/unfccc/	http://cdm.unfccc.int	UNFCCC
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications

Table 0-4: List of interviewed persons

Refere	Mol[1]		Name	Organisation / Function

nce				
/IM01/	V	☐ Mr. ☒ Ms	Lam Saoleng	NBP / Programme Coordinator
	V	☒ Mr. ☐ Ms	Him Sambath	NBP / Technical Manager
	V	☒ Mr. ☐ Ms	In Nimol	NBP / Database Officer
/IM02/	V	☒ Mr. ☐ Ms	Eric Buysman	Independent Carbon Consultant
/IM03/	V	☐ Mr. ☒ Ms	Ek Sopheara	Survey Consultant
		☐ Mr. ☒ Ms	Chan Sokyeng	Survey Consultant
/IM04/	V	☒ Mr. ☐ Ms	Lor Sam Ouen	BCC / Svay Rieng, Svay Chrum district
		☒ Mr. ☐ Ms	Kong Mouv	NBP / Supervisor
		☒ Mr. ☐ Ms	Pin Samon	PBPO Svay Rieng municipality / Coordinator
		☒ Mr. ☐ Ms	Em Bunthy	BCC / Takeo, Bati district

/LHH/	List of randomly selected 116 households for interview (46 visited and 70 interviewed via telephone calls) during the site visit.						
No.	**MoI[1]**	**Household Number**	**Householder Name**	**Location**			
				Province	**District**	**Commune**	**Village**
1	V	2102164679	Yern Teng	Takeo	Bati	Doung	Kandal
2	V	2102174824	Chin Cham	Takeo	Bati	Doung	Krang Prateal
3	V	2102174833	Tub Sang	Takeo	Bati	Doung	Krang Prateal
4	V	2102174834	Bo Yerm	Takeo	Bati	Doung	Krang Prateal

5	V	2102091260	El Nob	Takeo	Bati	Doung	Krang Prateal
6	V	2102174913	Veong Sok	Takeo	Bati	Doung	Krang Prateal
7	V	2102174937	Oar Vey	Takeo	Bati	Doung	Krang Prateal
8	V	2102174939	Chhang Sang	Takeo	Bati	Doung	Krang Prateal
9	V	2102174938	Chin Srey	Takeo	Bati	Doung	Krang Prateal
10	V	2102174832	To Toch	Takeo	Bati	Doung	Krang Prateal
11	V	2102174825	Leang Sreng	Takeo	Bati	Doung	Krang Prateal
12	V	2102091261	Gnem Savon	Takeo	Bati	Doung	Krang Prateal
13	V	2005111872	Horng Sophy	Svay Rieng	Svay Chrum	Kampong Chamlang	Ta Chey
14	V	2005090883	Uk Sa Em	Svay Rieng	Svay Chrum	Kampong Chamlang	Ta Chey
15	V	2005090874	Sok Thol	Svay Rieng	Svay Chrum	Kampong Chamlang	Ta Chey
16	V	2005143177	Saom Savat	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok
17	V	2005080465	Prak Sary	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok
18	V	2005132995	Keo Punlok	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok
19	V	2005163768	Pich Sam	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok
20	V	2005112134	Preab Phat	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok
21	V	2005090550	Som Savon	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok
22	V	2005070089	Kev Sophal	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok
23	V	2005122338	Long Choem	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok
24	V	2005112131	Kaen Yean	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok

25	V	2005133063	Mao Souren	Svay Rieng	Svay Chrum	Kampong Chamlang	Ta Chay
26	V	2005111626	Kim Sokhon	Svay Rieng	Svay Chrum	Kampong Chamlang	Ta Chay
27	V	2005173916	Nov Chamuan	Svay Rieng	Svay Chrum	Kampong Chamlang	Ta Chay
28	V	2005133029	Koet Thavy	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok
29	V	2005122188	Mom Norun	Svay Rieng	Svay Chrum	Kampong Chamlang	Ta Chay
30	V	2005111919	Mon Nmot	Svay Rieng	Svay Chrum	Kampong Chamlang	Ta Chay
31	V	2005122145	Mon Thant	Svay Rieng	Svay Chrum	Kampong Chamlang	Ta Chay
32	V	2005122703	Ham ChanTha	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
33	V	2005080502	Tep Savy	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
34	V	2005112019	Koe Loun	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
35	V	2005122747	Pen Savan	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
36	V	2005153560	Suo Saphoan	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
37	V	2005080484	Roth Saman	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
38	V	2005080506	Has Chan	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
39	V	2005153505	Prieb Pie	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
40	V	2005080530	Keo Noeun	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
41	V	2005173926	Kong SamOl	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
42	V	2005173900	Chea Sampoas	Svay Rieng	Svay Chrum	Ta Suos	Ta Pa

43	V	2005120538	Yong Raek	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
44	V	2005163704	Tap Thol	Svay Rieng	Svay Chrum	Ta Suos	Ta Pa
45	V	2005080505	Sou Sarom	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
46	V	2005080499	Ouk Som	Svay Rieng	Svay Chrum	Ta Suos	Chambak Kaong
47	T	701164190	Am Navy	Kampot	Angkor Chey	Champei	Daeum Pou
48	T	408181477	Chan Saroeurn	Kampong Chhnang	Tuek Phos	Khlong Popok	Kraoy Voat
49	T	2002173927	Vong Sok	Svay Rieng	Kampong Rou	Samlei	Prey Mnoas
50	T	2002173849	Chea Subin	Svay Rieng	Kampong Rou	Preah Ponlea	Traok
51	T	404161417	Yan Yary	Kampong Chhnang	Kampong Leaeng	Pou	Pou
52	T	808161220	Thoeurn Pun	Kandal	Angk Snuol	Mkak	Pongro
53	T	1413172394	Yin Kun	Prey Veng	Svay Antor	Me Bon	Phnum Kong
54	T	2004173808	Phai Norm	Svay Rieng	Romeas Haek	Mream	Chrong Popel
55	T	2008163773	Prak Vanny	Svay Rieng	Bavit	Bati	Prasab Leak
56	T	2501180218	Yen Mao	Tboung Khmum	Dambae	Tuek Chrov	Khley
57	T	1411162263	Bun Bun	Prey Veng	Pur Rieng	Prey Kanlaong	Kampong Kra muon
58	T	306173025	Yorn Chanthorn	Kompomg Cham	Kampong Siem	Srak	Srak
59	T	2004173835	Muth Samath	Svay Rieng	Romeas Haek	Sambatt Mean Chey	Prey Srah
60	T	1413172407	Uong Yet	Prey Veng	Svay Antor	Angkor Tret	Tra Laeuk
61	T	1406172397	Port Seangly	Prey Veng	Peam	Kaoh Chek	Kaoh Peam

					Chor		Reang
62	T	2005173909	Chhun Sokim	Svay Rieng	Svay Chrum	Svay Yea	Tuol Vihear
63	T	2007163760	Ken Silen	Svay Rieng	Svay Teab	Prasoutr	Prey Rumduol
64	T	508182963	Chem Lot	Kampong Spue	Thpong	Veal Pon	Prey Mich
65	T	707174223	Meas Roeurn	Kampot	Tuek Chhou	Kandaol	Anlong Kokir
66	T	301080601	Mel Khorn	Kompomg Cham	Batheay	Me Pring	Tang Roleang
67	T	306060088	Plong VanChim	Kompomg Cham	Kampong Siem	Kaoh Roka	Ta Meang
68	T	301152938	Pom Run	Kompomg Cham	Batheay	Me Pring	Tang Srei
69	T	1406182465	Ven Chanthou	Prey Veng	Peam Chor	Svay Phluoh	Bang'aek
70	T	1406182463	Thoeung Leang	Prey Veng	Peam Chor	Kaoh Chek	Kaoh Peam Reang
71	T	306132604	Khan Oul	Kompomg Cham	Kampong Siem	Kaoh Roka	Kaoh Roka Knong
72	T	301122351	Chheng Chhim	Kompomg Cham	Batheay	Me Pring	Tang Srei
73	T	311101676	Sran Sroeun	Tboung Khmum	Ou Reang Ov	Kong Chey	Tuol Ta Hao
74	T	2005184020	Un Rotha	Svay Rieng	Svay Chrum	Chambak	Tuol Chres
75	T	301080595	Soeng Sophol	Kompomg Cham	Batheay	Me Pring	Tang Roleang
76	T	301152943	Un Huoy	Kompomg Cham	Batheay	Me Pring	Tang Srei
77	T	1413152121	Pet Sokhun	Prey Veng	Svay Antor	Pean Roung	Thnal Kaeng
78	T	301080652	Heng Sokhom	Kompomg Cham	Batheay	Me Pring	Tang Roleang

79	T	2003184018	Puch Saran	Svay Rieng	Rumduol	Pong Tuek	Prey Srakum
80	T	2505170199	Mes Heak	Tboung Khmum	Ponhea Kraek	Kandaol Chrum	Tuol Chamkar
81	T	2003184016	Mom Son	Svay Rieng	Rumduol	Kampong Ampil	Svay Rolum
82	T	2004184017	Ty Sarom	Svay Rieng	Romeas Haek	Mream	Mream Khang Tboung
83	T	2505150113	Uong SamEourn	Tboung Khmum	Ponhea Kraek	Kandaol Chrum	Tuol Chamkar
84	T	2505150136	Tub Soeurng	Tboung Khmum	Ponhea Kraek	Kandaol Chrum	Tuol Chamkar
85	T	306173028	Ly Tangkan	Kompomg Cham	Kampong Siem	Kaoh Roka	Kaoh Roka Knong
86	T	303101592	San Pheang	Kompomg Cham	Cheung Prey	Pring Chrum	Ta Ni
87	T	301122583	But Chhoeun	Kompomg Cham	Batheay	Me Pring	Tang Srei
88	T	306173029	Chen Chanphol	Kompomg Cham	Kampong Siem	Kaoh Roka	Kaoh Roka Knong
89	T	301080616	Chun Chorn	Kompomg Cham	Batheay	Me Pring	Tang Srei
90	T	301122553	Chhum Aek	Kompomg Cham	Batheay	Me Pring	Tang Srei
91	T	1413182461	Mo Sarim	Prey Veng	Svay Antor	Samraong	Prey Khnong
92	T	301122499	Ky Chamreun	Kompomg Cham	Batheay	Me Pring	Tang Roleang
93	T	306132617	Phoung Sroun	Kompomg Cham	Kampong Siem	Kaoh Roka	Kaoh Roka Knong
94	T	301173016	Yorl Yun	Kompomg Cham	Batheay	Me Pring	Tang Srei
95	T	301142773	Rot Kouy	Kompomg Cham	Batheay	Me Pring	Tang Roleang
96	T	1406182464	Ell Marin	Prey Veng	Peam Chor	Kaoh Chek	Kaoh Peam Reang

97	T	2001101365	Kaev Thy	Svay Rieng	Bavit	Bati	Thnanh
98	T	2003184015	Meas Ron	Svay Rieng	Rumduol	Kampong Ampil	Kampong Ampil
99	T	2505150114	Chheng Sokha	Tboung Khmum	Ponhea Kraek	Kandaol Chrum	Tuol Chamkar
100	T	311101574	Moy Sombath	Tboung Khmum	Ou Reang Ov	Kong Chey	Tuol Ta Hao
101	T	2505150133	Kan Phanna	Tboung Khmum	Ponhea Kraek	Kandaol Chrum	Tuol Chamkar
102	T	2505150107	Dy Vuthy	Tboung Khmum	Ponhea Kraek	Kandaol Chrum	Tuol Chamkar
103	T	2005184014	Mom Thoeun	Svay Rieng	Svay Chrum	Chambak	Thmei
104	T	2505150108	Koy Pov	Tboung Khmum	Ponhea Kraek	Kandaol Chrum	Tuol Chamkar
105	T	2505150078	Khut Ly	Tboung Khmum	Ponhea Kraek	Kandaol Chrum	Tuol Chamkar
106	T	2005133029	Kaeth Thavy	Svay Rieng	Svay Chrum	Kampong Chamlang	Traok
107	T	2003184021	Srey Run	Svay Rieng	Rumduol	Thmea	Prey Chamkar
108	T	2001122177	Kong E	Svay Rieng	Bavit	Bati	Thnanh
109	T	2005184019	Som Pitou	Svay Rieng	Svay Chrum	Chambak	Angk Sala
110	T	1406182460	Mong Yong	Prey Veng	Peam Chor	Kaoh Chek	Mean Chey
111	T	2001132896	Hout Shilany	Svay Rieng	Bavit	Bati	Thnanh
112	T	2002080255	Roth Soeung	Svay Rieng	Kampong Rou	Prey Thum	Kakruos
113	T	2002080280	Chham Dara	Svay Rieng	Kampong Rou	Prey Thum	Kakruos
114	T	2001101363	Pech Mai	Svay Rieng	Bavit	Bati	Thnanh
115	T	2001111854	Chann Saran	Svay Rieng	Bavit	Bati	Thnanh
116	T	2001111861	Chib Sam Oeun	Svay Rieng	Bavit	Bati	Thnanh

[1)] Means of Interview: (**T**elephone, **E**-Mail, **V**isit)

ANNEX

A1: Verification Protocol

A2: Calibration dates and validity of installed monitoring equipment

A3: Statements of Competence of involved Personnel

ANNEX 1: VERIFICATION PROTOCOL

Table A-1: GHG calculation procedures and management control testing / detailed audit testing of residual risk areas and random testing

Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**	**Additional verification testing**	**Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)**
Raw data generation				
Installation of measuring equipment Dysfunction of installed equipment Maloperation by operational personnel Downtimes of equipment Exchange of equipment Change of measurement equipment characteristic Insufficient accuracy Change of technology Accuracy of values supplied by Third Parties	Installation of modern and state of the art equipment Process control automation Internal data review Regular visual inspect-ions of installed equip-ment Only skilled and trained personnel operates the relevant equipment Daily raw data checks Immediate exchange of dysfunctional equipment Stand-by duty is organized Training	Inadequate installation / operation of the monitoring equipment Inadequate exchange of equipment Change of personnel Undetected measurement errors Inappropriateness of Management system procedures w.r.t. monitoring plan requirements (e.g. substitute value strategies) Non-application of management system	Site – visit Check of equipment Check of technical data sheets Check of suppliers information / guarantees Check of calibration records, if applicable Check of maintenance records Counter-check of raw data and commercial data Check of CDM management system	**See Table A-2**

Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**	**Additional verification testing**	**Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)**
	Internal audit procedures Internal check of QA/QC measures of involved Third Parties	procedures Insufficient accuracy Inappropriate QA/QC measures of Third Parties	Check of CDM related procedures Application of CDM management system procedures Check of trainings Check of responsibilities Check of QA/QC documentation / evidences of involved Third Parties	
Raw data collection and data aggregation				
Wrong data transfer from raw data to daily and monthly aggregated reporting forms IT Systems Spread sheet programming Manual data transmission	Cross-check of data Plausibility checks of various parameters. Appropriate archiving system Clear allocation of responsibilities Application of CDM Management system	Unintended usage of old data that has been revised Incomplete documentation Ex-post corrections of records Ambiguous sources of information Non-application of management system procedures	Check of data aggregation steps Counter-calculation Data integrity checks by means of graphical data analysis and calculation of specific performance figures Check of management system certification	**See Table A-2**

Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**	**Additional verification testing**	**Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)**
Data protection Responsibilities	procedures Usage of standard software solutions (Spreadsheets) Limited access to IT systems Data protection procedures	Manual data transfer mistakes Unintended change of spread sheet programming or data base entries Problems caused by updating/upgrading or change of applied software	Check of data archiving system Check of application of Management system procedures	
Other calculation parameters				
Emission factors, oxidation factors, coefficients	The values and data sources applied are defined in the PDD and monitoring plan	Unintended or intended Modification of calculation parameters Wrong application of values Misinterpretations of the applied methodology and/ or the PDD Missing update of applicable regulatory framework (e.g. IPCC values)	Update-check of regulatory framework Countercheck of the applied MP in the MR against the methodology and the PDD	**See Table A-2**
Calculation Methods				

Identification of potential reporting risk	**Identification, assessment and testing of management controls**	**Areas of residual risks**	**Additional verification testing**	**Conclusions and Areas Requiring Improvement (including *Forward Action Requests*)**
Applied formulae Miscalculation Mistakes in spread-sheet calculation	Advanced calculation and reporting tools A CDM coordinator is in charge of the CDM related calculations Usage of tested / counterchecked Excel spreadsheets Involvement of external consultants	The danger of miscal-culation can only be minimized.	Countercheck on the basis of own calculation. Spread sheet walk-trough. Plausibility checks Check of plots	**See Table A-2**
Monitoring reporting				
Data transfer to the author of the monitoring report Data transfer to the monitoring report Unintended use of outdated versions	An experienced CDM consultant is responsible for monitoring reporting. CDM QMS procedures are defined	The danger of data transfer mistakes can only be minimized Inappropriate application of QMS procedures	Counter check with evidences provided. Audit of procedure application	**See Table A-2**

Table A-2: (Project specific) Periodic Verification Checklist

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
Description of the project activity				
Purpose and general description of the project activity *Check if the MR includes the following:* *Purpose of the PA and the measures taken to reduce GHG emissions* *Brief description of the installed technology and equipment* *Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc.)* *Total emission reductions achieved in this monitoring period*	/MR/	The verification team has checked the MR and confirms that the information provided is complete and correct with regards to the following: ☒ Purpose of the PA and the measures taken to reduce GHG emissions ☒ Brief description of the installed technology and equipment ☒ Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc ☒ Total emission reductions achieved in this monitoring period In this context refer to CAR A1 raised	~~CAR A.1~~	OK
Location of project activity *Check if the MR reflects correctly the following:* *Host Party(ies)* *Region / State / Province etc.* *City / Town / Community etc.* *Physical / geographical location (e.g. Latitude and Longitude)*	/MR/ /GSPDD-GSPDD2/ /IM01/	The verification team has checked the MR and confirms by means of comparison with the information given in the revised GSPDD version 2.1 and information gathered during the site visit that the information provided is complete and correct with regards to the following: ☒ Host Party(ies) ☒ Region / State / Province ☒ City / Town / Community ☒ Physical / Geographical location In this context no findings have been identified.	OK	OK
Parties and Project Participants *Check if the MR includes all PPs:* *All PPs as displayed on the GS website*	/MR/ /GSPDD-GSPDD2/ /GSDDR/	The verification team has checked the MR as well as the GS website and confirms that: ☒ all PPs as displayed on the project related GS website are correctly listed	OK	OK
Reference of applied methodology	/MR/	The verification team has checked the MR and confirms by	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
Check if the MR correctly describes / includes the following: *Reference to the applicable version of the methodology* *Reference to the applicable version(s) of relevant methodological tools*	/GSPDD-GSPDD2 / /gs/	means of comparison with the information given in the revised GSPDD and displayed on the GS website that the information provided is complete and correct with regards to the following: ☒ Number, title and version of the applicable GSF Methodology ☒ Name and version of applicable GSF methodological tools In this context no findings have been identified.		
Crediting period of project activity *Check if the MR correctly includes the following:* *Start date of the crediting period.* *Length and type of the crediting period*	/MR/	The verification team has checked the MR and confirms by means of comparison with the information displayed on the GS website that the information provided is complete and correct with regards to the following: ☒ Start date of the crediting period. ☒ Type and length of the crediting period In this context no findings have been identified.	OK	OK
Publication of the Verification Work Plan and monitoring report		The verification work plan has been uploaded to the Registry on 2019-03-15	OK	OK
Implementation of project activity				
Description of implemented registered project activity *Check if the MR correctly describes / includes the following:* *Implementation status of the PA* *Detailed description of installed technology(ies) / technical processes and equipment applied*	/MR/ /GSPDD-GSPDD2 / /RGSP/ /IM01/	The verification team has checked the MR and confirms by means of comparison with the information given in the revised GSPDD and revised GS Passport, the project standard and information gathered during the site visit that: ☒ the description of the implementation status of the PA is in line with the applicable provisions of the Gold Standard Requirements and Toolkit ☒ an appropriate description of the installed technology(ies), technical process and equipment has been included In this context no findings have been identified:	~~OK~~	OK
Initial project implementation	/MR/	The verification team has checked the implemented project	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
Assess whether the project has been implemented and operated as per the registered GSPDD and are all physical features of the project in place? *Further focus on the potential phase wise implementation and check the reporting on the corresponding status and starting dates accordingly.* *Check if the project is still in compliance with the applicability conditions of the methodology.*	/GSPDD-GSPDD2/ /RGSP/ /GSM /IM01/	activity and the MR and confirms by means of comparison with the information given in the GSPDD, the applicable Gold Standard Requirements and Toolkit and information gathered during the site visit that: ☒ the project has been implemented and operated as per the revised GSPDD and revised GS Passport and all physical features of the project are in place ☒ the project has been implemented phase wise and corresponding evidence has been provided ☒ the project is still in compliance with the applied methodology In this context no findings have been identified.		
Technical equipment changes *Check if relevant technical equipment of the project activity has been exchanged or modified during the monitoring period. Further ensure that consistent notations of key equipment (meters etc.) in GSPDD, MR and calculation spreadsheet are applied.* *Consider e.g. interviews with operational personnel, QMS records, maintenance records, instrument specifications.* *In case of changes, check whether the project is still in line with the registered GSPDD and assure that these changes have been considered in the monitoring report and the emission reduction calculation.*	/MR/ /GSPDD-GSPDD2/ /ER1/ /IM01/	The verification team has checked the implemented project activity and the MR and confirms by means of comparison with the information given in the revised GSPDD, the applicable Gold Standard Requirements and Toolkit and information gathered during the site visit and interviews that: ☒ no technical equipment has been exchanged or modified during the monitoring period ☒ the notations of key equipment are consistently applied in the project documentation In this context no findings have been identified.	OK	OK
Operation of the project activity *Check if relevant operation modes of the project activity have been exchanged or modified during the monitoring period.* *Consider e.g. interviews with operational personnel, operation log sheets, data management system records.*	/MR/ /IM01/ /GSPDD-GSPDD2/	The verification team has checked the implemented project activity and the MR and confirms by means of comparison with the information given in the revised GSPDD, the applicable Gold Standard Requirements and Toolkit and information gathered during the site visit and interviews that: ☒ no relevant operation modes of the project activity	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
In case of changes, check whether the project is still in line with the registered GSPDD and assure that these changes have been considered in the monitoring report and the emission reduction calculation.		have been exchanged or modified during the monitoring period ☐ the following changes have been adopted during the monitoring period, however the project is still in line with the registered GSPDD:		
Incidents *Identify if there have been any significant incidents, deviant operation modes and / or downtimes of the equipment?* *Consider e.g. interviews with operational personnel, operational log sheets, analysis of performance data.*	/IM01/ /onsite/	The verification team has checked the implemented project activity and the MR and confirms by means of comparison with the information given in the GSPDD, the applicable Gold Standard Requirements and Toolkit and information gathered during the site visit and interviews that: ☒ no significant incidents, deviant operation modes and / or downtimes of the equipment happened during the monitoring period ☐ the following incidents, deviant operation modes and / or downtimes of the equipment happened during the monitoring period:	OK	OK
Legislation Find out – esp. in the context of methodological requirements - whether relevant legislation with effect on the project activity in the host country has been changed. Assess, in case of changes, whether consequences for the PA with regard to relevant GS requirements have been accounted for. In case of changes data sources shall be referenced.	/MR/ /ER1/ /IM01/	The verification team has checked the host country legislation and confirms by means of comparison with the implemented project that: ☒ no relevant legislation with effect on the project activity in the host country has been changed In this context no findings have been identified.	OK	OK
Open issues from GS validation *Check (esp. in case of 1st periodic verification) whether there are any open issues indicated in the validation report (e.g. FAR)?*	/GSVAL/	☒ There were no open issues addressed in the validation report ☐ All open issues from the validation have been appropriately addressed. ☐ The following issues related to the validation have not yet been appropriately addressed:	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
Open issues from previous verification *Check in case of further periodic verifications whether there are any open issues indicated in previous verification reports (FAR).*	/VER/	☒ There were no open issues addressed in the previous verification report ☐ All open issues from the previous verification have been appropriately addressed. ☐ The following issues related to the previous verification have not yet been appropriately addressed:	OK	OK
Description of monitoring system				
Monitoring Plan – GS-PDD and GS Passport Compliance *Check if the monitoring plan is in accordance with the monitoring plan contained in the registered GS GSPDD (or any accepted revised MP).* *Please check esp. if* *all parameters stated in the MP of the registered GSPDD have been monitored and updated as applicable* *the monitoring equipment has been controlled and calibrated as per the MP* *the monitoring results are consistently recorded as per the approved frequency* *QA/QC procedures have been applied in accordance with the MP*	/MR/ /GSPDD-GSPDD2/ /RGSP/	By means of comparison of the MR with the revised GSPDD (or any revisions thereof) the verification team has checked whether the MP is in compliance with the revised GSPDD and revised GS Passport. The outcome is as follows: ☒ The MP is completely in accordance with the last registered/approved version of the GSPDD / MP / GS Passport. In this context the below finding is raised. Refer CAR B-2.	~~CAR B-1~~	OK
Monitoring Plan – Meth Compliance *Check if the monitoring plan is in accordance with the applied methodology.* *In case the methodology references applicable tools it has to be ensured that the MP is also compliant with those tools.* *Also please specify if monitoring aspects have been identified that are not specified in the methodology but*	/MR/ /GSPDD-GSPDD2/ /GST/ /AT/ /PLEAD/	By means of comparison of the MR with the applied Gold Standard methodology and related tools the verification team has checked whether the MP is in compliance with the MP related requirements of the applied methodology. The outcome is as follows: ☒ The MP is completely in accordance with the applied methodology by the GS project (last registered/approved version of the GSPDD)	OK	OK

<table>
<tr><th>Checklist Item
(incl. guidance for the verification team)</th><th>Refe-rence</th><th>Verification Team Comments
(Means and results of assessment)</th><th>Draft Concl.</th><th>Final Concl.</th></tr>
<tr><td>may encance the level of accuracy and completeness of the monitoring plan – this esp. applies for SSC PAs.</td><td></td><td>☒ The MP is completely in accordance with the applied tools which the methodology references. A breakdown of the referenced tools is as follows:
<table>
<tr><td>1</td><td>Title (of the tool)</td><td>Gold Standard Toolkit</td></tr>
<tr><td></td><td>Version</td><td>2.1</td></tr>
<tr><td></td><td>MP compliance</td><td>☒ full compliance
☐ findings have been raised
☐ N/A (for MP)</td></tr>
<tr><td>2</td><td>Title (of the tool)</td><td>Tool for the demonstration and assessment of additionality</td></tr>
<tr><td></td><td>Version</td><td>6.1</td></tr>
<tr><td></td><td>MP compliance</td><td>☐ full compliance
☐ findings have been raised
☒ N/A (for MP)</td></tr>
<tr><td>3</td><td>Title (of the tool)</td><td>Tool Project and leakage emissions from anaerobic digesters</td></tr>
<tr><td></td><td>Version</td><td>01.0.0</td></tr>
<tr><td></td><td>MP compliance</td><td>☒ full compliance
☐ findings have been raised
☐ N/A (for MP)</td></tr>
</table>
In this context no findings have been identified.</td><td></td><td></td></tr>
<tr><td>Management System
Check if the GHG data monitoring system can be assessed as appropriate.
In case reference is made to a (certified) company quality management system, check if all GHG related monitoring procedures have been fully integrated in the</td><td>/MR/
/RGSP/
/GSPDD-GSPDD2/
/ER1/</td><td>Description:
A third party independent consultant has been hired to conduct the monitoring of carbon parameters and Gold Standard sustainability indicators for the national biodigesters programme.
The project activity has a project database managed at the</td><td>OK</td><td>OK</td></tr>
</table>

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
project participant's quality management system. *In case of a stand-alone system, check how the GHG management system has been implemented and effectiveness is ensured.*	/S2/	NBP central office in Phnom Penh. The organization chart for the monitoring activities includes carbon and usage survey consultants. CMS Survey (Carbon and SD monitoring), KPT (BFT and PFT) by consultants and NBP for Usage Survey. *Verifier´s action:* The project database, survey procedures and forms have been reviewed by the verification team. *Conclusion:* The management system was set up as a stand-alone system and exclusively for the NBP. The system has been implemented effectively.		
Roles and Responsibilities *Check if all roles and positions of each person in the GHG data management process are clearly defined and implemented as stated in the monitoring plan. Please consider the complete data trail from raw data generation to submission of the final data.* *In case of changes, assure that the implemented monitoring procedures have not been affected.*	/MR/ /RGSP/ /ER1/ /S2/	*Description:* The project activity has a project database managed at the NBP central office in Phnom Penh. The organization chart for the monitoring activities includes carbon and usage survey consultants. CMS Survey (Carbon and SD monitoring), KPT (BFT and PFT) by consultants and NBP for Usage Survey. *Verifier´s action:* The project database, survey procedures and forms have been reviewed by the verification team. *Conclusion:* All the survey procedures and forms have been checked and used without any change so far up to the end of the current monitoring period.	OK	OK
Emergency procedures for the monitoring system *Check, as appropriate, whether relevant emergency procedures for the monitoring system have been included in the MR and assess whether these*	/MR/ /IM01/	*Description:* The computer server in the office has the primary back-up data stored and an external back-up kept by the project coordinator that will be used in the event of an emergency. *Verifier´s action:*	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification** Team **Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
procedures have been implemented, when required		During the on-site visit, the verification team has checked the server to confirm the primary data and records stored are the data from MPI to MPVi of CPII. The stored data are password protected and only authorized person could access. The database manager was interviewed to confirm how the data is applied in emergency case. *Conclusion:* By means of onsite assessment and checking the stored data, it can be concluded emergency respond plan is in place.		
Data archive and data protection *Check whether all records of monitoring parameters are archived according to the monitoring plan.* *Assess further whether appropriate measures have been taken in order to avoid unintended or intended manipulation or loss of the measured data.*	/MR/ /GSPDD-GSPDD2/ /IM01/	*Description:* Chapter 6 of the monitoring report also described how the data is archived and backed up. *Verifier´s action:* The data was kept in a project database which is hosted in a NBP central office in Phnom Penh. The data was backed up daily onto hard disk media and at a separate location at IT and database Management officer's house. Such back-up data shall be used as data for monitoring purpose in case the project database was down. During the on-site visit, the verification team has conducted interview and reviewed the records archiving method and procedures for the monitored parameters stated in MR and revised GSPDD. Two persons were authorized to access the database key-in interface and only the administrator is authorized to edit the saved database. Furthermore, the data stored at the server is password protected and only authorized personnel can access. *Conclusion:* By means of onsite assessment and checking the stored data, it can be concluded data archiving and protection is in place	OK	OK

Checklist (incl. guidance for the verification team) **Item**	**Refe-rence**	**Verification** (Means and results of assessment) **Team** **Comments**	**Draft Concl.**	**Final Concl.**
		and has been properly implemented.		
Data and parameters				
Data and Parameters fixed ex ante and ex post				
Compliance with registered GSPDD and the applied methodology (ex ante) *Check whether the value applied is in compliance with the registered GSPDD and the applied methodology or any other tool.*	/MR/ /GSPDD-GSPDD2 / /GSM/	By means of comparison of the MR with the revised GSPDD (or any revisions thereof) the verification team confirms that: ☒ all ex ante data and parameters are in compliance with the revised GSPDD and the applied methodology or any other tool. In this context no findings have been identified.	OK	OK
Compliance with registered GSPDD and the applied methodology (ex post) *Check whether the value applied is in compliance with the registered GSPDD and the applied methodology or any other tool.*	/MR/ /GSPDD-GSPDD2 / /GSM/	By means of comparison of the MR with the registered GSPDD (or any revisions thereof) the verification team confirms that: ☒ all ex post and parameters are in compliance with the revised GSPDD and the applied methodology or any other tool. In this context no findings have been identified.	OK	OK
Data and Parameters monitored for ER				
$P_{p,y}$		**Quantity of fuel that is consumed in the project scenario in year y**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *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 and the applied methodology.*	/MR/ /ER1/ /GSPDD-GSPDD2 / /GSM/ /ER1/	*Description:* According to the revised GSPDD and applied methodology, this parameter data will be at least every 2 years. The most recent survey was conducted in January to March 2018. The data applied for this monitoring period is based on surveyed data conducted in January to March 2018. Based on the results of KPT (PFT) survey, LPG, firewood and charcoal in wood equivalent are consumed in the project scenario. The average per household quantity of LPG, firewood and charcoal in wood equivalent are consistent with the surveyed data.	~~CAR C-3~~	OK

<table>
<tr><th>Checklist
(incl. guidance for the verification team)</th><th>Item</th><th>Refe-rence</th><th>Verification
(Means and results of assessment)</th><th>Team</th><th>Comments</th><th>Draft Concl.</th><th>Final Concl.</th></tr>
<tr><td></td><td></td><td></td><td><table><tr><th>Fuel</th><th>Kg/y/hh</th></tr><tr><td>LPG</td><td>18.77</td></tr><tr><td>Charcoal in wood equivalent</td><td>10.353</td></tr><tr><td>Firewood</td><td>72.491</td></tr></table>The data was used in calculating the project emission from fuel use in the project scenario.
Verifier´s action:
The data stated in the MR was cross-checked with the surveyed results and the value applied are inconsistent with the data from the ER spreadsheet.
Conclusion:
The data applied for this monitoring period is inconsistent with the (KPT (PFT) survey conducted in January to March 2018.
Reer CAR C-3 raised</td><td></td><td></td><td></td></tr>
<tr><td>b) Accuracy and QA/QC Procedure
In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.
Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.</td><td></td><td>/MR/
/GSPDD-GSPDD2/
/ER1/
/S2/
/OM1/
/IM01/
/IM02/</td><td>Description:
The data applied was based on the consolidated survey results conducted from Jan to Mar 2018 and compliance with the applied methodology.
Verifier´s action:
The data applied was cross-checked with survey results conducted in Jan to Mar 2018 and found to be inconsistent.
QA/QC procedures are in place and implemented appropriately.
Conclusion:
It can be concluded, the data applied is inconsistent with surveyed results.
Refer CAR C-3 raised</td><td></td><td></td><td>~~CAR C-3~~</td><td>OK</td></tr>
<tr><td>c) Correctness
Determine whether the value given in the sustainability monitoring report is correct or determined in a</td><td></td><td>/MR/
/GSPDD/
GSPDD2</td><td>☒ Correct ☐ Not correct (initial assessment)
Description:</td><td></td><td></td><td>~~CAR C-3~~</td><td>OK</td></tr>
</table>

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
conservative manner. *In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/ /ER1/	The data applied as based on the survey database calculation conducted on Jan to Mar 2018 *Verifier´s action:* The data applied was cross-checked against the database survey results conducted on Jan to Mar 2018 and found inconsistent. *Conclusion:* The data applied is inconsistent.		
f_{NRB}		**Fraction of Non-Renewable Biomass**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *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 and the applied methodology.*	/MR/ /GSPDD-GSPDD2 / /ER1/ /IM02/ /NRB/	*Description:* The value reported in the MP was 77% based on the EB77 report. The data is used in calculating the portion of project CO_2 emission from the biomass fuel consumption in the project scenario (for firewood in this case). *Verifier´s action:* The value applied was cross-checked with EB 77 report referring to SSCWG43 information note on the default value for Cambodia. *Conclusion:* The parameter is monitored in accordance with the revised GSPDD	OK	OK
b) Accuracy and QA/QC Procedure *In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.* *Describe whether all applicable QA/QC procedures are*	/MR/ /GSPDD-GSPDD2 / /EB77/ /NRB/ /ER1/ /OM1/	*Description:* A value of 77% applied is a default value and not measured. Therefore inaccuracy is low. *Verifier´s action:* Since default value has been applied, no measurement method is involved. QA/QC procedure implemented. *Conclusion:* The data applied is consistent with EB 77 report and WG43	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.		information note.		
c) Correctness *Determine whether the value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /ER1/ /EB77/ /NRB/	☒ Correct ☐ Not correct (initial assessment) *Description:* The value applied is a default data from EB77 report with reference to WG43. *Verifier´s action:* A value of 77% was reported and applied in the MR. *Conclusion:* The value of 77% applied is based on the default value for host country according to EB77 report and WG43 information note.	OK	OK
$U_{p,y}$		**Percentage of bio-digesters in use in monitoring period y**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *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 and the applied methodology.*	/MR/ /GSPDD-GSPDD2/ /ER1/ /S2/ /IM02/ /IM03/	*Description:* The rate of bio-digesters in use in the monitoring period was incorrect. The data was consolidated from the usage survey results, conducted by a third party independent consultant. The data is used to calculate the emission reductions per unit per month. *Verifier´s action:* The data has been checked against the survey results and ER worksheet. *Conclusion:* The usage survey was conducted in accordance with the revised GSPDD. Refer CAR C-2 and CAR C-3 raised	~~CAR C-2~~ ~~CAR C-3~~	OK
b) Accuracy and QA/QC Procedure *In case of measured (or estimated) values, check*	/MR/ /GSPDD-	*Description:* The data was consolidated from the survey results and no	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs. *Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.*	GSPDD2 / /ER1/ /S2/ /OM1/ /T1/	equipment was involved in monitoring. *Verifier´s action:* The data is applied in ER calculations is crosschecked with the survey results. QA/QC procedures are in place and implemented appropriately. *Conclusion:* The parameter is monitored in accordance to the revised GSPDD.		
c) Correctness *Determine whether the value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /GSPDD-GSPDD2 / /S2/ /ER1/	☐ Correct ☒ Not correct (initial assessment) *Description:* The data is calculated with the usage survey results. *Verifier´s action:* The data has been checked against the usage survey records and ER worksheet. *Conclusion:* Inconsistency were found. Refer CAR C-2 and CAR C-3 raised	~~CAR C-2~~ ~~CAR C-3~~	OK
$LE_{p,y}$		**Leakage emission in project scenario during year y**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *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 and*	/MR/ /GSPDD-GSPDD2 / /ER1/ /S2/ /IM02/ /IM03/	*Description:* The total leakage emission includes the leakage from the bio-digesters and incomplete combustion of the stoves.	OK	OK

Emission source	**kg CH_4/hh/y**	**tCO_2e/hh/y**
Physical leakage	4.199	0.105
Incomplete combustion	0.023	0.001
Sum	**4.221**	**0.106**

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
the applied methodology.		The value applied in the calculations are derived from the Carbon Monitoring Survey (CMS) results. *Verifier´s action:* The data applied in the ER spreadsheet and MR are crossed checked with the CMS results. *Conclusion:* The parameter is monitored according to the revised GSPDD.		
b) Accuracy and QA/QC Procedure *In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.* *Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.*	/MR/ /GSPDD-GSPDD2/ /ER1/ /S2/ /OM1/ /OM2/	*Description:* The value is derived based on data from the Carbon Monitoring Survey (CMS) and no monitoring equipment required. *Verifier´s action:* The data applied in the calculation is crosschecked with survey results QA/QC procedures are in place and implemented appropriately. *Conclusion:* The parameter is monitored in accordance to the revised GSPDD.	OK	OK
c) Correctness *Determine whether the value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /GSPDD-GSPDD2/ /ER1/ /S1/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data has been calculated from the CMS survey database. *Verifier´s action:* The data has been checked against the survey results. *Conclusion:* The final value applied in the MR is correct.	OK	OK
$N_{p,y}$		**Number of biogas plants commissioned**		
a) Measurement / Determination method	/MR/	*Description:*	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
Describe how the monitoring parameter was measured / determined. *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 and the applied methodology.*	/GSPDD-GSPDD2 / /ER1/ /IM01/ /IM02/	The total number of biogas plants commissioned reported in the monitoring period is 27,231 units based on the NBP database. The newly commissioned units for this monitoring period were 646 units *Verifier´s action:* The verification team has checked NBP database, quality control procedures for data handling and the ER worksheet. The number of biogas commissioned is reported by the BCCs and keyed into the NBP database at the central NBP office in Phnom Penh. *Conclusion:* The parameter is monitored in accordance to the revised GSPDD.		
b) Accuracy and QA/QC Procedure *In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.* *Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.*	/MR/ /GSPDD-GSPDD2 / /ER1/ /OM1/	*Description:* The data was based on the NBP database. *Verifier´s action:* The verification team had checked NBP database and quality control procedures for data handling. QA/QC procedures are in place and implemented appropriately. *Conclusion:* The parameter is monitored according to the revised GSPDD.	OK	OK
c) Correctness *Determine whether the value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the*	/MR/ /GSPDD-GSPDD2 / /ER1/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data has been calculated from the NBP database. *Verifier´s action:*	OK	OK

<table>
<tr><th>Checklist Item
(incl. guidance for the verification team)</th><th>Refe-rence</th><th>Verification Team Comments
(Means and results of assessment)</th><th>Draft Concl.</th><th>Final Concl.</th></tr>
<tr><td>monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.
In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</td><td></td><td>The data has been checked against the NBP database at the NBP central office in Phnom Penh.
Conclusion:
The final value applied in the MR is consistent with the value stated in the ER worksheet.</td><td></td><td></td></tr>
<tr><td>MS_(P,s,k)</td><td></td><td>Fraction of livestock category T’s manure fed in the biodigester and other MS</td><td></td><td></td></tr>
<tr><td>a) Measurement / Determination method
Describe how the monitoring parameter was measured / determined.
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 and the applied methodology.</td><td>/MR/
/GSPDD-GSPDD2
/
/ER1/
/IM02/
/S2/</td><td>Description:
The fraction of manure fed in the biodigester for respective animal category as follows:
<table><tr><th>Animal</th><th>Biodigester</th><th>Slurry system</th><th>Anaerobic lagoon</th><th>Dry lot</th><th>Daily spread</th><th>Solid storage</th><th>Other</th><th>Pasture</th></tr><tr><td>Cow</td><td>56.48%</td><td>0.28 %</td><td>0.00%</td><td>0.44 %</td><td>0.66%</td><td>13.56%</td><td>3.51 %</td><td>25.08 %</td></tr><tr><td>Pig</td><td>46.22%</td><td>3.42 %</td><td>11.14%</td><td>2.23 %</td><td>1.59%</td><td>26.40%</td><td>8.92 %</td><td>0.09%</td></tr><tr><td>Buffalo</td><td>52.67%</td><td>0.00 %</td><td>0.00%</td><td>0.37 %</td><td>0.30%</td><td>10.67%</td><td>4.36 %</td><td>31.64 %</td></tr></table>The data was derived from the CMS results conducted by a third party independent consultant.
Verifier´s action:
The data applied in the calculations is crosschecked with the CMS results.
The source for the data is incorrectly referred.
Conclusion:
The CMS was conducted in accordance with the revised GSPDD.
Refer CAR C-3 raised</td><td>~~CAR C-3~~</td><td>OK</td></tr>
<tr><td>b) Accuracy and QA/QC Procedure
In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring</td><td>/MR/
/GSPDD-GSPDD2</td><td>Description:
The data was consolidated from the CMS survey results.
There is no measurements required. The data is derived from</td><td>OK</td><td>OK</td></tr>
</table>

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs. *Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.*	/ /ER1/ /S1/ /O3/	the CMS survey and calculated. *Verifier´s action:* The verification team had checked the CMS survey sheet and crosschecked for correctness. QA/QC procedures are in place and implemented appropriately *Conclusion:* The parameter is monitored according to the revised GSPDD.		
c) Correctness *Determine whether the value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /GSPDD-GSPDD2 / /ER1/ /S1/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data has been calculated from the CMS survey database. *Verifier´s action:* The data has been checked against the survey forms records to confirm that the data is correctly consolidated. *Conclusion:* The final value applied in the MR is correct.	OK	OK
$N_{(T)}$		**Number of animals of livestock category T**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *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 and the applied methodology.*	/MR/ /GSPDD-GSPDD2 / /ER1/ /IM02/ /S1/	*Description:* The number of animals of livestock category T as follows: **Category T** | **LC_T** Cow | 4.988 Pig | 2.465 Buffalo | 0.685 The data was derived from the CMS database conducted by a third party independent consultant. *Verifier´s action:* The verification team had checked the CMS database and	OK	

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
		data applied in the calculation. *Conclusion:* The CMS was conducted in accordance with the revised GSPDD.		
b) Accuracy and QA/QC Procedure *In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.* *Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.*	/MR/ /GSPDD/ GSPDD2 / /ER1/ /S1/ /OM1/	*Description:* The data was consolidated from the CMS survey results and no equipment was involved in monitoring. *Verifier´s action:* The verification team had checked the CMS survey sheet and crosschecked for correctness QA/QC procedures are in place and implemented appropriately *Conclusion:* Data was collected as per section B.7.2 of the revised GSPDD and the prescribed sampling plan	OK	OK
c) Correctness *Determine whether the value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /GSPDD- GSPDD2 / /ER1/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data has been calculated from the CMS survey database. *Verifier´s action:* The data has been checked against the survey results to confirm that the data is correctly consolidated. *Conclusion:* The final value applied in the MR is correct.	OK	OK
PL		**Physical leakage of the bio-digester**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Check if relevant equipment has been exchanged and if*	/MR/ /GSPDD- GSPDD2 /	*Description:* A default value of 10% has been applied in the MR for the current monitoring period. The default value was based the applied methodology	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
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 and the applied methodology.*	/ER1/ /GSM/ /IM02/	"Technologies and practices to displace decentralized thermal energy consumption", version 2.0 0. *Verifier´s action:* The verification team had checked and compared with the applied methodology. *Conclusion:* Default value applied is correct.		
b) Accuracy and QA/QC Procedure *In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.* *Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.*	/MR/ /GSPDD-GSPDD2/ /ER1/ /GSM/ /IPCC/	*Description:* A default value of 10% has been applied. *Verifier´s action:* A default value of 10% has been applied. *Conclusion:* A default value of 10% has been applied.	OK	OK
c) Correctness *Determine whether the value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /GSPDD-GSPDD2/ /ER1/ /GSM/	☒ Correct ☐ Not correct (initial assessment) *Description:* A default value of 10% has been applied. *Verifier´s action:* A default value of 10% has been applied. *Conclusion:* A default value of 10% has been applied.	OK	OK
$EF_{awms,T}$		**Animal waste methane emission factor by average temperatures**		

<table>
<tr><th>Checklist Item
(incl. guidance for the verification team)</th><th>Refe-rence</th><th>Verification Team Comments
(Means and results of assessment)</th><th>Draft Concl.</th><th>Final Concl.</th></tr>
<tr><td>a) Measurement / Determination method
Describe how the monitoring parameter was measured / determined.
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 and the applied methodology.</td><td>/MR/
/GSPDD-GSPDD2/
/ER1/
/IM02/
/S2/</td><td>Description:
The emission factor of animals of livestock category T as follows:<table><tr><th>Category T</th><th>EF (kgCH4/head/year)</th></tr><tr><td>Cow</td><td>3.990</td></tr><tr><td>Pig</td><td>7.241</td></tr><tr><td>Buffalo</td><td>6.187</td></tr></table>The data is calculated using input from the CMS survey conducted by a third party independent consultant and default values.
Verifier´s action:
The verification team has checked CMS survey report and crosscheck with the data applied in ER spreadsheet for correctness.
The default value applied is verified.
Conclusion:
The parameter is monitored according to the revised GSPDD.</td><td>OK</td><td>OK</td></tr>
<tr><td>b) Accuracy and QA/QC Procedure
In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.
Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.</td><td>/MR/
/GSPDD-GSPDD2/
/ER1/
/S2/
/OM1/</td><td>Description:
The data was calculated using default data and data from CMS survey results and no equipment was involved in the monitoring.
Verifier´s action:
The verification team has checked CMS survey report and crosscheck with the data applied in ER spreadsheet for correctness.
The default value applied is verified
QA/QC procedures are in place and implemented appropriately
Conclusion:</td><td>OK</td><td>OK</td></tr>
</table>

Checklist (incl. guidance for the verification team) **Item**	**Refe-rence**	**Verification** (Means and results of assessment) **Team Comments**	**Draft Concl.**	**Final Concl.**
		The parameter is monitored according to the revised GSPDD.		
c) Correctness *Determine whether the value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /GSPDD-GSPDD2 / /ER1/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data has been calculated from the CMS survey database. *Verifier´s action:* The data has been checked against the survey results and default value applied correctly. *Conclusion:* The final value applied in the MR is correct.	OK	OK
Bio-slurry		**MS of the end-use systems of bio-slurry**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *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 and the applied methodology.*	/MR/ /GSPDD-GSPDD2 / /ER1/ /S1/ /IM02/ /IM01/ /LHH/	*Description:* During this monitoring period, 20,230 households use bio-slurry for their farming and/or gardening activities. For details refer table 45 of MR applied to calculate the number of households used bio-slurry. SD indicator No. 3 – Soil condition, chosen parameter is the cumulative number of households that use bio-slurry as fertilizer. The CMS results show the number of households that use bio-slurry was 20,230 at the end of current monitoring period. The PP has calculated the emissions from the use of bio-slurry to check if it is below 1% of the total emission reduction per household per year. For this monitoring period, the emission from the bio-slurry is 0.084 $tCO_2e/y/hh$. The emission source from the use of bio-slurry was not covered by the applied methodology. Therefore, the PP has calculated the project emission from the end-use of bio-slurry (digestate) to account for the project emission in case the bio-slurry was handled aerobically. The value was 0.084	OK	OK

Checklist (incl. guidance for the verification team) **Item**	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
		tCO_2e/y/hh which is lower than the emission reductions per household per year period (5.154 tCO_2e/hh/y) in the current monitoring period. Tab Bio-slurry of the excel worksheet has been checked, the data and calculations could be confirmed as correct. Therefore, this emission source can be considered as negligible and can be excluded from the ER assessment for this monitoring period. However, for conservativeness, the PP has included as project emissions. *Verifier´s action:* The verification team had checked and compared with the applied methodology. *Conclusion:* The survey was conducted in accordance with the registered GSPDD. The emission from this source is below 1% of the emission reductions per household per year.		
b) Accuracy and QA/QC Procedure *In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.* *Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.*	/MR/ /ER1/ /S1/ /OM1/	*Description:* The data was consolidated from the CMS survey results and no equipment was involved in monitoring. The quality control procedures are performed with regards to the plant in operation and under construction by masons and BCCs, after commissioning services, household training and avoidance of double counting of the emission reductions. *Verifier´s action:* The verification team had checked the quality control procedures of the programme. QA/QC procedures are in place and implemented appropriately. *Conclusion:* The parameter is monitored according to the registered	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification** Team **Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
		GSPDD.		
c) Correctness *Determine whether the value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /GSPDD-GSPDD2/ /ER1/ /S2/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data has been calculated from the CMS survey database. *Verifier´s action:* The data has been checked against the survey forms records to confirm that the data is correctly consolidated. *Conclusion:* The final value applied in the MR is correct.	OK	OK
W(site)		**Average pig weight at the project site by pig type (sow, boar, fattening pig and piglet (kg)**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *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 and the applied methodology.*	/MR/ /GSPDD-GSPDD2/ /ER1/	*Description:* This parameter monitored the average pig weight at the project site by pig type in kg. The parameter is measured and calculated. The hearth girth and length of the pig type is measured in meters. The measured hearth girth and length is then applied to the below equation to determine the expected weight of the pigs. Pig weight = Hg^2 x L x 69.3 *Verifier´s action:* The verification team had cross-checked the data applied to calculate the pig weight by type in the ER spreadsheet for correctness. *Conclusion:* The weight of the pigs by type is monitored according to the revised GSPDD.	OK	OK
b) Accuracy and QA/QC Procedure *In case of measured (or estimated) values, check*	/MR/ /ER1/	*Description:* The data is measured and calculated using the measured	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification** Team **Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs. *Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out by competent personnel.*	/GSPDD-GSPDD2 / /OM1/	data of the pig hearth girth and length to determine the weight. *Verifier´s action:* The verification team had checked the data in the CMS data sheet of ER spreadsheet are applied correctly to calculate the average weight of the pig type. QA/QC procedures are in place and implemented appropriately. *Conclusion:* The parameter is monitored according to the revised GSPDD.		
c) Correctness *Determine whether the value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /GSPDD-GSPDD2 / /ER1/ /S2/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data has been calculated from the CMS survey data. *Verifier´s action:* The data has been checked against the survey forms records to confirm that the data is correctly consolidated. *Conclusion:* The final value applied in the MR is correct.	OK	OK
Parameters monitored for Sustainability				
No. 1 - Air quality		**Reduction in wood consumption for cooking in the project compared to the baseline**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/MR/ /RGSP/ /ER1/ /S2/ /OM1/ /LHH/	*Description:* The chosen parameter has been revised to remove charcoal from monitoring and approved by GS on 19/10/2015. With the revision the chosen parameter for this indicator is the reduction in wood consumption for cooking in the project compared to the baseline. The reduction of wood consumption reported for this monitoring period was 95%.	OK	OK

Checklist (incl. guidance for the verification team) **Item**	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
		Verifier´s action: The verification team has checked the MR and the survey data in the excel spreadsheet. The verification team has interviewed 116 households. The responses indicate that the use of firewood was low as compared to the baseline scenario. No charcoal fuel was used for cooking. All the respondents said that they only used firewood during special events where they needed to cook more food than usual. *Conclusion:* The survey procedures and forms have been reviewed and could be confirmed as in line with the revised GS Passport.		
b) Correctness and Scoring *Determine whether the monitoring method/value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered passport detailed assessment of the conservativeness of the approach used should be given.* *Score in accordance to Toolkit Annex I* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /RGSP/ /IM02/ /S1/ /LHH/ /ER1/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data is sourced from the Kitchen Performance Test (KPT) survey conducted by an independent consultant. *Verifier´s action:* The KPT data has been reviewed by the verification team, which was then cross checked with the records of onsite interview with the 46 households and telephone interviews for 70 randomly selected households of various districts and provinces *Conclusion:* The data of the survey is correct. *Score:* The verification team concluded on a score of positive impact (+).	OK	OK
No. 2 - Water quality and quantity		**Number of toilets connected to the bio-digester**		
a) Measurement / Determination method	/MR/	*Description:*	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
Describe how the monitoring parameter was measured / determined. *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/RGSP/ /ER1/ /IM02/ /S2/ /LHH/	The number of toilets connected reported in the MR was 3,028 toilets and increase of 5 units for this monitoring period. *Verifier´s action:* The database has been checked by the verification team. The database management officer was interviewed. The details of the toilet connected to the bio-digesters was entered into the database basing on the information reported by the PBPO every toilet is constructed and connected to the bio-digester system. The verification team has checked the visited and interviewed households during the onsite with 3 household toilets are connected. *Conclusion:* The project database and data management procedure could be confirmed as correct and in accordance with the revised GS Passport.		
b) Correctness and Scoring *Determine whether the monitoring method/value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered passport detailed assessment of the conservativeness of the approach used should be given.* *Score in accordance to Toolkit Annex I* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /RGSP/ /ER1/ /IM02/ /S2/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data on toilet connection is keyed directly into the project database by a database management officer. *Verifier´s action:* The project database was checked and the data management officer was interviewed on the data handling procedure. *Conclusion:* The data of the survey is correct. *Score* The number of toilets connected to the bio-digester has increased as compared to the baseline scenario was zero. The score for this parameter is positive (+).	OK	OK
No. 3 - Soil condition		**Cumulative number of households that use bio-slurry as**		

Checklist (incl. guidance for the verification team) **Item**	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
		fertilizer		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/MR/ /RGSP/ /onsite/ /ER1/ /LHH/	*Description:* The number of households using bio-slurry as 31/12/2018 are 20,230. The data was derived from the Carbon Monitoring Survey (CMS). *Verifier´s action:* The CMS data and procedures have been reviewed which is the same as defined in the revised GS Passport. A cross check was performed against the interview outcomes during the site visit for 116 interviewed and visited households by the verification team. *Conclusion:* The determination method is consistent with the revised GS Passport.	OK	OK
b) Correctness and Scoring *Determine whether the monitoring method/value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered passport detailed assessment of the conservativeness of the approach used should be given.* *Score in accordance to Toolkit Annex I* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /ER1/ /RGSP/ /OM1/	☒ Correct ☐ Not correct (initial assessment) *Description:* The value of the data in the monitoring report was correct as regards to the CMS database. *Verifier´s action:* The CMS database and procedures have been reviewed by the verification team. All the 116 interviewed households used bio slurry for their rice field and other crops having significant savings from buying chemical fertilizers. *Conclusion:* The data of the survey is correct. *Score:* The number of households using bio slurry as fertilizers for their farming activities have increased from the baseline	OK	OK

Checklist (incl. guidance for the verification team) **Item**	**Refe-rence**	**Verification Team** (Means and results of assessment) **Comments**	**Draft Concl.**	**Final Concl.**
		scenario, the score is positive (+).		
No. 4 - Biodiversity		**Cumulative savings of wood**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/MR/ /RGSP/ /ER1/	*Description:* The report cumulative savings for this monitoring period was 27.7 Gg of firewood, totalling 257.3 Gg firewood from the start of project The cumulative savings of fire wood was calculated based on average consumption of fuelwood per household ($FW_{baseline,hh}$) in the baseline minus average consumption of fuelwood in the project is the reduction of fuelwood per average household, multiplied with the number of biodigesters $\mathbf{RE_{fuel} = (\sum FW_{baseline,hh} - \sum FW_{project,hh}) \times N_{biodigester}}$ *Verifier´s action:* The method of calculating such accumulative savings of firewood is assessed as correct and in accordance with the revised GS Passport. The input data was derived from the Carbon Monitoring Survey which has been verified by the verification team. *Conclusion:* The method of determining the accumulative savings of firewood for the current monitoring period could be assessed as correct.	OK	OK
b) Correctness and Scoring *Determine whether the monitoring method/value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered passport detailed assessment of the conservativeness of the approach used should be given.* *Score in accordance to Toolkit Annex I*	/MR/ /RGSP/ /ER1/ /OM1/	☒ Correct ☐ Not correct (initial assessment) *Description:* The value in the monitoring report was calculated based on data from the Carbon Monitoring Survey. *Verifier´s action:* The CMS database and procedures have been reviewed by the verification team. All the 116 randomly interviewed households said that they	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.		have stopped using firewood for cooking unless during festive or special events when large amount of food to be cooked. *Conclusion:* The data of the survey is considered as correct. *Score:* The method of determining the accumulative savings of firewood for the current monitoring period could be assessed as correct. The score for the current monitoring period is positive (+).		
No. 5 - Quality of Employment		**Number of trained masons and supervisors (quality inspectors of bio-digesters)**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/MR/ /RGSP/ /T1/ /ER1/ /IM04/ /IM05/ /IM06/	*Description:* The number of trained masons and supervisors was reported in the MR as at 31/12/2018 was 801 and 154. The monitoring of such number of masons and supervisors was done by means of reporting from the BCC and PBPO to the NBP central office where the data is processed and keyed in the project database *Verifier´s action:* The training procedures were checked and the data handling process was confirmed by the verification team through interviews with the BCCs and PBPOs during the site visit. The project database and masons certificates were reviewed. *Conclusion:* The number of masons and supervisors are correctly determined and reported in the MR.	OK	OK
b) Correctness and Scoring *Determine whether the monitoring method/value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the*	/MR/ /RGSP/ /ER1/ /OM1/ /T1/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data is monitored by means of keeping track of the number of masons and supervisors and keyed in the project	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
monitoring as per registered passport detailed assessment of the conservativeness of the approach used should be given. *Score in accordance to Toolkit Annex I* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*		database. *Verifier´s action:* The database, training procedures and certificates were checked by the verification team. *Conclusion:* The data can be confirmed for correctness. *Score:* The number of certified masons as 31/12/2018 has increased from 799 to 801 and trained supervisors from 149 to 154. The score for the current monitoring period is positive (+).		
No. 6 - Livelihood of the poor		**Parameter 1 – Cumulative number of users that use biogas for cooking** **Parameter 2 - Number of household members that benefit from having an improve waste management system**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/MR/ /RGSP/ /S2/ /IM03/ /IM02/ /LHH/	*Description:* The chosen parameters have been revised as from this monitoring period and approved by GS on 2015-10-19. Refer Section 5.4 above post registration changes for this indicator. Parameter 1: The MR reported 19,943 families use the biogas to cook daily. Parameter 2: The MR reported total of 94,607 households members benefitted. The data was derived from the Carbon Monitoring Survey conducted by a third party independent consultant. *Verifier´s action:* The CMS procedures and database have been reviewed by the verification team and cross checked with the information obtained from the interviews with the 46 households visited and 70 interviewed by telephone.	~~CAR F1~~	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
		Conclusion: The monitoring of this SD indicator is in accordance with the GS Passport.		
b) Correctness and Scoring *Determine whether the monitoring method/value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered passport detailed assessment of the conservativeness of the approach used should be given.* *Score in accordance to Toolkit Annex I* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /RGSP/ /ER1/ /S2/ /LHH/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data was consolidated from the Carbon Monitoring Survey results by a third party independent consultant. *Verifier´s action:* The verification team had confirmed the reported figures by conducting interviews with 116 households. From the interview, it was found all visited and interviewed households used biogas for daily cooking. The number of household members and the number of times of cooking per day was checked. *Conclusion:* The monitoring of this SD indicator is in accordance with the revised GS Passport. *Score:* In the baseline scenario, there is no biogas for cooking and no waste management systems installed, the score for this indicator is positive (+).	OK	OK
No. 7 - Access to affordable and clean energy services		**Total reduction in cooking fuel expenditure compared to the baseline calculated at current prices**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/MR/ /RGSP/ /ER1/ /S2/ /IM03/	*Description:* The chosen parameter has been revised as from this monitoring period and approved by GS on 19/10/2015. The savings for this monitoring period is $13.32 savings per month per hh The data was consolidated from the Carbon Monitoring Survey conducted by an independent consultant.	OK	OK

Checklist (incl. guidance for the verification team) **Item**	**Refe-rence**	**Verification** (Means and results of assessment) **Team** **Comments**	**Draft Concl.**	**Final Concl.**
		The savings is calculated by multiplying the amount of fuel saving with the current prices of the fuel the number of digesters in operation, the share of plants in operation and the total number of plants *Verifier´s action:* The survey database and procedures have been checked and reviewed by the verification team. *Conclusion:* The survey was conducted and data was consolidated in accordance with the revised GS Passport		
b) Correctness and Scoring *Determine whether the monitoring method value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered passport detailed assessment of the conservativeness of the approach used should be given.* *Score in accordance to Toolkit Annex I* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /RGSP/ /ER1/ /S2/ /LHH/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data was consolidated from the Carbon Monitoring Survey conducted by a third party independent consultant. *Verifier´s action:* The data and calculations have been checked by the verification team from the ER excel file submitted by the PP. The results coincide with what was perceived by the verification team during the interviews with 116 randomly selected households. *Conclusion:* The monitoring of this SD indicator is in accordance with the revised GS Passport. *Score:* The total savings as at 31/12/2018 for the current monitoring period is $13.32 per month per HH when compared with savings of $11.96 per month per HH for MRVI. The reduction is mainly due to lower usage rate and lower fuel prices. In the baseline scenario it is zero (0). Hence the score for this parameter is positive (+)	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
No. 8 - Human and institutional capacity		**Cumulative number of established Biogas Construction Companies (BCC)**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/MR/ /RGSP/ /ER1/	*Description:* The total reported number of BCC was 107 of which 53 are currently active for this monitoring period. The data is monitored by keeping track of the number of BCCs established and reported to the NBP central office in Phnom Penh. *Verifier´s action:* The data handling procedure has been checked against the GS Passport. *Conclusion:* The monitoring of this SD indicator is in accordance with the revised GS Passport.	OK	OK
b) Correctness and Scoring *Determine whether the monitoring method value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered passport detailed assessment of the conservativeness of the approach used should be given.* *Score in accordance to Toolkit Annex I* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/MR/ /RGSP/ /IM04/ /IM05/ /IM06/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data was based on the project database, into which the number of BCCs was reported to and keyed in at the NBP central office in Phnom Penh. *Verifier´s action:* The project database was checked. Furthermore, 3 BCCs representatives were interviewed by the verification team to confirm their existence and operational status. *Conclusion:* The monitoring of this SD indicator is in accordance with the revised GS Passport. *Score:* Since the program start up to the current monitoring period has created employment for 107 BCCs of which 53 are still in operation as at 31/12/2018 as compared to the baseline	OK	OK

Checklist (incl. guidance for the verification team) **Item**	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
		scenario is zero (0). In this aspect the score is positive (+).		
No. 9 - Quantitative employment and income generation		**Cumulative number of masons working years**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/MR/ /RGSP/ /ER1/	*Description:* The chosen parameter for this indicator has been revised and approved by GS on 19/10/2015. As per documents presented to the verification team, the total number of man years was 2,550 since the start of the programme until 31/12/2018. The man years is calculated based on the number of digesters built multiplied with the default number of days required for the construction divided by the number of days worked per year at a default of 220 days per year. The mason working days was based on rated working days of both skilled and unskilled masons for different sizes of the biodigesters required. The total mason working days is then calculated based on the total number of biodigesters units constructed and commissioned for the programme *Verifier´s action:* The project database and records on the construction of biodigester units have been checked. *Conclusion:* The total number of mason working days has been correctly determined.	OK	OK
b) Correctness and Scoring *Determine whether the monitoring methodvalue given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the monitoring as per registered passport detailed assessment of the conservativeness of the approach*	/MR/ /RGSP/ /ER1/	☒ Correct ☐ Not correct (initial assessment) *Description:* The data was calculated based on the project database and records by NBP supervisors and staff. *Verifier´s action:* The data was correctly consolidated and calculated from the	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
used should be given. *Score in accordance to Toolkit Annex I* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*		database. The project database and records have been reviewed. *Conclusion:* The monitoring of this SD indicator is in accordance with the GS Passport. The value is correctly calculated. *Score:* The total working man-years as at 31/12/2018 was 2,550 as compared to 31/12/2017 was 2,508 man-years Therefore, the score for this parameter is positive (+).		
No. 10 - Balance of payments and investments		**Net cash inflow: sum of cash inflows – cash outflows. Cash inflow is VER income, foreign direct investment; the cash outflow is the expenditure on materials and equipment not available in Cambodia.**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/MR/ /RGSP/ /SD1/	*Description:* The MR reported the total net cash inflow of US$617,069.72 as of 31/12/2018 for the current monitoring period. The data on the net cash flow statement is consolidated and presented by the project accountant. *Verifier´s action:* The net cash flow statement has been checked by the verification team. *Conclusion:* The net cash flow is determined as per the local accounting practices; the verification team deems that it is calculated appropriately.	OK	OK
b) Correctness and Scoring *Determine whether the monitoring method value given in the sustainability monitoring report is correct or determined in a conservative manner.* *In case of conservative approaches used in lieu of the*	/MR/ /RGSP/ /SD1/	☐ Correct ☒ Not correct (initial assessment) *Description:* The net cash flow has been calculated as per local accounting practices.	~~CAR D-3~~	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
monitoring as per registered passport detailed assessment of the conservativeness of the approach used should be given. *Score in accordance to Toolkit Annex I* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*		*Verifier´s action:* The net cash flow statement has been checked by the verification team. *Conclusion:* The monitoring of this SD indicator is in accordance with the GS Passport. Refer CAR D-3 raised. *Score:* When compared with the previous monitoring period, the net cash flow of the current monitoring period was $546,627.75. The decrease due to reduce in donor funding in addition to lower VERs price and increased in GS fees have cause the funding is lower than the target of USD1 million. The score for this SD indicator is positive (+) even though there is a drop in the cash inflow.		
No. 11 - Technology transfer and technological self-reliance		**Number of biodigesters built**		
a) Measurement / Determination method *Describe how the monitoring parameter was measured / determined.* *Assess whether the measurement / determination method is in line with the registered passport, applied toolkit and GSPDD. .*	/MR/ /RGSP/ /S2/ /ER1/	*Description:* A total number of 27,231 bio-digesters were built and commissioned as of 31/12/2019. The data was based on the project database. The number of bio-digesters built was keep track by the BCCs and PBPO and report NBP central office in Phnom Penh. *Verifier´s action:* The project database has been checked by the verification team. *Conclusion:* The calculation of accumulative number of bio-digesters is in accordance with the revised GS Passport.	OK	OK
b) Correctness and Scoring *Determine whether the monitoring method value given*	/MR/ /RGSP/	☒ Correct ☐ Not correct (initial assessment)	OK	OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
in the sustainability monitoring report is correct or determined in a conservative manner. *In case of conservative approaches used in lieu of the monitoring as per registered passport detailed assessment of the conservativeness of the approach used should be given.* *Score in accordance to Toolkit Annex I* *In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.*	/S2/ /ER1/	*Description:* The data was based on the number of bio-digesters built and commissioned. *Verifier´s action:* The project database has been checked by the verification team. *Conclusion:* The monitoring of this SD indicator is in accordance with the revised GS Passport. *Score:* The number of biodigesters commissioned for this monitoring period were 27,231 units as at 31/12/2018 as compared to 26,585 units as at 31/12/2017 with increase of 646 units. In the baseline scenario, there was no biodigester built, the score for this SD indicator is positive (+).		
Sampling				

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
a) Implementation of sampling plan *Check whether the PP has applied a sampling approach to determine the monitored values (as per section D.2 above).* *If this is the case, please provide an assessment whether the PPs have correctly and sufficiently described the implemented sampling plan including* *Description of the implemented sampling design* *Collected data* *Analysis of collected data* *Demonstration on whether the required confidence/precision has been met.*	/MR/ /ER1/ /RGSP/ /GSPDD-GSPDD2/ /S1/ /S2/ /SSS/ /GSS/	☒ A sampling approach has been taken by the PP due to large number of implemented biodigesters. *Description:* The sampling as described in the MR is based on GS and EB guidelines for following data: Kitchen Performance Tests Carbon Monitoring Survey Usage Survey *Verifier´s action:* The verification team has checked on the sampling plan and considered appropriate. An addition of 10% has been included to ensure the level of assurance and the number of households is representative. The data collected were reviewed and cross checked during the onsite field inspection on the selected households to confirm the correctness. *Conclusion:* The sampling plan applied by the PP is incompliance to GS recommendation and guidelines of UNFCCC.	OK	OK
b) Sampling during verification *In case the VT has applied a sampling approach in the course of the verification the approach shall be described for each parameter.*	/MR/ /ER1 /RGSP/ /GSPDD-GSPDD2/ /SSS/ /GSS/ /SSW/ /SZ/	☒ A sampling approach has been applied by the VT for selected the household for the field inspection and interview. *Description:* The verification team has applies the sampling plan based on 90/30 confident level according to GS recommendation to ensure the number of households interviewed are representative. The sample size is 116 of households from the same village in different districts & provinces. During the onsite inspection and interviewed, the usage, kitchen performance test and carbon monitoring survey was checked to confirm the sampling conducted by the PP is sufficient to represent the entire total number of biodigesters	OK	OK

Checklist (incl. guidance for the verification team) **Item**	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
		implemented. *Conclusion:* The verification team has cross checked with the below link to ensure the sample size of 120 is sufficient. http://www.raosoft.com/samplesize.html This is one of the well-known and widely applied statistical tools. It was applied by project developer in the registered PoA, ID 7359 on the UNFCCC CDM website. http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/2XJUR5NOWHY7T8BDAFM4613CIG9VS0/view Therefore, the reliability of this statistical tool could be confirmed. With the number of households, the sample size for 90/30 CI is 68. Therefore, the 116 sample of households is sufficient and meets the GS sampling requirements.		
Calculation of Emission reductions				
Traceability *Assess if the calculation is fully traceable. In case of complex calculations an Excel calculation spreadsheet shall be used. All applied formulae must be visible.*	/MR/ /ER1/	The verification team has checked the emission reduction calculation and confirms that: ☒ the calculation is fully traceable ☒ all applied formulae are visible However, the finding has been identified: Refer CAR C-5, CAR C-6, CAR C-7	~~CAR C-5~~ ~~CAR C-6~~ ~~CAR C-7~~	OK
Parameter consistency *Assess whether all internal and external parameters and data used for calculation are applied consistently in the monitoring report and the calculation spreadsheet?* *Consider only the correct data exchange between the monitoring report and the calculation spreadsheet (if any). Further ensure the consistency of notations for all parameters in the GSPDD, MR and calculation*	/MR/ /ER1/	The verification team has checked the emission reduction calculation and the MR and confirms that: ☒ all parameter notations are consistent in the project documentation ☒ all internal and external parameters and data used for calculation are consistently applied In this context the following findings have been identified. Refer CAR C-5, CAR C-6, CAR C-7	~~CAR C-5~~ ~~CAR C-6~~ ~~CAR C-7~~	OK

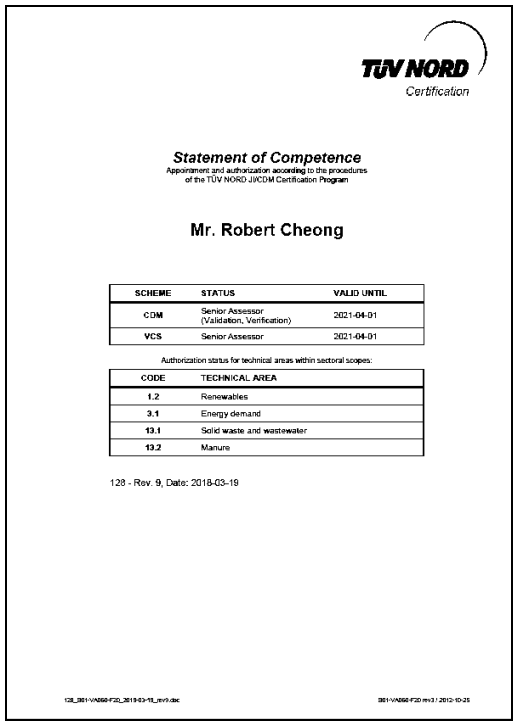
Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
spreadsheet.				
Correctness of calculation *Check if the applied formulae and methods for calculating baseline emissions, project emissions and leakage are in accordance with the monitoring plan and / or the approved methodology.* *Assess whether the provided calculations are complete and reflect all requirements of the monitoring plan.* *Check especially that no standard or old values have been used for calculation where calculations based on up-to-date data is required.*	/MR/ /GSPDD-GSPDD2/ /ER1/	The verification team has checked the emission reduction calculation and the MR and confirms that: ☒ all applied formulae for calculating baseline emissions, project emissions and leakage are in accordance with the monitoring plan ☒ the provided calculations are complete In this context the following findings have been identified: Refer CAR C-5, CAR C-6, CAR C-7		OK
Emission reductions table *Check if the MR includes a summary table of the emission reductions calculation specifying separately* *Total baseline emissions* *Total project emissions:* *Total leakage* *Total emission reductions.* *Assess whether the values are correct or need to be revised as a consequence of issues identified above.*	/MR/ /ER1/	☒ The MR includes a summary table of the emission reductions calculation. ☒ The summary table specified the total baseline, project and leakage emissions as well as the total emission reductions separately. ☐ The values as specified in the ER summary table are correct; no issues have been identified during the verification which require changes in the ER calculation. ☐ During the verification issues with impact on the ER calculation have been identified. Thus subject to the closure of above listed findings the summary needs to be revised. In this context the following findings have been identified: Refer CAR C-4, CAR C-5, CAR C-6, CAR C-7	~~CAR C-4~~ ~~CAR C-5~~ ~~CAR C-6~~ ~~CAR C-7~~	OK
Comparison with ex-ante determined emission reductions *Check if the MR includes a comparison of actual values of the monitoring period with the estimations in the registered GSPDD.* *Check further whether in case of an increase an*	/MR/ /ER1/ /GSPDD-GSPDD2/	The verification team has checked the MR and confirms that: ☒ the MR includes a comparison of actual emission reductions with the estimations of the registered GSPDD ☒ the increase has been appropriately explained In this context no finding has been identified.		OK

Checklist Item (incl. guidance for the verification team)	**Refe-rence**	**Verification Team Comments** (Means and results of assessment)	**Draft Concl.**	**Final Concl.**
appropriate explanation is included in the MR. *Assess in case of a significant increase whether this is due to technical or organisational changes within or outside the control of the PP which might require a notification / approval of changes.*				

ANNEX 2: CALIBRATION DATES AND VALIDITY OF INSTALLED MONITORING EQUIPMENT

Monitoring equipment	Related monitoring parameter as per applicable registered monitoring plan	Serial number	Type	Accuracy or accuracy class	Current calibration	Validity of calibration(s)	Delay in calibration: yes/no	Period of delayed calibration
Weight Stone	KPT / PFT	N/A	N/A	N/A	01/07/2016	N/A	☒ No ☐ Yes	From: To:

ANNEX 3: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL



TÜV NORD Certification

Statement of Competence

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

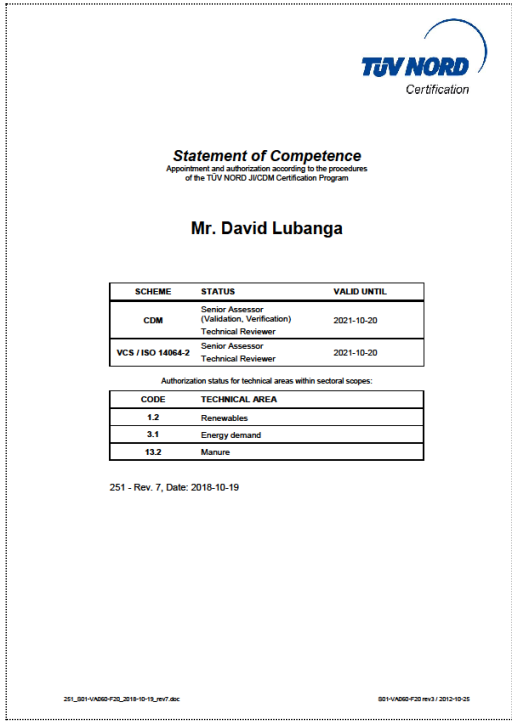
Mr. Robert Cheong

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification)	2021-04-01
VCS	Senior Assessor	2021-04-01

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
3.1	Energy demand
13.1	Solid waste and wastewater
13.2	Manure

128 - Rev. 9, Date: 2018-03-19



TÜV NORD Certification

Statement of Competence

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

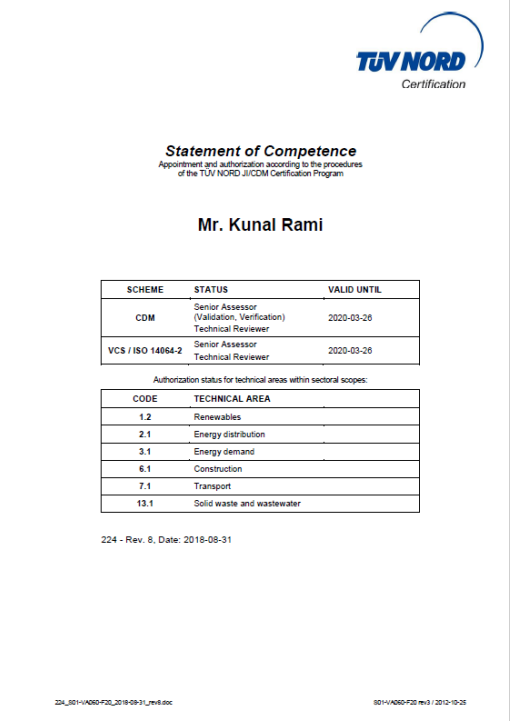
Mr. David Lubanga

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



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	2020-03-26
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2020-03-26

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. 8, Date: 2018-08-31