Verification report form for GS4GG Programme of Activity (Gold Standard for the Global Goals)

BASIC INFORMATION	
Title of the GS4GG Programme of Activity (PoA)	PoA GS ID: 11450 MicroEnergy Credits – Microfinance for Clean Energy Product Lines - India
Reference number of the Programmes of Activity (PoA)	GS 11450
Version number of the verification and certification report	1.0
Completion date of the verification and certification report	11/12/2022
GS ID (s) of VPAs under PoA	GS VPA ID: 11491 GS11450 - MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India - MicroEnergy Credits PoA – VPA 31- GS11491
Version number of the monitoring report to which this report applies	2.0
Completion date of the monitoring report to which this report applies	30/11/2022
Monitoring period no. and duration	1st 01/01/2021 to 31/12/2021
Project Representative	Micro Energy Credits Corporation Private Limited
Host Party	India
Applied methodologies and standardized baselines	AMS-I.A "Electricity generation by the user" version 14. Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC), version 03.1.
Activity requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration

	☐ Renewable Energy Label ☐ N/A
Estimated amount of annual average GHG emission reductions	ICS: 72,044 tCO_2e SLS: 152,548 tCO_2e

Sustainable Development Goals Targeted	SDG Impact	Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period		Units/Products
		Estimated	Achieved	
SDG 13: Climate Action	Number of VER's (ICS)	66,567	53,999	tCO_2e VERs
	Number of VER's (SLS)	126,081	120,019	tCO_2e VERs
SDG 1: No Poverty	Number of households with clean energy products i.e., ICS	24,320	20,300	Number of ICS
	Number of households with clean energy products i.e., SLS	440,042	350,106	Number of SLS
SDG 3: Good Health and Well Being	Percentage of users reporting reduction in smoke/PM after shifting to ICS in project	100 %	86 %	Percentage
SDG 5: Gender Equality	Percentage of users reporting time saving due to reduction in collected fuel consumption/cooking time/boiling water	100 %	86 %	Percentage
SDG 7: Affordable and Clean Energy	Number of beneficiaries (ICS) (operational product)	21,888	17,458	Number of ICS
	Number of beneficiaries (SLS) (operational product)	440,042	343,189	Number of SLS
SDG 8: Decent Work and Economic Growth	Total number of jobs created	20	60	Number of Jobs

Name and UNFCCC reference number of the VVB	Earthood Services Private Limited E-0066

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

SECTION A. Executive summary

The GS programme of activity "MicroEnergy Credits – Microfinance for Clean Energy Product Lines - India" (PoA GS 11450) aims to replacement of fossil fuel consumption and the resultant GHG emission with a clear and sustainable technology which will lead to reduced GHG emissions. CME archives this through dissemination of improved cookstove (ICS), Solar lighting systems (SLS) and Water Purification System (WPS) in households/facilities of rural areas in various states of India. The PoA is using carbon finance to support local partners engaged in different activities like production, distribution, and maintenance of various product technologies like ICS, SLS and WPS. The VPAs main target is on reduction of greenhouse gas emissions from the burning of non-renewable woody biomass and/or charcoal for cooking and boiling of water for drinking purpose. Improved Cookstoves (ICS) improve heat transfer efficiency as compared to the baseline conventional there stone fired stoves, and thereby reducing GHG emissions, the water purification systems also reduce the dependency of boiling water using non-renewable woody biomass, thereby reducing the GHG emissions from the burning of non-renewable woody biomass and/or charcoal for treating the water, and solar lighting systems results in fulfilment of lighting needs through a renewable source (solar energy), thus replacing the baseline scenario with the project activity will lead to reduction in GHG emissions and fulfilling the requirements of the applied methodologies AMS-I. A "Electricity generation by the user" version 14/10/ and TPDDTEC Version 3.1/09/ respectively.

The VPA's are being submitted to GS4GG for Verification are as follows:

Parameter	Validated information
GS ID of the VPAs to be included	GS11491 (VPA 31)
Title of the VPAs	GS11450 - MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India - MicroEnergy Credits PoA – VPA 31 – GS11491
Methodology applied	• AMS-I. A "Electricity generation by the user" version 14. • Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC), version 03.1.
Crediting period	5 years, Renewable twice, total 15 years of crediting period.

The VPAs aim at dissemination of improved cookstove and solar lighting system in various states of India /02/ and is being implemented by MicroEnergy Credits Corporation Private Limited's (PO) and coordinated by MicroEnergy Credits Corporation Private Limited (MEC). The VPA's aims at GHG emission reductions through displacement of fossil fuel use with improved cookstove and solar lighting systems (ICS and SLS) to meet the thermal and electric demands of facility/household. The households in rural areas of India traditionally use fossil fuels which includes charcoal, kerosene, LPG, diesel, wood, and coal intensive grid for fulfilling their energy demands. The baseline scenario under the VPA's is the replacement of traditional three stone fired cookstove with the improved cookstove thereby reducing the amount of fuelwood used for cooking purposes in the baseline. Also, the distribution of solar lighting systems replaces the kerosene-based lamps in households, which would have resulted in GHG emissions due to burning of kerosene.

The PoA has been registered under GS4GG (GSID 11450). The CME of the PoA is Micro Energy Credits Corporation Private Limited and with the help of local partners & the VPAs Implementer The improved cookstove are implemented by Shri Kshetra Dharmasthala Rural Development Project (SKDRDP) and solar lighting system are implemented by Samasta Microfinance Ltd. (Samasta) and Greenlight Planet India Pvt. Ltd. (GLP).

The Monitoring period covered under this verification is 01/01/2021 – 31/12/2021 (inclusive of both the dates) for the VPA 31. The VPA 31 (GS 11491)/02/ envisage an archived annual GHG emission reduction and other SDG impacts over the crediting period as given in the table below.

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units/ Products
13 Climate Action (mandatory)	Number of VERs (ICS)	53,999	tCO_2e VERs
13 Climate Action (mandatory)	Number of VERs (SLS)	120,019	tCO_2e VERs
1 End poverty in all its forms everywhere	Number of households with clean energy products	20,300	Number ICS
1 End poverty in all its forms everywhere	Number of households with clean energy products i.e. SLS	350,106	Number SLS
3 Good Health and Wellbeing	% Households confirming less smoke with the use of improved cookstove	86 %	%
5 Gender Equality	% Household reporting time saving on domestic work by women in collecting fuel or cooking on traditional stove	86 %	%
7 Affordable and Clean Energy	Number of beneficiaries (ICS)	17,458	Number
7 Affordable and Clean Energy	Number of beneficiaries (SLS)	343,189	Number
8 Decent Work and Economic Growth	Quantitative Employment and income generation	60	Number

Scope of Verification

The verification is an independent and objective review for determination of the monitored reductions in GHG emissions by the VVB. The verification includes the implementation and operation of the PoA as set out in the registered PoA-DD/01/ & VPA-DD/02/ (VPA 31) in the monitoring period.

The verification tests the data and assertions set out in the monitoring report prepared for this monitoring period, and it is based on the review of the following:

(i) The approved methodology AMS-I.A "Electricity generation by the user, version 14.0/10/ and TPDDTEC – "Technologies and Practices to Displace Decentralized Thermal Energy Consumptions, Version 3.1 /09/.
(ii) The registered PoA-DD/01/ & registered VPA-DD/02/ and monitoring plan/01/02/
(iii) UNFCCC criteria referred to in the Kyoto Protocol criteria and the CDM modalities and procedures as agreed in the Bonn Agreement and the Marrakech Accords
(iv) GS4GG requirements
(v) The CDM Validation and Verification Standard (VVS) version 3.0/25/ and The CDM Project Standard (PS) version 3.0/24/
(vi) Relevant decisions, guidance, and clarifications of the CMP and CDM Executive Board and any other information and references relevant to the project activity's reported emission reductions
(vii) GS review of validation of PoA and VPAs

The verification has considered both the quantitative and qualitative aspects on stated/reported emission reductions. The monitoring report (all versions) and corresponding supporting documentation was assessed in accordance with the rules defined by UNFCCC and GS4GG, as appropriate to the PoA. The verification is not meant to provide any consulting or recommendations to the CME/others. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

Verification Process
The verification process is conducted as per internal GS4GG Requirements, which includes the following steps;

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

Verification Conclusion
The review of the monitoring report, supporting documentation and subsequent follow up actions have provided ESPL with sufficient evidence to determine the fulfilment of stated criteria. Earthood is of the opinion that the PoA "MicroEnergy Credits – Microfinance for Clean Energy Product Lines - India" (GS ID: 11450) meets all the GS requirements and has correctly applied the GS approved methodologies AMS-I. A "Electricity generation by the user" version 14/10/ and TPDDTEC Version 3.1/09/ respectively.

The GHG emission reductions were calculated correctly based on the approved methodologies AMS-I.A "Electricity generation by the user" version 14/10/, TPDDTEC Version 3.1/09/ and and the monitoring plan contained in the registered PoA-DD/01/ and VPA-DD /02/.
Earthood Services Private Limited can certify that the emission reductions achieved in the monitoring period 01/01/2021 – 31/12/2021 for VPA 31 by GS PoA "MicroEnergy Credits – Microfinance for Clean Energy Product Lines - India" (GSID: 11450) amount to 174,018 for the

VPA 31. Therefore, this is being submitted for request for issuance, as per GS4GG and UNFCCC procedures.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection*	Interview(s)	Verification findings
1.	Team Leader	IR	Guleria	Shifali	Central Office	Y	Y	Y	Y
2.	Methodological Expert	IR	Guleria	Shifali	Central Office	Y	Y	Y	Y
3.	Technical Expert (TA 1.2, 3.1)	IR	Guleria	Shifali	Central Office	Y	Y	Y	Y
4.	Local Expert	EI	Guleria	Shifali	Central Office	Y	Y	Y	Y
5.	Trainee (Verifier)	IR	Vashisht	Sushant	Central Office	Y	N	N	Y
6.	Trainee (Verifier)	IR	Yadav	Ashish	Central office	N	Y	Y	N
7	Trainee (Verifier)	IR	Koul	Abhishek	Central office	N	Y	Y	N

*On – site interviews have been conducted for the current validation and the same has been discussed in detail in section D.2 of the report.

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)
1.	Technical reviewer and TA expert (TA 1.2) to TR	IR	Garg	Shreya	Central Office
2.	Approver	IR	Singh	Kaviraj	Central Office

SECTION C. Application of materiality in conducting the verification

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Erroneous transfer of information from documented	Low	POs contracted by CME enters the details	On a sampling basis, the records are

	records (sales receipt, carbon transfer form etc.) to credit tracker platform		in credit tracker platform at the time of installation. POs also conduct an internal check to verify the accuracy of data entry.	checked with the information from the credit tracker platform and substantiated by questions asked during the remote surveys of end-users. The familiarity of PO representatives with the tracker platform is also checked.
2.	Erroneous consideration of technical specifications of CEPs (especially for solar CEPs)	Low	The technical specifications are provided by the manufacturer.	Technical specifications of each CEP model are checked against the document issued by the manufacturer.
3.	Observational error by monitoring survey staff of CME/CPA implementer while recording the responses of users in relation to survey parameters	Low	Other than monitoring surveys, the CEP usage status-check surveys are also conducted regularly for distributed CEP. Therefore, risk of error is low. However, if there are discrepancies, they are to be dealt with as per the acceptance sampling approach.	If the aggregated materiality threshold stays within the prescribed materiality threshold, no additional effort is required. However, if the aggregated materiality threshold is above the prescribed threshold, additional samples are to be inspected. If additional sampling is not able to reduce the materiality threshold to a reasonable level of assurance, the monitoring result by the CME for that parameter is to be discarded.
4.	Calculation and referencing errors in ER sheet	Low	The ER calculations are cross-checked by using two different methods of calculation and comparing the results, therefore occurrence of error is less likely. However, referencing errors within the ER sheet may occur.	All calculations and referencing will be checked by verification team with respect to applicable requirements under various documents viz., methodology, PoA DD, CPA DD etc.

C.2. Consideration of materiality in conducting the verification

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

The applicable materiality threshold is 2.0% as PoA comprises Large-scale VPAs

Particulars / Monitoring Report	MR Version (Initial)	MR Version (Revised/Final)

Emission Reductions Achieved (tCO2e) in this monitoring period	174,018	174,018
Applicable Threshold (%) as per CDM VVS for PoAs Version 03.0	2.0%	2.0%

During the assessment all findings were closed and from the sample selected for verification, no systemic or systematic material errors were identified which would have an impact on total emission reductions from the entire population.

SECTION D. Means of verification

D.1. Desk/document review

The verification of the information of the PoA was performed through the document review including review of monitoring report /41/ version 2.0 dated 30/11/2022. Additionally, cross checks were performed for information provided in the monitoring report using other source of information, the verification team's sectoral or local expertise and, if necessary, independent background investigations.

The desk review involves:

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

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

D.2. On-site inspection

Duration of on-site inspection: 24/09/2022 & 28/11/2022				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Physical site visit: Households visited (implementation of PoA)		24/09/2022 & 28/11/2022	Shifali Guleria, Ashish Yadav, Abhishek Koul
2.	Review of information flows for generating, aggregating and reporting the monitoring parameters	Karnataka	24/09/2022 & 28/11/2022	
3.	Cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;	Karnataka	24/09/2022 & 28/11/2022	
4.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the	Karnataka	24/09/2022 & 28/11/2022	

	applicable requirements			
5.	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	Karnataka	24/09/2022 & 28/11/2022	

D.3. Interviews

D.3.1. Interviews with CME and VPA Implementers

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1	Swammy	Kumar	MEC India	24/09/2022 & 28/11/2022	VPA DD description, Monitoring parameters, Project boundary, Ex-ante and Ex-post parameters	Shifali Guleria, Ashish Yadav, Abhishek Koul
2	Malhotra	Rhea	MEC India		VPA DD description, Monitoring parameters, Project boundary, Ex-ante and Ex-post parameters	
ICS End- User						
1	-	Bhagya	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
2	-	Manjula	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
3	-	Saroja	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
4	-	Girija	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
5	-	Parvathi	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
6	P.M.	Pooja	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
7	-	Girija	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
8	-	Bhindamma	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
9	-	Puttamma	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
10	-	Manjula	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
11	-	Manjamma	ICS End user	24/09/2022	VVB Project Survey	Ashish Yadav
SLS End- User						
1	Devi	Sheela	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul
2	Babulal	Sunita	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul

3	Pappuram	Chameli	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul
4	Devi	Dhori	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul
5	Devi	Sushila	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul
6	Singh	Bahadur	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul
7	Madan	Deepak	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul
8	Goutam	Saroj	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul
9	Chand	Dharam	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul
10	Saini	Raju	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul
11	Hari Kishan	Birbati	SLS End User	28/11/2022	VVB Project Survey	Shifali Guleria, Abhishek Koul

Type of questions asked by VVB to VPA Implementers:

Following questions are asked by the end-users for the verification of samples:

No.	Questions asked by Team member for SLS monitoring survey
1.	Name of the end-user
2.	Location/ Address (Village name, Pincode)
3.	Branch, District, State
4.	What is the Product Model? Can you show us the product.
5.	What is the Installation Date?
6.	What is the Unique ID of CEP?
7.	Total Quantity of each product type you have?
8.	Is your product in use/ operational?
9.	How many hours do you use the solar lighting system per day
10.	Is device using electricity/energy to operate?
11.	What was the baseline device in use?
12.	Lumen output and wattage
13.	How many lamps did you receive?
14.	How many lamps are operational?
15.	Does the HH include distributed Cookstove and Purifier?
16.	Is your sampled HH also surveyed by PP?

No.	Questions asked by Team member for ICS monitoring survey

1.	Name of the end-user
2.	Location/ Address (Village name, Pincode)
3.	Branch, District, State
4.	What is the Product Model? Can you show us the product.
5.	What is the Installation Date?
6.	What is the Unique ID of CEP?
7.	Total Quantity of each product type you have?
8.	Is your product in use/ operational?
9.	Is device using electricity/energy to operate?
10.	Is the baseline stove still in use?
11.	Quantity of wood use in baseline stove?
12.	Is there any smoke reduction after using the project stove?
13.	Are you spending lesser time in collecting wood since using the project device?
14.	Amount of time saved (hrs)
15.	Does the HH include distributed Cookstove and Purifier?
16.	Is your sampled HH also surveyed by PP?

All the end-users reported that the product is working satisfactorily, and they feel that there has been an improvement in the indoor air quality in case of ICS. All the end users also reported that they are aware of the grievance mechanism. No adverse or negative responses were received with regards the usage or convenience of use of stove.

D.4. Sampling approach

VVB's sampling plan:
In order to meet the requirements of Standard for Sampling and surveys for CDM project activities and programmes of activities /26/, the verification team applied acceptance sampling in the verification (in accordance with para 28). The verification team selected random samples of CME's sampled records, checked the acceptability (or otherwise) of the data for each such record with CME's sample records, and then based on the number of records where there is an agreement, determined if the CME's sample records meet the requirements.

The verification team determined the sample size for acceptance sampling by evaluating the following, using its own professional judgment and guidance in the Standard 'Sampling and surveys for CDM project activities and programme of activities' /26/:

- The proportion of discrepancies between the CME's data and verification team's (field or onsite inspection results) data that can be considered acceptable. This is referred to as the AQL (Acceptable Quality Level): 0.5% was considered in this verification.
- The proportion of discrepancies between the CME's data and verification team's (field or onsite inspection results) data that would be considered unacceptable. This is the UQL (Unacceptable Quality Level): 20% was considered in this verification.
- The producer risk: 10% was considered.
- The consumer risk: 10% was considered.

Considering the above input values, a sample size of 11 was required as per Table (Sample size and acceptance number based on AQL, UQL, and producer and consumer risks) in the referred Standard /26/. Accordingly, the acceptance number (c) thus determined for the

sample size is 0. A sample size of 11 for each technology of each VPA meets the criteria. The samples to be surveyed by assessment team were randomly selected from the list of monitored samples using the random sample generator on Microsoft excel. The audit plan and list of samples thus obtained to be surveyed by assessment team was communicated to CME via email.

The current verification is for GS 11491 (VPA 31). In this monitoring period, following was observed:

GS Ref. VPA	Measure/Technology	Unique CEPs at the end of previous MP (under CDM)	Unique CEPs at the end of current MP	Incremental CEPs distribution?	Fresh/New Monitoring by CME in the MP?
GS11491	Improved cookstove	20,300	20,300	No	Yes
	Solar Lighting system	350,106	350,106	No	Yes

Accordingly, the verification team together has verified 22 samples collectively (11 samples for each technology distributed) during the on - site survey and observed that the sampling survey results of the CME for all the CEPs checked were consistent with VVB's survey results. The sampling method used is in line with Standard: Sampling and surveys for CDM project activities and programme of activities /26/ and Guideline: Sampling and surveys for CDM project activities and programme of activities /27/. In all, the verification team conducted onsite surveys for 22 households.

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

Area of verification findings	No. of CL	No. of CAR	No. of FAR
General	-	-	-
Compliance of the monitoring report with the GS4GG monitoring report form	-	CAR #01	-
Remaining forward action requests from validation and/or previous verifications	-	-	-
VPAs considered for verification and covered under this report	-		-
Programme of activities	-	-	-
Compliance of the programme implementation with the registered PoA-DD	-	-	-
Implementation and operation of the management system	CL#02	-	-
VPA Implementation	-	-	-
Compliance of the VPA implementation with the included VPA design document	CL#01	-	-
Post-design certification changes	-	-	-
Compliance of the monitoring activities with the registered monitoring plan	-	-	-
Data and parameters fixed ex ante or at renewal of crediting period	-	-	-
Data and parameters monitored	-	-	-
Comparison of monitored parameters with last monitoring period	-	-	-
Implementation of the sampling plan	-	CAR#02	-
Assessment of data and calculations of net emission reductions or removals	-	-	-
Calculations of baseline value of each SDG Impact	-	-	-
Calculations of project value of each SDG Impact	-	-	-

Calculations of leakage GHG emissions	-	-	-
Calculations of net benefits for each SDG Impact	-	-	-
Comparison of actual GHG ER value achieved during this monitoring period with estimated value	-	-	-
Safeguarding principles	-	-	-
Stakeholder Inputs and Legal Disputes	-	-	-
Continuous input and grievance mechanism	-	-	-
Internal quality control	-	-	-
Others (editorial/ consistency)	-	-	-
Total	02	02	00

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the GS4GG monitoring report form

Means of verification	The monitoring report form used is GS4GG Monitoring report template version 1.1 /04/, which is a valid version available at the time of verification. All the sections of the aforesaid form were filled as per the Monitoring report template guide version 1.1 /04/ and all the relevant details were provided in the form.
Findings	CAR#01 was raised and resolved.
Conclusion	The monitoring report version 2.0 /41/ has been found to be completed using the valid version of the monitoring report form. The information provided in the monitoring report has been assessed in accordance with the GS4GG principles & requirements version 1.2/28/ and monitoring report template guide /04/.

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

This is the first verification of VPA 31 under GS. The validation and verification of the VPA is submitted simultaneously for GS design and performance review. Any FAR's raised will be reflected in the next verification.

E.3. VPAs considered for verification and covered under this report

Title and GS reference number of the VPA included in the PoA as of the end of this monitoring period	Is the VPA considered for this verification? (yes/no)	Version of the VPA-DD/ PoA-DD
GS11450 - MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India - MicroEnergy Credits PoA – VPA 31- GS11491.	Yes	Version 2.0/ Version 2.1

E.4. Programme of Activities

E.4.1. Compliance of the programme implementation with the registered PoA-DD

Means of verification	The PoA involves the promotion, distribution and sale of improved cook stoves (ICS), Solar lighting systems and water purifiers in India. CME has implemented the VPA's through coordination with the partner organizations (POs) and further with local/channel sellers/distributors. The overall responsibility of implementation and operation is with CME (MEC), which was evident from the interviews conducted with CME. This is consistent with PoA DD /01/. The current verification considers 01 VPA (VPA 31 - GS11450 - MicroEnergy Credits – Microfinance for Clean

Energy Product Lines – India - MicroEnergy Credits PoA – VPA 31-GS11491) that was put together by CME.
The implementation of the VPA, as referenced above, is within the geographical boundary of the PoA-DD/01/, which constitutes the physical boundary as well.

The type of CEP (Clean Energy Product) models deployed under the VPAs is verified by the following:

VPA 31 – GS11491:

Type of CEP	Model	PO/ Implementer
Improved Cookstove	Grameen Jumbo Stove (GJS)	Shri Kshetra Dharmasthala Rural Development Project (SKDRDP)
Solar Lighting System	There are various models of Solar lighting systems distributed in VPA 31, which were all reviewed and found acceptable under the applied methodology	Samasta Microfinance Ltd. (Samasta) and Greenlight Planet India Pvt. Ltd. (GLP)

The Improved Cook stove model implemented under the PoA include Grameen Greenway Smart Stove (GSSV3) and Grameen Greenway Jumbo Stove (GJS), among other models. These ICS are high efficiency cook stoves designed as an eco-friendly and modern replacement for traditional mud & stone stoves and delivers convenient cooking without any requirement of fuel processing or change in cooking habits thus solving the health, environment and fuel collection effort required for operating traditional stoves.

Solar lighting systems implemented under the PoA are renewable energy-based LED/CFL lighting systems. Through the introduction of LED/CFL-based lighting systems the project activity is replacing portable fossil fuel-based lamps.

Water purification system disseminated under the PoA include various models. The water purifiers remove harmful virus, bacteria, parasites, pesticides and physical impurities, giving the water which is as safe as boiled water. The water purification systems disseminated in this PoA do not require electricity or continuous tap water and hence, there is no plumbing required. However, it is to be noted that no water purification systems are disseminated under verified VPAs.

Technical specification of each type of CEP models are verified with the details provided by respective CEP suppliers /21/, /22/ and found to be consistently reported in the monitoring report.

As per the PoA DD/1/ maximum 2 types of CEP shall be deployed under any VPA in any combination except ICS and Water Purifier being together. The numbers of CEPs deployed under the VPA has been confirmed by the monitoring database i.e. Credit Tracker Platform /47/.

The verification team has confirmed that the number of CEPs deployed under the VPA and the actual thermal energy savings/year (for type II) and installed capacity (for type I) were found as follows:

VPA title and GS ID	Technology	Savings/Capacity/Emission Reduction
GS11450 - MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India - MicroEnergy Credits PoA – VPA 31- GS11491	ICS Solar Lighting system	130.58 GWh 0.99 MW

The verification team was able to confirm that the quantity, specification and target group of the CEPs is consistent with the PoA DD /1/ and VPA DD/2/. Further, based on the review of Credit Tracker Platform /47/, physical observations from on-site visit conducted during current monitoring period:

- The VPA(s) are implemented within the boundary of the PoA as described in the PoA-DD/1/.
- The CME is same as that mentioned in the PoA-DD/1/.
- The implementation and operation of the project activity has been conducted in accordance with the description contained in the PoA-DD/1/ and VPA-DD/2/.
- All physical features of the VPA proposed in the included VPA-DD are in place.
- The project participants/VPA implementer has operated the VPA as per the included VPA-DD.

The verification team has conducted surveys via on-site visits with 22 households. It was observed that each CEP was assigned a unique household identification number. The unique identification number on each CEP, personal information of CEP owners and commissioning date of CEP was cross checked with the MIS system of POs and further checked with Credit Tracker Platform available with the CME. The operation of the CEPs was confirmed through remote surveys of owners/representatives (of CEPs). The households were asked various questions to confirm identity of the end user, operational status of the CEPs, presence and usage of baseline technologies, among others.

The emission reductions being claimed during this monitoring period are lesser than the estimated emission reductions in the VPA-DD, as given in the table below for comparable estimated ERs in the VPA-DD for the corresponding period:

As in VPA-DD	Estimated ERs (tCO_2)	Actual ERs (tCO_2)
GS11450 - MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India - MicroEnergy Credits PoA – VPA 31- GS11491	66,567 ICS 126,081 SLS	53,999 ICS 120,019 SLS

The actual distribution of solar lighting systems and improved cookstoves for VPA's are less than the maximum quantity estimated in the VPA-DD

	for corresponding year of CEP distributions. The VPA-DD also mention that the Type 1 SSC threshold of 15 MWe and Type II threshold of 180 GWhth will not be exceeded for the small-scale VPA. The information (including data and variables) provided in the MR is found to be in line with the description provided in the PoA-DD/1/. The verification team considers the programme description as contained in the PoA-DD/1/ is complete and accurate. The PoA-DD/1/ complies with the applied methodologies, tools, and forms. The monitoring report was compared and verified against the description provided in the PoA-DD/1/ and found to be correct. **Grievance Mechanism** The grievance mechanism involves recording the complaints from the beneficiaries by the field staffs to the household on a regular basis in a logbook/39/ which is maintained at the registered office. During the current monitoring period, no grievances were received which was verified upon checking the logbook/39/.
Findings	No findings
Conclusion	The verification team can confirm that all physical features (technology, project equipment, and monitoring and metering equipment) of the VPA were in place and that the CME operated the project activity in accordance with the registered VPA-DD/2/ and VPA-Inclusion Report/3/ during the current monitoring period and based on the information verified through the on-site audit and interviews.

E.4.2. Implementation and operation of the management system

Means of verification	Based on the interview of CME representatives, representatives of different POs (VPA implementer's) and monitoring team, it is confirmed that the CME has organized an appropriate management and operational system for monitoring and reporting. The CME co-ordinates with respective POs to establish a marketing and lending program for CEPs. POs staff, local distributors, technicians, and other service providers involved in marketing of CEPs to concerned households. The monitoring plan and procedures to identify each CEP sold have been followed by POs. MEC (Micro Energy Credits Corporation Private Limited) is CME for the PoA and responsible for inclusion of VPAs in the PoA. The Carbon Operation Manager of MEC is responsible for completion of inclusion process. The Carbon Operation Manager directly reports to CEO of CME and gets the carbon expert assistance during the VPA inclusion process, if required. The information about the type of CEP installed under each VPA is stored in Credit Tracker Platform/47/ that is maintained by MEC (CME). The Credit Tracker Platform/47/ records the unique identification number, location, installation date, and usage status of each clean energy product (CEP) in each VPA, helps to identify, locate and verify any or all of the CEP installations in particular VPA. CME has provided the tracker output file/46/ that is used to ensure that unique identification of CEPs can be tracked. This file has been verified to also ensure that no household receives more than 1 solar lighting system.

	The Carbon Operation Manager at the CME is responsible for QA/QC of the data, analysis, and reporting into the monitoring report. For survey data, a monitoring team has been organized by the CME consisting of trained monitoring staff, who conducted the surveys/ field tests. The staff was interviewed, and training records/35//35.1/ were checked to ensure that they were trained for conducting the surveys/ field tests. The monitoring manager at the CME is responsible for QA/QC of the data, analysis, and reporting into the monitoring report. In line with the registered monitoring plan, CME conducts an annual survey to ascertain the status of equipment and classify them as installed active, installed damaged and installed inactive. This process is to initiate a repair/post-sales service. All the products which were found to be damaged or inactive are discounted from emission reduction calculation as verified from emission reduction spreadsheet/5/. There are no CEPs with installed inactive status in the database for the VPA included in batch requesting issuance. VPA Implementer/PO field staff annually visit households included in the database to cross-check the information on the database with the factual evidence in the field. Any inconsistencies found (e.g., change in the address of a user) are updated on the database, and in the case, CEPs are found to be no longer in use, they will be clearly marked as such and excluded from emission reduction calculations. Original copies of sales receipts/23/, completed survey forms/41/ and carbon title transfer forms/14/ are retained by the respective POs/VPA implementers. The organizational structure and roles and responsibilities for monitoring were in line with the information provided in the VPA-DD/02/, which was confirmed through interviewing PD representatives and the situation on the ground as observed during the onsite visit conducted during current monitoring period, and the structure was considered appropriate. The CEP users sign a title transfer/14/ with the PO while purchasing the product. The title transfer affirms the legal rights of the carbon credits generated by the CEP to the POs. The verification team cross-checked that that carbon title forms/14/ were duly signed by the end-users. Further, a signed contractual agreement between the PO and the CME/40/ guides the transfer of the emission reduction rights to the CME. It has been checked and verified from sample carbon title transfer forms/14/ and agreement between POs and CME/40/ that for the VPA's covered in current verification, the carbon credits generated from the CPA belong to the POs and are later transferred to the CME (MEC). The verification team confirms that the process pertaining to the transfer of emission reduction rights to CME is valid and appropriate for the VPA under this batch which are requesting issuance.
Findings	CL#02 was raised and resolved.
Conclusion	The verification team assessed the management systems in place to implement the monitoring of the PoA. This included the roles and responsibilities, data collection, transfer and aggregation procedures, data storage and archiving for the monitoring system. The roles and responsibilities data collection transfer and aggregation procedures, data storage and archiving for the monitoring system have been provided in the MR /41/. The verification team confirms that the monitoring management system of the VPA and by extension PoA is in place with the responsibilities properly identified and established as per the PoA-DD/01/.

E.4.3. Post-design certification changes

E.4.3.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

Not Applicable

E.4.3.2. Corrections

Not Applicable

E.4.3.3. Inclusion of a monitoring plan

Not Applicable

E.4.3.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

Not Applicable

E.4.3.5. Changes to the programme design

Not Applicable

E.4.3.6. Addition of CPA inclusion template

Not Applicable

E.4.3.7. Change of coordination/managing entity

Not Applicable

E.4.3.8. Change specific to afforestation and reforestation activities

Not Applicable

E.5. Voluntary project activity

E.5.1. Compliance of the VPA implementation with the included VPA design document

Means of verification	The reporting for this issuance has been done technology-wise, thus section E.5 shall be dealing with distribution of ICS and its compliance with PoA-DD/01/ and applicable standard. VPA described in this section target the promotion, distribution and sale of ICS (Improved Cook Stoves) i.e., Greenway Jumbo Stoves (GJS). According to a third-party lab assessment/8/, this cookstove has a thermal efficiency of 31.17% respectively/8/. Micro Energy Credits Corporation Private Limited is the Coordinating and Managing Entity (CME) for the implementation of VPA. The CME coordinates and manages each Partner Organization (PO)/ VPA Implementer and assists them in implementing each element of the monitoring plan, which was confirmed to be the case by interviewing the CME and PO staff. Improved cookstove:

VPA Ref. #	GS 11491 (VPA 31)
Location / State	Karnataka

CEP Type	ICS
CEP Model	Grameen Jumbo Stove (GJS)
VPA Implementer / PO	SKDRDP
Total Quantity Sold / Disseminated	20,300
Maximum Estimated Qty CEPs in CPA ((for comparable year of distribution)	24,320
Estimated ERs (comparable period) (tCO2e)	66,567 tCO_{2e}
Actual ERs from the CEP Type (tCO2e)	53,999 tCO_{2e}

ICS were distributed in the state of Karnataka in India, which is consistent with the description given in the included VPA DD/02/. By the end of current monitoring period requesting issuance, total 20,300 ICS were disseminated under this VPA, which is within the estimated quantity of 24,320 ICSs of the VPA DD/02/ for comparable year of distribution. It has been checked by the verification team that the VPA is below the threshold of 180 GWh/year (thermal), however, as per VPA-DDs the scale of the VPA's is defined as large scale for ICS. The distribution model is that stoves are distributed by PO, managed by CME. The stoves are sold to end users and the sales data is collected by means of sales receipts/23/ at the time of sale to the end-user.

PO has a mechanism of allocating a unique ID to each CEP and the end user so that there is no inter and/or intra-VPA double counting. It was found that PO involved in implementation of VPA's are involved in this issuance has allocated unique identification numbers to the CEPs sold by them. This information was checked against sample end-user documentation/19//23/, CME database, and was found to be appropriate. The stoves are sold to end users and the sales data is collected by means of sales receipts/23/ at the time of sale to the end user.

This verification report covers the monitoring period from 01/01/2021 to 31/12/2021 (inclusive of both the dates).

Findings	CL#01 was raised and resolved.
Conclusion	• The verification team is of the opinion that physical features of the VPA have been implemented in accordance with the VPA-DD/02/. • It is also confirmed, through the review of the supporting documentation, that physical features of the component VPA have been implemented in accordance with the VPA-DD /02/. • The VPA was also found to be completely operational in line with the VPA-DD /02/. • The information provided in the relevant sections of the monitoring report are appropriately describe the implementation and operational status of the PoA.

E.5.2. Post-design Certification Changes

E.5.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

Not Applicable

E.5.2.2. Corrections

Not Applicable

E.5.2.3. Changes to the start – date of the crediting period.

Not Applicable

E.5.2.4. Change to project design of approved project

Not Applicable

E.5.3. Compliance of the registered monitoring plan with applied methodologies and standardized baselines

Means of verification	The monitoring plan contained in the VPA-DD/02/ was reviewed in relation to the monitoring requirements of the applied methodology, TPDDTEC, version 3.1 /09/, as well as the PoA DD /01/, bearing in mind the technology involved. In light of the review conducted, it was found that the monitoring plan in the VPA-DD/02/ contains all the required parameters to be monitored in the context of the VPA design and description and allows determination of emission reductions according to the PoA DD/01/ and applied methodology/09/. That is included in the VPA-DD/02/.
Findings	No findings raised.
Conclusion	The monitoring plan is in line with the approved methodology, Gold Standard Simplified Methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC), version 3.1 /09/, that is included in the registered PoA DD/1/ and VPA-DD/02/. The monitoring plan is in accordance with the applied methodology /09/ that is included in the VPA-DD/02/.

E.5.4. Compliance of monitoring activities with the registered monitoring plan

E.5.4.1. Data and parameters fixed ex ante or at renewal of crediting period

SDG13: Quantity of fuel consumed in baseline scenario b during year y, in kg/HH-day

Means of verification	Quantity $P_{b,y}$ – kg per household per day The value of this parameter considered is 7.11 kg/household-day. This was cross checked with the baseline kitchen performance test (KPT)[1]. The calculation steps and the attendant references in the excel sheet/08/ were checked. The sample mean of the daily consumption of dry fuelwood is a statistically determined value at 90/10 confidence interval/precision, derived based on the 4 consecutive days of fuelwood consumption when the KPT was conducted. The standard deviation of the sample is obtained from a revised sample size. This effectively removes overestimation of fuelwood estimation in baseline by eliminating the outliers in the household in the observational period of 4 consecutive days. The Precision check has been conducted by the CME on the outliner eliminated samples at 90/10, which is found to be below the threshold of 10%, hence was acceptable.
Findings	No findings were raised.

[1] https://cleancooking.org/binary-data/DOCUMENT/file/000/000/604-1.pdf

Conclusion	The value mentioned in the Monitoring Report /41/ and Emission Reduction Spreadsheet /05/ are consistent with the approach given in registered VPA-DDs wherein it is recommended to establish baseline fuel usage for VPAs at the time of verification/02/. Hence the applied value is correct and justified.

SDG13: CO_2 emission factor arising from use of fuel type I in baseline scenario, tCO_2e/ t_{fuel}

Means of verification	$EF_{b, I,CO2}$ – tCO_2/t_{fuel} The value of this parameter considered is 112 tCO_2/TJ. The value is fixed and is derived from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.5–- Default emission factors for stationary combustion in the residential and agriculture/forestry/fishing/fishing farms categories/33/. This value is used towards determination of baseline emissions.
Findings	No findings were raised.
Conclusion	The value mentioned in the Monitoring Report /41/ and Emission Reduction Spreadsheet /5/ are consistent with the registered VPA-DD/02/. The applied value is correct and justified.

SDG13: Non-CO_2 emission factor arising from use of fuel type *i* in baseline scenario, tCO_2/t_{fuel}

Means of verification	$EF_{b,i,non-CO2}$ - tCO_2/t_{fuel} The value of this parameter considered is 37.25 tCO_2/TJ. The value is fixed and is derived from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.9–- Residential Source Emission Factors. The value is calculated using the Emission factor of firewood for CH_4 and N_2O and their corresponding GWP/33/. This value is used for the determination of baseline emissions.
Findings	No findings were raised.
Conclusion	The value mentioned in the Monitoring Report /41/ and Emission Reduction Spreadsheet /5/ are consistent with the registered VPA-DD/2/. The applied value is correct and justified.

SDG13: CO_2 emission factor arising from use of fuel type *i* in project scenario, $tCO2/t_{fuel}$

Means of verification	$EF_{p,i,CO2}$ - tCO_2/t_{fuel} The value of this parameter considered is 112 tCO_2/TJ. The value is fixed and is derived from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.5–- Default emission factors for stationary combustion in the residential and agriculture/forestry/fishing/fishing farms categories/33/. This value is used towards determination of baseline emissions.
Findings	No findings were raised.
Conclusion	The value mentioned in the Monitoring Report /41/ and Emission Reduction Spreadsheet /5/ are consistent with the registered VPA-DD/2/. The applied value is correct and justified.

SDG13: Non- CO_2 emission factor arising from use of fuel type *i* in project scenario, $tCO2/t_{fuel}$

Means of verification	$EF_{p,\ i,\ non\text{-}CO2}$ - tCO_2/t_{fuel} The value of this parameter considered is 37.25 tCO_2/TJ. The value is fixed and is derived from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.9–- Residential Source Emission Factors. The value's calculated using the Emission factor of firewood for CH_4 and N_2O and their corresponding GWP/33/. This value is used towards determination of baseline emissions.
Findings	No findings were raised.
Conclusion	The value mentioned in the Monitoring Report /41/ and Emission Reduction Spreadsheet /5/ are consistent with the registered VPA-DD/2/. The applied value is correct and justified.

SDG13: Net calorific value of the fuel type *i* used in the baseline, TJ/Tonne

Means of verification	$NCV_{b,I}$ – TJ/tonne The value of this parameter considered is 0.0156 TJ/tonne. The value is fixed and is derived from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 1: Introduction, Table 1.2–- Default net calorific values Default IPCC values for wood/wood waste are applied/33/. This value is used for the determination of baseline emissions.
Findings	No findings were raised.
Conclusion	The value mentioned in the Monitoring Report /41/ and Emission Reduction Spreadsheet /5/ are consistent with the registered VPA-DD/2/. The applied value is correct and justified.

SDG13: Net calorific value of the fuel type *i* used in the project scenario, TJ/Tonne

Means of verification	$NCV_{p,I}$ - TJ/tonne The value of this parameter considered is 0.0156 TJ/tonne. The value is fixed and is derived from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 1: Introduction, Table 1.2–- Default net calorific values/33/. This value is used for the determination of baseline emissions.
Findings	No findings were raised.
Conclusion	The value mentioned in the Monitoring Report /41/ and Emission Reduction Spreadsheet /5/ are consistent with the registered VPA-DD/2/. The applied value is correct and justified.

SDG13: Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass, fraction

Means of verification	$f_{NRB,b,i,y}$ The value of this parameter considered is 0.86. The value of f_{NRB} is calculated using the Tool 30: Calculation of the fraction of non-renewable biomass of CDM/11/. As per the tool, PD has referred to the FSI report of various states of India to calculate the individual f_{NRB}. The detailed

	calculation of the approach has been assessed by the VVB through a f_{NRB} calculation excel sheet. The formulas and approach used by the PD is found to be appropriate and in line with the applied methodology/9/ and Tool 30/11/. This value is used for the determination of baseline emissions.
Findings	No findings were raised.
Conclusion	The value mentioned in the Monitoring Report /41/ and Emission Reduction Spreadsheet /5/ are consistent with the registered VPA-DD/2/. The applied value is correct and justified.

E.5.4.2. Data and parameters monitored (Carbon & SDG)

SDG13: Quantity of fuel consumed in project scenario p during year y, Pp,y in kg/HH-day

Relevant SDG Indicator	**SDG13: Climate Action**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	The parameter is measured and recorded at least once every two years (biennial)
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the PoA-DD/1/ and VPA-DD/2/
	Monitoring equipment	This value is derived statistically based on surveys in project scenario, adopting minimum 4 consecutive days of wood consumption by the sampled household. The weight of the fuelwood is measured by weighing scales. Type – Digital Moisture Meter Accuracy Class - +/- 1% Serial number – TM157341, TM157285, TM28591, TM240016, TM28657, TM240017, TM28618, TM239929, TM157277 Calibration frequency – Annual Date of calibration – 19/02/2021 Validity – Until 18/02/2022 Serial number – X014064, X014086, X013975, X014073, X014104, X014102, X014082, X014049, Calibration frequency – Annual Date of calibration – 16/12/2021 Validity – Until 15/12/2022 Type - Weighing Scale Accuracy Class - +/- 0.5 grams Serial number – WS00120, WS00123,

		WS12012, WS00132, WS00156, WS00151, WS00153, WS00436, WS00136, Calibration frequency – Annual Date of calibration – 15/02/2021 Validity – Until 14/02/2022 Serial number – WB01, WB02, WB03, WB04, WB06, WB07, WB08 Calibration frequency – Annual Date of calibration – 17/12/2021 Validity – Until 16/12/2022
	Calibration frequency /interval:	Annual Please refer to section E.5.6 of this report for further details.
	How were the values in the monitoring report verified?	The value of the parameter is 3.05 kg/HH/day. This is statistically derived value whose computation is explained as follows: The 4 consecutive day consumption of the firewood by the sampled household is calculated using 90/10 rule. The purpose of the calculation is to find the mean value of the firewood consumption which is as close to the population mean as possible. The calculation behind this was verified from the ER Calculation sheet of VPA 31/05/. As per 90/10 rule, the mean consumption from the sampled household is acceptable if the precision value attained is less than 10%. In other words, mean value obtained drawn from simple random sample, in project scenario is likely to be 90% of time closer to the unknown population mean. In the calculation provided by the CME, the precision attained is less than 10% of the outer bounds if 90/10 is applied, to accept the sample mean. The calculation steps, and the applicability with the methodology/09/ was ascertained and found that the value calculated was conservative, as the PD had rejected all upper bound outliers while determining the mean value of wood consumption. The outliers were defined as follows: Upper Outlier Threshold (UOT): Upper Quartile of means of firewood consumption + 1.5* interquartile range of firewood consumption Lower Outlier Threshold (LOT): Lower Quartile of means of firewood consumption–- 1.5* interquartile range of firewood consumption For the monitoring period and as per the random sampling of households, the quantity of firewood which are equal to or above UOT

		were ignored for arriving at the mean value of the samples. The computations are conservative and does not overestimate the fuelwood consumption which in turns underestimates the emission reduction. To account for seasonal variations in wood consumption, 2 KPTs were conducted in dry and wet season. However, CME has calculated the ERs based on the higher wood consumption. During the current monitoring period, wood consumption in wet season comes out to be higher for all the VPAs and has been used by CME, which is found to be conservative. Calculations of both project KPT has been reviewed and found to be appropriate.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC processes were deemed to be appropriate and trustworthy. At the outset of each research, the equipment used in KPT is calibrated. Section E.5.6 of this report discusses calibration information. Personnel in charge of carrying out KPT studies are properly trained to supervise data collection and identify any inaccuracies in reported statistics.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not Applicable
Findings	No Findings were raised.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/2/ (as per measurement methods and procedures to be applied) and applied methodology/9/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/1/.	

SDG13: Usage rate in project scenario p during year y determined on a sampling basis, Up,y, Fraction(or %)

Relevant SDG Indicator	**SDG13: Climate Action**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Annually

Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the PoA-DD/1/ and VPA-DD/2/.
Monitoring equipment	Not applicable as this parameter is ascertained through surveys.
Calibration frequency /interval:	Not Applicable
How were the values in the monitoring report verified?	This value is ascertained through annual surveys about the usage of the stoves in the project scenario. The value obtained during this monitoring period are: MP: 01/01/2021 to 31/12/2021 **VPA#** / **Model/State** / **Value (%)** VPA 31 / Jumbo/KA / 86% This value was accepted after checking the user habit survey results /42/ provided by the CME. To achieve a Good Practice utilization rate of up to 90% (estimated value), field team training, end-user training and follow-ups, and an awareness campaign are all necessary. Before distribution, sensitization seminars are organized in each village/area to explain how the stove works. In addition, the field team conducts continuous monitoring operations in the field to verify data quality is up to standard, which serves to encourage stove users to use the stoves and gives them the opportunity to raise questions about the stoves. This was further cross checked with the desk review of documents and through interviews during the onsite visit.
If applicable, has the reported data been cross-checked with other available data?	The survey results, assumptions and sales records were checked by the verification team and were found acceptable. The results are reproducible in the corresponding ER sheet of final Monitoring Report. The responses from randomly selected samples from VPA for ICS under this batch issuance for VVB survey were cross-checked with CME monitoring survey forms which were provided by the CME, and all end users responses were consistent with monitoring results. The usage values were also compared with values obtained from last monitoring conducted for previous MP under CDM which was 0.90 (MP12B8). It was evident from the values provided that the parameter value (i.e. usage rate) has

		decreased for each sub-group since the previous monitoring, which is reasonable and can be attributed to older age of stoves making those more prone to damages and discontinuation of usage.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The QA/QC procedure are in place, internal checks have been done by the VPA implementer and established through on-site interviews.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not Applicable
Findings	None	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/2/ (as per measurement methods and procedures to be applied) and applied methodology/9/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/2/.	

SDG13: Policy for encouraging discontinuation of baseline stove

Relevant SDG Indicator	**SDG13: Climate Action**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Updated every two years
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the PoA-DD/1/ and VPA-DD/2/
	Monitoring equipment	Not Applicable
	Calibration frequency /interval:	Not Applicable
	How were the values in the monitoring report verified?	The data is verified by checking the internal records of the MEC Credit tracker-based database excel spreadsheets/46/. End user trainings/35.1/ were checked which demonstrates that users have been informed about the use of project stoves and phase out of baseline stove.
	If applicable, has the reported data been cross-checked with other available data?	Information about the baseline system used is recorded at the time of loan processing, ICS buyers provide this information which is recorded in the

		baseline survey forms. The verification team has verified the sample baseline survey forms and found to be satisfactory. As another cross-check, the verification team, while conducting the remote survey of 11 randomly selected households from VPA, also questioned the end-users about the baseline system. All 11 sampled household responses from VPA were consistent with information provided in credit tracker platform.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC processes were deemed to be appropriate and trustworthy.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not Applicable
Findings	No Findings were raised.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/2/ (as per measurement methods and procedures to be applied) and applied methodology /9/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan/2/.	

SDG13: Technologies in the monitoring Database for project scenario p through year y, Np,y, Number

Relevant SDG Indicator	**SDG13: Climate Action**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	This parameter is measured continuously
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the registered PoA-DD/1/ and VPA-DD/2/
	Monitoring equipment	Not Applicable
	Calibration frequency /interval:	Not Applicable
	How were the values in the monitoring report verified?	The value of the parameter is 20,300. The data is verified by checking the records of MEC Credit tracker-based database excel

		spreadsheets/46/ and sales records/23/.
	If applicable, has the reported data been cross-checked with other available data?	Yes. The information provided in the VPA Database were verified randomly with the sales receipt/loan document and through on-site VVB survey of the household representatives.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The CME supervises the activities of the PO, providing training, guidelines and templates to facilitate accurate record keeping in their MIS system/Credit Tracker Platform. During the site visit the sale process, record keeping was reviewed and were found reliable.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not Applicable
Findings	No findings	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/2/ (as per measurement methods and procedures to be applied) and applied methodology /9/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

SDG13: Leakage in project scenario p during year y, LEp,y, Tonnes/year

Relevant SDG Indicator	**SDG13: Climate Action**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	At least once every two years (biennial)
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the registered PoA-DD/1/ and VPA-DD/2/
	Monitoring equipment	Not Applicable
	Calibration frequency /interval:	Not Applicable
	How were the values in the monitoring report verified?	The value of the parameter is 0. There are 4 ways in which the leakages can occur in this project activity i. The displaced stove is reused outside the project boundary in place of lower emitting technology ii. The non-renewable biomass/fossil fuel

		saved due to the project activity are used by non-beneficiaries who previously used lower emitting sources iii. The project significantly impacts the NRB fraction within an area where other CDM/VER project activities account for NRB fraction in their baseline scenario iv. The project population compensates loss of space heating effect of inefficient tech by adopting some other form of heating or by retaining some use of inefficient technology. However, all the four conditions can be discounted as follows: i. The baseline stove were 3 stone/ traditional rudimentary stove. Owing to the crudeness to its design and ease of installation, anybody could install it outside the project boundary and hence there is no risk for the baseline stoves to move outside the project boundary. ii. Due to the abundance of the firewood in the project location the risk of non-renewable biomass used by non-project users does not arise and does not pose a threat to leakage emissions iii. Again, the sheer scale of biomass availability in the project activity area vis a vis the project activity, the VPA does not pose a threat of biomass or the fNRB value. Besides this parameter is going to be checked at the beginning of every VPA crediting period. iv. Due to the temperate and climate in Karnataka, India the need for space heating is minimal. Also, no evidence suggests that this is the case. Besides the PMS covers all non-cooking use of the household. The calculation steps involved in the sampling method was cross checked and assessed and found to be correct.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC processes were deemed to be appropriate and trustworthy.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not Applicable

Findings	None
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/2/ (as per measurement methods and procedures to be applied) and applied methodology /9/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.

SDG1: Number of ICS distributed in Project, $BSA_{Project}$, Number

Relevant SDG Indicator	**SDG 1: No poverty**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	This parameter is measured on annual basis
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the registered PoA-DD/1/ and VPA-DD/2/
	Monitoring equipment	Not Applicable
	Calibration frequency /interval:	Not Applicable
	How were the values in the monitoring report verified?	The verified value for this parameter is 20,300. The records of number of VPA for ICS distributed in monitoring database, ex-post monitoring survey records were cross checked. Since the database is a primary source of data collection and the QA/QC were found to be robust as described below, the values were accepted.
	If applicable, has the reported data been cross-checked with other available data?	Not Applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC processes were deemed to be appropriate and trustworthy.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not Applicable.
Findings	None	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/2/ (as per measurement methods and procedures to be applied) and applied methodology /9/. The monitoring results were	

	recorded consistently as per the approved frequency in the monitoring plan.

SDG3: HH reporting reduction in smoke while cooking on improved stove in project, SPMHH, %

Relevant SDG Indicator	**SDG 3: Good Health and Well Being**	
Means of verification	**Criteria/Requirements**	**VVB Assessment**
	Measuring /Reading /Recording frequency	Annually
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the frequency in line to the PoA-DD/1/ and VPA-DD/2/.
	How were the values in the monitoring report verified?	The verified value for this parameter is 86%. The usage Survey Records/19/ was checked to find out the respondent's responses regarding reduced smoke. This was further cross checked during the onsite visit when the households having the ICS were asked about the reduction in smoke by using the project ICS and all of the end users agreed that there is reduction in smoke compared to the baseline.
	If applicable, has the reported data been cross-checked with other available data?	Not Applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC processes were deemed to be appropriate and trustworthy.
Findings	None	
Conclusion	Sustainability criteria was found to be fulfilled. The monitoring and reporting is as per the GS PoA-DD /1/, and VPA-DD/2/. The representation of the monitored value was found to be accurate which was easily verifiable. No discrepancy in data monitoring, data management, transfer of data or QA/QC procedures was found.	

SDG 5: Time Saving per Households, HHTS %

Relevant SDG Indicator	**SDG 5: Gender Equality**	
Means of verification	**Criteria/Requirements**	**VVB Assessment**
	Measuring /Reading /Recording frequency	Annually

	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the frequency is in line to the PoA-DD/1/ and VPA-DD/2/.
	How were the values in the monitoring report verified?	The verified value for this parameter is 86%. The Monitoring Survey Records/19/ was checked to find out the respondent's responses regarding reduced time spent on collection of firewood. This was further cross checked during the onsite visit when the households having the ICS were asked about the average reduction in time in collecting wood and all of the end users agreed that time was saved considerably as less firewood was needed to cook compared to the baseline.
	If applicable, has the reported data been cross-checked with other available data?	Not Applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC processes were deemed to be appropriate and trustworthy.
Findings	None	
Conclusion	Sustainability criteria was found to be fulfilled. The monitoring and reporting is as per the GS PoA-DD/1/ and VPA-DD/2/. The representation of the monitored value was found to be accurate which was easily verifiable. No discrepancy in data monitoring, data management, transfer of data or QA/QC procedures was found.	

SDG 7: Access to affordable and clean energy (Number of operating ICS units under Project), $AACS_{HH}$, Number

Relevant SDG Indicator	**SDG7: Affordable and Clean Energy**	
Means of verification	**Criteria/Requirements**	**VVB Assessment**
	Measuring /Reading /Recording frequency	Continuously
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the frequency is in line to the PoA-DD/1/ and VPA-DD/2/.
	How were the values in the monitoring report verified?	The value of the parameter is 17,458. The post monitoring records/19/ were checked to identify as part of the assessment as well as during the interviews conducted with the 11 selected beneficiaries during site visit/6/ the intended beneficiaries who have access

		to affordable, reliable and modern energy services. Since the usage survey determines the usage rate for ICS, the value of the parameter based on the usage survey was accepted.
	If applicable, has the reported data been cross-checked with other available data?	Not Applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC processes were deemed to be appropriate and trustworthy.
Findings	None	
Conclusion	Sustainability criteria was found to be fulfilled. The monitoring and reporting is as per the GS PoA-DD/1/, and VPA-DD/2/. The representation of the monitored value was found to be accurate which was easily verifiable. No discrepancy in data monitoring, data management, transfer of data or QA/QC procedures was found.	

SDG 8: Quantitative Employment and income generation, QE IG, Number

Relevant SDG Indicator	**SDG 8: Decent Work and Economic Growth**	
Means of verification	**Criteria/Requirements**	**VVB Assessment**
	Measuring /Reading /Recording frequency	Annually
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the frequency is in line to the PoA-DD/1/ and VPA-DD/2/.
	How were the values in the monitoring report verified?	The value of the parameter is 60. The employment contract /32/ were cross checked for all contracted employees/32/. Based on the documentary evidence provided by CME, this value was verified and accepted.
	If applicable, has the reported data been cross-checked with other available data?	Not Applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC processes were deemed to be appropriate and trustworthy.
Findings	None	

Conclusion	Sustainability criteria was found to be fulfilled. The monitoring and reporting is as per the GS PoA-DD/1/ and VPA-DD/2/. The representation of the monitored value was found to be accurate which was easily verifiable. No discrepancy in data monitoring, data management, transfer of data or QA/QC procedures was found.

E.5.5. Implementation of sampling plan

Means of verification

The sampling plan was implemented by the CME in accordance with the Gold Standard methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption, Version 3.1/09/, and the CDM EB 110, Annex 1, Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities/26/. Two different sample sets were picked from population serviced under the VPA 31 viz., Usage Surveys of Cookstoves and Project KPTs. Thus, the project database with the demographic cohorts identified during the sampling survey serves along with the user age (whether non-beneficiary, beneficiary, and user for last 1 year and more) as the sample frames for the project population.
Since the VPA covers various state of India and various model of stove is distributed in the population, the sampling has been conducted for each state separately. Population with each state is reasonably considered homogenous. Therefore, the approach of simple random sampling for every sampling frame is acceptable.

<u>Parameters to be covered through monitoring surveys:</u>
The CME has conducted following kinds of surveys:

Usage Surveys:
- $U_{p,y}$-- Usage rate in project scenario p during year y determined on a sampling basis

Project Monitoring Survey/Project Field Tests:
- $P_{,p,y}$- Quantity of fuel consumed in project scenario p during year y, in tonnes, and as derived from the statistical analysis conducted on the data collected during the project performance field tests

Sustainability Surveys:
1. BSA/HHS- Proportion of population living in households with access to basic services
2. $SPM_{,HH}$-- Air Quality in project households
3. HHTS- Time saved per household
4. $AACS_{,HH}$-- Number of households and institutions having access to affordable, reliable and modern energy services
5. QE,IG- Quantitative Employment and income generation

Monitoring survey (by CME) duration:
The monitoring survey (field survey / tests) was carried out by CME representatives between following duration for the current monitoring period.

For Monitoring Period: 01/01/2021 to 31/12/2021:

VPA 31:

Survey Type	Monitoring dates	Monitoring frequency	Monitoring survey applicable for

			this MP?
Usage and Habit Survey	03/01/2022 to 18/01/2022	Annual	Yes
Project KPT	July/August 2021 and Jan/Feb 2022	Biennial	Yes

It is confirmed that monitoring survey is applicable for the entire monitoring period.

Sample size calculation for different tests

Usage Survey: All monitored parameters were evaluated using simple random sampling with the requisite precision/confidence. Usage survey /42/ was done to determine usage and changes in circumstances experienced following the ICS project's deployment. The sample size was determined using the TPDDTEC Version 3.1/09/, which indicates that for a group size more than 1000, a minimum sample size of 100 is required for such a survey. Using MS Excel random selection algorithm, CME drew samples at random from the Monitoring Database. The representation of different age groups of distribution was also considered with 30 samples from each vintage picked in accordance with methodological sampling requirements. To ensure accurate representation of the entire population, the usage surveys were conducted on randomly chosen cookstoves dispersed across the project distribution boundary.

Kitchen Performance Tests (Project KPT): The KPT sample size determination was based on the guidelines provided in the TPDDTEC Version 3.1 methodology/09/ for evaluating the fuel consumption in the project scenario. The sample size in cases of independent samples was calculated, yielding a sample size of 90 for all the VPAs. This resulted in a precision of 90/10 being met.
In case, the confidence/precision is not met for any parameter for improved cookstove, the upper or lower bound is conservatively applied to arrive at final values for the parameter, which is found in line and acceptable considering the provisions provided in TPDDTEC v3.1./09/.

It is noted that the average lifetime of cookstove model distributed in the VPAs, according to its technical specifications, is 5 years. However, the lifetime may vary from individual product to product depending on usage handling and other physical factors. Parameter Usage Rate ensures that non-operationality rate of project devices found in representative sample is accounted for in ER calculations. It is observed from the monitoring results for this parameter that the fraction of operational ICS in the VPAs have reduced since the previous monitoring periods, which can be attributed to older age of stoves making those more prone to damages and discontinuation of usage.

Additionally, as already discussed in previous sections, CME conducts an annual monitoring for all end users as an additional QA/QC procedure to check the usage status of the project cookstove periodically, thus capturing non-functional or damaged devices, which are not included in calculation for emission reductions. It is noted that the overall number of the "installed_damaged" products has increased when compared to the previous annual monitoring survey results, which is verified from the credit tracker output files and is found reasonable.

All parameters of interest are included in the ER spreadsheet for the VPA's. These were checked for the input values as well as formula applied

	and were found consistent. The reliability (demonstration of precision achieved after the survey results) is depicted in the ER calculation sheets corresponding to final Monitoring Report, which were also found correct.
Findings	CAR#02 was raised and resolved.
Conclusion	The verification team confirmed that the sampling plan and the parameter values are in accordance with the monitoring plan provided in PoA DD/1/ and the VPA DD/2/.

E.5.6. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	The registered monitoring plan (in the VPA DD/2/ and PoA DD/1/) does not state the calibration requirements for any of the parameters. However, as good practice, the verification team enquired information with regard to monitoring equipment viz., weighing scale and moisture meter that were used to carry out field KPT tests. The devices used in this project activity is mentioned here: Type – Digital Moisture Meter Accuracy Class - +/- 1% Serial number – TM157341, TM157285, TM28591, TM240016, TM28657, TM240017, TM28618, TM239929, TM157277 Calibration frequency – Annual Date of calibration – 19/02/2021 Validity – Until 18/02/2022 Serial number – X014064, X014086, X013975, X014073, X014104, X014102, X014082, X014049, Calibration frequency – Annual Date of calibration – 16/12/2021 Validity – Until 15/12/2022 Type - Weighing Scale Accuracy Class - +/- 0.5 grams Serial number – WS00120, WS00123, WS12012, WS00132, WS00156, WS00151, WS00153, WS00436, WS00136, Calibration frequency – Annual Date of calibration – 15/02/2021 Validity – Until 14/02/2022 Serial number – WB01, WB02, WB03, WB04, WB06, WB07, WB08 Calibration frequency – Annual Date of calibration – 17/12/2021 Validity – Until 16/12/2022 It is noteworthy that registered monitoring plan does not specify any calibration frequency however, CME has maintained an annual frequency. All the monitoring surveys took place in the days when all the equipment were under calibration.
Findings	No Findings were raised.
Conclusion	The verification team confirms that CME applied good practices (as per manufacturer recommendation) while using the monitoring equipment and these were under the state of calibration. There is no specific requirement prescribed in this regard in the registered monitoring plan

	of monitoring methodology. The monitoring devices were found to be calibrated during the field test/15//16/.

E.5.7. Assessment of data and calculation of emission reductions or net removals

E.5.7.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

Means of verification	**1- SDG-13: Climate Action** The equations used were found consistent with the PoA DD/1/, VPA DD/2/ and the applied methodology TPDDTEC, version 3.1/9/ Using TPDDTEC–- Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC), version 3.1/9/, "When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission are considered the same, the overall GHG reductions achieved by the project activity in year y are calculated as follows:" $eRy = \sum_{b,p} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,\ fuel} * (f_{NRB,b,\ y} * EF_{fuel,\ CO2} + EF_{fuel,\ nonCO2})) - \sum LE_{p,y}$ **(Eq.3)** Where: $\sum b, p$: Sum over all relevant (baseline b/project p) couples. $N_{p,y}$: Cumulative number of project technology – days included in the project database for project scenario p against baseline scenario b in year y $P_{p,b,y}$: Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y,(tons/day). $F_{NRB,b,y}$: Fraction of biomass used inyear y for baseline scenario b that can be established as non – renewable biomas (drop this term from the equation when using a fossil fuel baseline scenario). $NCV_{b,fuel}$: Net calorific value of the fuel that is substituted or reduced (IPCC default for wood fuel, 0.015 TJ/ton). $EF_{b,fuel,\ CO2}$: CO_2 emission factor of the fuel that is substituted or reduced. 112 tCO_2/TJ for Wood/Wood Waste, or the IPCC default value of other relevant fuel. $EF_{b,fuel,non\ CO2}$: Non – CO_2 emission factor of the fuel that is reduced. $LF_{p,y}$: Leakage for project scenario p in year y (tCO_2e/yr). Sample calculation of VPA 31 jumbo stove karnataka: ER_y = 7,409,500*0.86*(0.0071-0.0030) * 0.0156*(0.86*112+37.25) – 0 = 53,999 tCO_2e Leakage if applicable, will be assessed on the following points: a. The displaced baseline technologies are reused outside the project

boundary in place of lower emitting technology or in a manner suggesting more usage than would have occurred in the absence of the project.

b. The NRB or fossil fuels saved under the project activity are used by non-project users who previously used lower emitting energy sources.

c. The project significantly impacts the NRB fraction within an area where other CDM or VER project activities account for NRB fraction in their baseline scenario.

d. The project population compensates for loss of the space heating effect of inefficient technology by adopting some other form of heating or by retaining some use of inefficient technology.

In line with section 6 of TPDDTEC/09/ as the project involves installation of new systems with high efficiency and hence leakage emission is considered zero.

b) <u>SDG-1: No Poverty</u>

SDG 1 (Net Benefit) = $BSA_{project}$ – $BSA_{Baseline}$

Where:
$BSA_{Baseline}$ = Number of ICS distributed in baseline = 0
$BSA_{project}$ = Number of ICS distributed in project = 20,300

SDG 1 (Net Benefit) = 20,300 – 0

c) <u>SDG-3: Good health and well-being</u>

SDG 3 (Net Benefit) = $SPM_{HH,project}$ – $SPM_{HH,Baseline}$

Where:

$SPM_{HH,Baseline}$ % HH reporting reduction in smoke while cooking on improved stove in baseline

$SPM_{HH,Project}$ % HH reporting reduction in smoke/ while cooking on improved stove in Project

SDG 3 (Net Benefit) = 86%

d) <u>SDG-5: Gender Equality</u>

SDG 5 (Net Benefit) = $HHTS_{Project}$ – $HHTS_{Baseline}$

Where:

$HHTS_{baseline}$ = % HH reporting time saving from fuel collection due to reduced fuel consumption in baseline

$HHTS_{Project}$ = % HH reporting time saving from fuel collection due to

	reduced fuel consumption in Project SDG 5 (Net Benefit) = 86% e) **<u>SDG-7: Affordable clean energy</u>** SDG 7 (Net Benefit ICS) = $ACS_{project}$ – $ACS_{Baseline}$ *Where:* $ACS_{baseline}$ Access to affordable and clean energy (Number of operating ICS units under baseline) $ACS_{project}$ Access to affordable and clean energy (Number of operating ICS units under Project) SDG 7 (Net Benefit SLS) = 17,458 f) **<u>SDG-8: Decent Work</u>** The SDG impact is calculated as below: SDG 8 (Net Benefit) = QE $IG_{Project}$ – QE $IG_{Baseline}$ *Where:* QE $IG_{Baseline}$ Quantative Employment and income generation (Number of person (male or female) hired under baseline) QE $IG_{Project}$ Quantative Employment and income generation (Number of person (male or female) hired under project) SDG 8 (Net Benefit) = 60 Detailed assessment of all the parameters used to calculate emission reductions is provided under section E.5.4.2. The calculations presented in the Monitoring Report /41/ and the corresponding ER sheet /5/ were found appropriate and complying with provisions prescribed in the registered monitoring plan/2/ of the respective VPA-DD/2/, PoA-DD/1/ and applied methodology/9/.
Findings	None
Conclusion	The verification team verified that a) A complete set of data for the monitoring period was available and the verification of each monitoring parameter is elaborated under Section E.5.4.2 of this report. The complete monitoring data is also presented in the corresponding ER calculations sheet/5/ of final Monitoring Report/41/. b) The information provided in the monitoring report was cross checked with other sources, wherever appropriate and available, and such information is also included under Section E.5.4.2 of this report. c) The calculations of baseline emissions as presented in the corresponding ER calculations sheet/5/ of final Monitoring Report/41/ were checked and found to be consistent with the formulae and methods described in the registered monitoring plan of VPA-DD/2/, registered PoA-DD/1/ and the applied methodology/9/. d) All assumptions used in the emission calculations were found appropriate and therefore justified e) Appropriate emission factors, IPCC default factors/33/ and other

	reference values have been correctly applied. This has also been elaborated under Section E.5.4.1 of this report. f) No standardized baseline was prescribed in the registered PoA-DD/1/.

E.5.7.2. Calculation of project value or estimation of project situation of each SDG Impact

Means of verification	a) SDG-13: Climate Action The equation for calculating emission reductions already accounts for project emissions. b) SDG-1: No Poverty The SDG impacts for the project were 20,300 (VPA 31) users confirmed to improve savings. c) SDG-3: Good health and well-being The SDG impacts for the project were: • 86% (VPA 31) of respondents confirmed to be exposed to less smoke and/or health problems d) SDG-5: Gender Equality The SDG impacts estimated for the project were: • 86% (VPA 31) of users confirmed that fuel collection is less time consuming e) SDG-7: Affordable clean energy The SDG impacts estimated for the project were the distribution of 17,458 (VPA 31) improve cookstoves. f) SDG-8: Decent Work The SDG impacts estimated for the project was: • 60 (VPA 31) were hired under this project.
Findings	None
Conclusion	The verification team verified that a) A complete set of data for the monitoring period was available and the verification of each monitoring parameter is elaborated under Section E.5.4.2 of this report. The complete monitoring data is also presented in the corresponding ER calculations sheet/5/ of final Monitoring Report /41/. b) The information provided in the monitoring report was cross checked with other sources, wherever appropriate and available, and such information is also included under Section E.5.4.2 of this report.

E.5.7.3. Calculation of leakage

Means of verification	The 4 conditions under which the leakage should be accounted for are not observed in this project activity. The detailed discussion on the same is provided in section E.5.4.2 above under the parameter: SDG13: $LE_{p,y}$
Findings	None
Conclusion	A complete set of data for the monitoring period was available and the verification of each monitoring parameter is elaborated under Section E.5.4.2 of this report. The complete monitoring data is also presented in the corresponding ER calculations sheet/5/ of final Monitoring Report /41/. The information provided in the monitoring report was cross checked with other sources, wherever appropriate and available, and such

	information is also included under Section E.5.4.2 of this report.

E.5.7.4. Calculation of net benefits or direct calculation for each SDG Impact

Means of verification

SDGs Targeted	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	Climate Action	53,999 tCO_2e VERs	0 tCO_2e VERs (for all VPAs)	53,999 tCO_2e VERs
1	No Poverty (ICS)	0	20,300	20,300
3	Good Health and well being	0%	86%	86%
5	Gender Equality	0%	86%	86%
7	Affordable and clean energy (ICS)	0	17,458	17,458
8	Decent work and economic growth	0	60	60

The calculation methods applied for all the SDG impacts were checked with PoA-DD/1/ and VPA-DD/2/. The verification team confirms that the stated figures were checked and found acceptable.

Findings

No findings

Conclusion

The verification team confirms that

a) The complete data was available and is duly reported.
b) As indicated above, the description with regard to cross-check of reported data is included under respective parameter (refer Section E.5.4 of this report);
c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project emissions and leakage emissions were followed;
d) Appropriate emission factors, IPCC default factors and other reference values were correctly applied.

E.6. Voluntary project activity

E.6.1. Compliance of the VPA implementation with the included VPA design document

Means of verification

The reporting for this issuance has been done technology-wise, thus section E.6 shall be dealing with distribution of solar CEPs and its compliance with registered PoA-DD/1/, VPA-DD/2/ and applicable standards.

GS11491 (VPA 31) described in this section targets the promotion, distribution and sale of different models of solar lighting systems implemented in this PoA.

Micro Energy Credits Corporation Private Limited is the Coordinating and Managing Entity (CME) for the implementation of VPA. The CME

coordinates and manages each Partner Organization (PO)/VPA Implementer and assists them in implementing each element of the monitoring plan.

Solar Lighting systems:

Solar Lighting systems VPA Ref. #	GS 11491 (VPA 31)
Location / State	Andhra Pradesh (AP), Assam (AS), Bihar (BH), Gujarat (GJ), Rajasthan (RJ), Haryana (HR), Maharashtra (MH), Goa, West Bengal (WB), Chhattisgarh (CG), Jharkhand (JK), Karnataka (KA), Madhya Pradesh (MP), Odisha (OD), Tamil Nadu (TN), Uttarakhand (UK) and Uttar Pradesh (UP)
CEP Type	SLS
CEP Model	There are various models of Solar lighting systems distributed in the VPA, all reviewed and found acceptable under applied methodology
VPA Implementer / PO	Samasta Microfinance Ltd. (Samasta) and Greenlight Planet India Pvt. Ltd. (GLP)
Total Quantity Sold / Disseminated	350,106
Maximum Estimated Qty CEPs in CPA ((for comparable year of distribution)	440,042
Estimated ERs (comparable period) (tCO2e)	126,081
Actual ERs from the CEP Type (tCO2e)	120,019

The solar lighting systems are sold to end users and the sales data is collected by means of sales receipts /23/ at the time of sale to the end user. The technical specifications of SLS model were verified through the specifications provided by technology suppliers /22/ and found to be consistent with the monitoring report. The PO has a mechanism of allocating a unique ID to each CEP and the end user so that there is no inter and/or intra-VPAs double counting.
During onsite surveys, the end users were asked if we can see the product installed to confirm the model in use. It has been checked by the verification team that the verified VPA are way below the threshold /02/ for their respective methodologies:

VPA	Capacity (MW)	Threshold (MW)
GS11491 (VPA 31)	0.99 MW	15 MW

All technical specifications/22/ were reviewed and SLS models were found to be meeting the applied methodology requirements and PoA

	eligibility criteria of PoA and therefore, found acceptable by the verification team, as provisioned in section A.3 of VPA-DD/2/.
Findings	No Findings were raised.
Conclusion	• The verification team is of the opinion that physical features of the VPAs have been implemented in accordance with the VPA-DD/2/. • It is also confirmed, through the review of the supporting documentation, that physical features of the component VPA have been implemented in accordance with the VPA-DD/2/. • The VPA was also found to be completely operational in line with the VPA-DD/2/. • The information provided in the relevant sections of the monitoring report are appropriately describe the implementation and operational status of the PoA.

E.6.2. Post-Design Certification changes

E.6.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

Not Applicable

E.6.2.2. Corrections

Not Applicable

E.6.2.3. Changes to the start-date of the crediting period

Not Applicable

E.6.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

Not Applicable as this is the first monitoring period of the VPA under GS.

E.6.2.5. Changes to project design of approved project

There are no changes made during this monitoring period.

E.6.3. Compliance of the registered monitoring plan with applied methodologies and standardized baselines

Means of verification	The monitoring plan contained in the VPA-DD/2/ was reviewed in relation to the monitoring requirements of the applied methodologies AMS.I.A version 14.0/10/ as well as the PoA-DD/1/, bearing in mind the technology involved. In light of the review conducted, it was found that the monitoring plan in the VPA-DD/2/ contains all the required parameters to be monitored in the context of the VPA design and description and allows determination of emission reductions according to the PoA-DD/1/ and applied methodology/10/.
Findings	No findings raised.
Conclusion	The monitoring plan is in line with the approved methodology, Gold Standard Simplified Methodology AMS I.A Version 14.0/10/, that is included in the registered PoA-DD/1/ and VPA-DD/2/. The monitoring

	plan is in accordance with the applied methodology /10/ that is included in the VPA-DD/2/.

E.6.4. Compliance of monitoring activities with the registered monitoring plan.

E.6.4.1. Data and parameters fixed ex ante or at renewal of crediting period

SDG13: The specific luminous efficiency of kerosene when burnt in a kerosene lantern, in Lumens/ W

Means of verification	LE_{Ker}– Lumens/ W The value of the parameters is 0.13 Lumens/ W. The value of this parameter is considered is mentioned below as per VPA DD/2/. This was checked with the revised accepted PoA-DD and included VPA-DD/2/. This value is used towards determination of baseline emissions.
Findings	No findings were raised.
Conclusion	The value mentioned in the Monitoring Report /41/ and Emission Reduction Spreadsheet /5/ are consistent with the approach given in VPA-DD/2/. Hence the applied value is correct and justified.

SDG13: The specific CO_2 emissions of kerosene, tCO_2e/ GJ

Means of verification	EF_{Ker}– tCO_{2e}/ GJ The value of the parameter is 0.0719 tCO_{2e}/ GJ. The value is fixed and is derived from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 2: Stationary Combustion, Table 2.5–- Default emission factors for stationary combustion in the residential and agriculture/forestry/fishing/fishing farms categories/32/. This value is used towards determination of baseline emissions.
Findings	No findings were raised.
Conclusion	The value mentioned in the Monitoring Report /41/ and Emission Reduction Spreadsheet /5/ are consistent with the registered VPA-DDs/2/. The applied value is correct and justified.

SDG13: Standard normal for a confidence interval of 90%

Means of verification	z The value of the parameter is 1.290, 1.645, 1.96. The value of this parameter is considered is mentioned below as per VPA DDs/2/. This was checked with the revised accepted PoA-DD/01/ and included VPA-DDs/2/. This value is used towards determination of baseline emissions. This value is used for the determination of baseline emissions.
Findings	No findings were raised.
Conclusion	The value mentioned in the Monitoring Report/41/ and Emission Reduction Spreadsheet/5/ are consistent with the registered VPA-DD/2/. The applied value is correct and justified.

E.6.4.2. Data and parameters monitored (Carbon & SDG)

SDG13: lumens output for each solar lamp n deployed as part of project activity (Ln), Lumens

Relevant SDG Indicator	**SDG13: Climate Action**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Annual
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the PoA-DD/1/ and VPA-DD/2/
	Monitoring equipment	Not applicable
	Calibration frequency /interval:	Not applicable
	How were the values in the monitoring report verified?	The values reported in the final MR /41/ were verified through the technical specifications provided by the suppliers of the respective model. The verified value of this parameter for solar lighting systems sold/distributed under the relevant VPA at the end of the current monitoring period is lower of Lumen output of installed system and 140.54 Lumen as per PoA-DD/1/ and VPA-DD/2/ constraint. Additionally, each household in the database only receives one solar lighting system and if any of the households are found to have another SLS installed during quarterly monitoring, no emission reductions are claimed from those households. These measures ensure that no single household gets emission reductions higher than those that were validated at the time of PoA and VPA registration (equivalent level of kerosene consumption in the baseline). The verification team has verified the lumen output of models disturbed in the current monitoring period and found to be consistent with the technical specifications provided by respective product suppliers. In case the SLS models have more than one setting for light intensity, the conservative value is considered in line with VPA-DD/2/. The verification team also checked the type of solar lighting systems in all of the surveyed households during the onsite surveys. The information thus obtained was cross-checked against technical specifications

		of the device and it was confirmed if it matched. Specific to distribution of solar CEPs, each household is given a "user account identification number". This number can be used to establish that one household receives only one product since the number is unique and cannot be repeated. The verification team checked the uniqueness of "user account identification number" for solar CEPs across the VPA covered using conditional formatting and confirms that only a single solar device has been provided to each household. The assessment team has also verified the tracker output file provided by CME that includes consolidated list of all CEP sales made under the Programme and confirms that only 1 solar CEP has been implemented in a single household.
	If applicable, has the reported data been cross-checked with other available data?	Type/ model of solar lighting systems given in ER sheets were further checked with the credit tracker output file/47/ during document review of the supporting documents shared by CME. No discrepancy in data was observed regarding models of solar lighting systems distributed.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Solar lighting systems installation information is maintained in the MEC tracker system that records address of the household. The tracker system is monitored continuously. It can be confirmed that management ensuring the correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not Applicable
Findings	None	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/2/ (as per measurement methods and procedures to be applied) and applied methodology/10/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

SDG13: Total number of solar lamps of type i that have been deployed in period a, Ni,a, Lamps

Relevant SDG Indicator	**SDG13: Climate Action**

Means of verification	**Criteria/Requirements**	**Assessment/Observation**	
	Measuring /Reading /Recording frequency	Annual	
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the PoA-DD/1/ and VPA-DD/2/	
	Monitoring equipment	Not applicable. The number in Credit Tracker Platform.	
	Calibration frequency /interval:	Not Applicable	
	How were the values in the monitoring report verified?	The values reported in the final MR /41/ (and corresponding ER sheets /5/) were verified through the Credit Tracker Platform /44/, /46/ that records the name of the customer, loan account number, branch name address/ description of location, contact telephone number(s) (where available), unique client ID and date of first loan disbursement date. The entire database for the VPA included in the current monitoring period is presented in the ER sheet as VPA Database/5/. The verified value for solar systems sold/distributed under the VPA at the end of the current monitoring period are: **VPA#** — **Value** VPA 31 — 350,106	
	If applicable, has the reported data been cross-checked with other available data?	Yes. The information provided in the VPA database/5/ and ER sheets/5/ was verified randomly with the sales receipt/ warranty cards/23/ and through interviews of the household representatives.	
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The CME supervises the activities of the PO, providing training, guidelines and templates to facilitate accurate record keeping in their MIS system/Credit Tracker Platform. The sale process and record keeping was reviewed by conducting CME and PO interviews; the record keeping processes explained were found reliable.	
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM	Not Applicable	

	Project Standard?	
Findings	None	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/2/ (as per measurement methods and procedures to be applied) and applied methodology/10/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

SDG13: Average number of days lamps of type i that have been deployed in period a were operating in period v, di,a,v, days

Relevant SDG Indicator	**SDG13: Climate Action**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Annual
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the PoA-DD/1/ and VPA-DD/2/
	Monitoring equipment	Not Applicable
	Calibration frequency /interval:	Not Applicable
	How were the values in the monitoring report verified?	The credit tracker platform records the exact date of sale for solar lighting system that can be tracked by the implementing partners and CME. The value of this parameter calculated as the total days from date of installation of the SLS to the end date of monitoring period or the entire monitoring period, whichever is lesser. Individual number of days SLS have operated during the monitoring period is calculated and the average value is used for calculating the emission reductions. In the event of a non-functional CEP being identified during the monitoring, the number of crediting days for that device are considered '0'. It is noteworthy to see that apart from considering the methodological requirements for determination of this parameter value, an additional check on conservativeness of emission reduction estimation is also ensured by considering 0 crediting days for products identified as non-functional at any point during the quarterly or annual monitoring. This quarterly and annual monitoring is followed by CME. The value of the parameter for all the models distributed in each state of VPA

		reported in the MR is verified through the Credit Tracker Platform output file and found to be consistent. The dates of installations were also verified through sales receipts or installation cards /23/ of 11 randomly selected households for remote survey from the VPA with SLS distribution. The information obtained was consistent with dates provided in ER sheets/5/. It was thus confirmed that for households where distribution was done during the monitoring period (if any), emission reductions were only claimed for days passed since installation. The SLS model specific state-wise average values of parameter are equal to or lower than 365 days, which was found appropriate based on the evidences provided as mentioned above.	
	If applicable, has the reported data been cross-checked with other available data?	The date of installation of the 11 randomly selected households per VPA for DOE onsite survey was further cross-checked with credit tracker screenshots/46/ of recorded details of these 11 households. The values provided were found to be consistent. The applied value does not exceed 365 which is the total number of operational days in the monitoring period. The verified average values were equal to this as per the model distributed and date of installation.	
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The CME supervises the activities of the PO, providing training, guidelines and templates to facilitate accurate record keeping in their MIS system/Credit Tracker Platform. The sale process and record keeping was reviewed by conducting CME and PO interviews; the record keeping processes explained were found reliable.	
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not Applicable	
Findings	No findings		
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/2/ (as per measurement methods and procedures to be applied) and applied methodology/10/. The monitoring results were recorded consistently as per the approved frequency in the		

	monitoring plan.

SDG13: Average operating hours of kerosene lamps in the baseline, H, Hours/ day

Relevant SDG Indicator	**SDG13: Climate Action**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Annual
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the registered PoA-DD/1/ and VPA-DD/2/
	Monitoring equipment	Not Applicable
	Calibration frequency /interval:	Not Applicable
	How were the values in the monitoring report verified?	As per the applied methodology AMS I.A version 14/10/, paragraph I "For the specific case of lighting devices a daily usage of 3.5 hours shall be assumed, unless it is demonstrated that the actual usage hours adjusted for seasonal variation of lighting is different based on representative sample survey (90% confidence interval +/-10% error) done for minimum of 90 days". For the current monitoring period default value of 3.5 hours/day is considered for this parameter for the VPA.
	If applicable, has the reported data been cross-checked with other available data?	The value reported in the ER calculation sheet /5/ was checked with MR/40/ and applied methodology AMS I.A version 14/10/ and found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the QA/QC procedures are in place. The data provided in applied methodology/10/ has been appropriately reported and used in ER calculation sheet/5/ and MR/41/.
Findings	None	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1//2/ (as per measurement methods and procedures to be applied) and applied methodology /10/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

SDG13: Lamp failure rate: Share of lamps of lamp type i in checked sample group gi,v not operational in period v (LFRi,v), %

Relevant SDG Indicator	**SDG13: Climate Action**

Means of verification	**Criteria/Requirements**	**Assessment/Observation**	
	Measuring /Reading /Recording frequency	Annual	
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the registered PoA-DD/1/ and VPA-DD/2/	
	Monitoring equipment	Not Applicable	
	Calibration frequency /interval:	Not Applicable	
	How were the values in the monitoring report verified?	This parameter is determined by CME/PO/Monitoring partner through the quarterly survey to confirm the usage status of all SLS. The results collected are recorded in the Credit Tracker Platform /44/46/. If a solar lighting system is found to be not in use or non-operational during the survey then the same is considered as "failed" during the entire monitoring period under concern. All SLSs distributed till the day of surveying are monitored. Lamp failure rate is calculated as: LFR = (Number of failed lamps/Total number of lamps monitored) The value of this parameter for different SLS models distributed during the current monitoring period is provided in the monitoring report /41/ and ER calculation sheets/5/. The verification team randomly selected 11 samples for VVB's onsite survey from the VPA covered in this request for issuance and found that all 11 surveyed SLSs for the VPA were operational (as confirmed by the end users). The results were consistent with the monitoring survey results provided in ER calculation sheet/5/ for the surveyed households.	
	If applicable, has the reported data been cross-checked with other available data?	The results were cross-checked with quarterly usage survey forms/42/ for the 11 households surveyed to ensure consistency of data. No discrepancies in data reporting of this parameter were observed. Additionally, the lamp failure rate values are also compared with values obtained from last monitoring period under CDM and it could be confirmed that for each sub-group the parameter value has	

		increased (indicating increased number of failed lamps) since last monitoring period. This is reasonable and can be attributed to older age of the SLSs, thus making them more prone to discontinuation of usage.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the training was provided to the staff responsible for collection of data/35.1/. QA/QC procedure is in place.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not Applicable
Findings	None	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/2/ (as per measurement methods and procedures to be applied) and applied methodology /10/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

SDG 13: This factor corrects the total number of lamps of Iype i by the share of these lamps that were found to be operational according to the sampling in period v., $CF_{i,v,LFR}$, %

Relevant SDG Indicator	**SDG 13: Climate Action**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	Annual
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the registered PoA-DD/1/ and VPA-DD/2/
	Monitoring equipment	Not Applicable
	Calibration frequency /interval:	Not Applicable
	How were the values in the monitoring report verified?	Value of this parameter is calculated using the value of lamp failure rate ($LFR_{i,v}$) using the below equation: $CF_{i,v,LFR} = 1 - \left(LFR_{i,v} + z * \sqrt{\frac{LFR_{i,v} * (1 - LFR_{i,v})}{n_{i,v,total}}} \right)$

		Values mentioned in the monitoring report were checked with the ER calculations sheet and found to be consistent.
	If applicable, has the reported data been cross-checked with other available data?	Calculation approach reported in the ER calculation sheet was found to be satisfactory and in line with the registered monitoring plan.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	This value is calculated based on the results of other monitored parameters with 90/10 confidence/precision. The statistical error is included in this parameter (confidence level 90%) when 90/10 precision is not met.
Findings	None	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/2/ (as per measurement methods and procedures to be applied) and applied methodology /10/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

SDG13: Total number of lamps checked for which a valid result was obtained, $n_{i,v,total}$, Lamps

Relevant SDG Indicator	**SDG 13: Climate Action**	
Means of verification	**Criteria/Requirements**	**VVB Assessment**
	Measuring /Reading /Recording frequency	Annually
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the frequency in line to the PoA-DD/1/ and VPA-DD/2/.
	How were the values in the monitoring report verified?	This parameter is determined using the sampling surveys. Simple random sampling is applied to determine the sample size for the surveys. Sample size for each type of SLS model is calculated separately for each partner organization and each state. The verification team conducted a on-site visit wherein 11 randomly selected households from the VPA with SLS distribution were surveyed and asked about the operationality and usage of the project device. All sampled households were found to have an operational SLS which was subjected to regular, daily usage. The data of surveyed households was also consistent with results presented in ER sheets/5/,

		which were used in calculation of the parameter value. The monitored value are included in the final Monitoring Report /41/. The required level of precision i.e., 10% or less, has been achieved at 90% confidence level. Minimum 30 samples or total number of deployed SLS were monitored wherever the sample size arrived as less than 30 for a particular group of SLS model/state/PO combination. In some cases, the actual number of installations were less than 30 therefore the entire population size was considered. The verification team was able to confirm that the sample size calculation is in line with the Guideline: Sampling and surveys for CDM project activities and programme of activities/27/. As an additional measure of conservativeness, CME has calculated this value using the assumption that all SLSs with status recorded as "installed_damaged" during quarterly and annual usage monitoring survey (which was done as a QA/QC procedure inline with revised approved PoA-DD/1/ and VPA-DD/2/) are not working or in use. CME has considered no emission reductions from these devices with "installed_damaged" status even if they are functional and in use after introducing minor repairs or fixes. This has been verified through evidence provided i.e., some sample monitoring survey forms/42//19/ and quarterly usage survey forms/42/. This has been reflected accurately in ER sheets/5/ as well.
	If applicable, has the reported data been cross-checked with other available data?	The survey results, assumptions and sales records for different state/model/PO groups were checked by the verification team at random and were found acceptable. The results are reproducible in the ER sheets corresponding to final Monitoring Report/41/. The verification team cross-checked the parameter related data in ER sheet against the filled monitoring survey forms of the CME/42/ of the 66 randomly selected samples for VVB's onsite survey. It was confirmed that all the responses on solar lighting systems' operationality as reported by the end users during onsite interviews were consistent with the CME's sample survey results/19/42/.

	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The CME/PO select the households for monitoring survey to check the lamp usage status for each lamp type *i* in the monitoring period. The survey results are recorded in Credit Tracker. The training was provided to the staff responsible for collection of data/35.1/. Thus, the QA/QC procedure is in place for the training of staff, and the documentary evidences were shared by CME against these requirements/35.1/.
Findings	None	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

SDG 13: Determination of whether or not the end user used kerosene for lighting prior to the project activity, kerosene usage in the baseline

Relevant SDG Indicator	**SDG 13: Climate Change**	
Means of verification	**Criteria/Requirements**	**VVB Assessment**
	Measuring /Reading /Recording frequency	Annual
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the frequency is in line to the PoA-DD/1/ and VPA-DD/2/.
	How were the values in the monitoring report verified?	Every household is asked about the baseline fuel used for lighting purpose at the time of loan application. The information gathered from the end users/purchaser of the product is recorded in the MIS system of POs and Credit Tracker Platform. This was confirmed from the credit tracker output file/47/. For the current monitoring period, it was inquired and confirmed during DOE onsite surveys of 11 randomly selected households per VPA that all those households were using kerosene for lighting prior to the purchasing the SLS.
	If applicable, has the reported data been cross-checked with other available data?	Data recorded in the system generated credit tracker output file/47/ is checked at random. Also, the sample households are randomly checked by the verification team for 11 randomly selected households per VPA by cross- checking the data in ER sheet against baseline survey forms of these households/44/ (which were filled at the

		time of SLS installation). The form contains information about the baseline fuel in use by the household.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the training was provided to the staff responsible for collection of data/35.1/. QA/QC procedure is in place.
Findings	None	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

SDG1: Number of SLS distributed in Project, BSAProject, Number

Relevant SDG Indicator	**SDG 1: No poverty**	
Means of verification	**Criteria/Requirements**	**Assessment/Observation**
	Measuring /Reading /Recording frequency	This parameter is measured on annual basis
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The frequency is in line with the registered PoA-DD/1/ and VPA-DD/2/
	Monitoring equipment	Not Applicable
	Calibration frequency /interval:	Not Applicable
	How were the values in the monitoring report verified?	The verified value for this parameter is 350,106. The records of number of VPA for SLS distributed in monitoring database, ex-post monitoring survey records were cross checked. Since the database is a primary source of data collection and the QA/QC were found to be robust as described below, the values were accepted.
	If applicable, has the reported data been cross-checked with other available data?	Not Applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC processes were deemed to be appropriate and trustworthy.
	In case project participants have temporarily not monitored the parameter, has	Not Applicable

	either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	
Findings	None	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan/1/ (as per measurement methods and procedures to be applied) and applied methodology /10/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

SDG 7: Access to affordable and clean energy (Number of operating SLS units under Project), $ACS_{Project}$, Number

Relevant SDG Indicator	**SDG7: Affordable and Clean Energy**	
Means of verification	**Criteria/Requirements**	**VVB Assessment**
	Measuring /Reading /Recording frequency	Continuously
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the frequency is in line to the PoA-DD/1/ and VPA-DD/2/.
	How were the values in the monitoring report verified?	The verified value for this parameter is 343,189. The post monitoring records/41/18/ were checked to identify as part of the assessment as well as during the interviews conducted with the 11 selected beneficiaries during on site visit the intended beneficiaries who are having access to affordable, reliable and modern energy services. The value of the parameter considered was found to be acceptable.
	If applicable, has the reported data been cross-checked with other available data?	Not Applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The QA/QC processes were deemed to be appropriate and trustworthy.
Findings	None	
Conclusion	Sustainability criteria was found to be fulfilled. The monitoring and reporting is as per the GS PoA-DD /1/ and registered VPA-DD/2/. The representation of the monitored value was found to be accurate which was easily verifiable. No discrepancy in data monitoring, data management, transfer of data or QA/QC procedures was found.	

E.6.5. Implementation of sampling plan

Means of verification

The monitoring has been carried out in accordance with the monitoring plan contained in the PoA-DD/1/ and respective VPA-DD/2/.

Sampling Design/Target Population/Sampling Frame/Reliability:

In this sampling design, the VPA that are covered under the current monitoring period (GS11491 (VPA 31)) are the subject. The sampling frame considered confidence level and precision as 90/10 considering the requirement of Standard for sampling and surveys for CDM PAs and PoAs/26/.

The Credit Tracker Platform that records the contact details of the solar lighting systems end users, serves as the basis from which sampling frame is developed.

Sampling Method (AMS-I.A):
Considering the homogeneity regarding the usage of solar products for the PO's in the relevant VPA with solar lighting system sales, simple random sampling is applied to determine the parameter "Total number of lamps checked for which a valid result was obtained". In first stage of sampling the total sales population is divided per partner if more than one partner organization (PO) involved in the VPA. Further if the solar lighting systems sold by the PO in more than one state then the sales population splits at state level.

Sample Size (Required and Actual) for Parameter of Interest:
The sampling is applied to the proportion-based parameter $n_{,i,v,total}$ for the monitoring period requesting issuance. The sample sizes were determined, separately as per type of Solar lighting models and /or for the SLS models implemented by each PO per state.

In this regard, sample size calculation spreadsheet/5/ was checked and found correct as per registered monitoring plan. Minimum 30 samples or total number of deployed SLSs were monitored wherever the sample size arrived as less than 30 for particular group of SLS model/state/PO combination. In some cases, the actual number of installations were less than 30, and therefore, the entire population size was considered. The verification team was able to confirm that the sample size calculation is in line with the Guideline: Sampling and surveys for CDM project activities and programme of activities/27/. Thus, the actual surveyed systems were either same or higher than the required number.
To confirm whether the sample is representative of the different vintage of solar CEPs, CME had submitted a separate excel file/43/ which was assessed by the verification team for the proportion of total sales in different vintages versus the proportion of selected sampled households in those vintages. The vintages were calculated based on implementation date. The same is found to be justified and appropriate. Hence the verification team was able to confirm that the samples are representative of the total population.

A sample vintage consideration for application of sampling plan for VPA 31 following AMS-I.A is as follows:

Vintage split for GLP Sunking Boom in the state of Gujarat: (sample size requirement-67) – VPA31

Vintage based on	Proportion in	Required	Number of

implementation date	distribution	number of samples based on proportion in distribution	samples monitored for d.light S400
0-1 (01/01/2021 to 31/12/2021)	0%	0	0
1-2 (01/01/2020 to 31/12/2020)	0%	0	0
2-3 (01/01/2019 to 31/12/2019)	22%	15	15
3-4 (01/01/2018 to 31/12/2018)	67%	45	45
4-5 (01/01/2017 to 31/12/2017)	11%	7	7

VPA as a part of this issuance request have CEP sales in different vintages, and the number of samples (weightage based on number of CEPs installed and being used in the vintage) are assigned to each vintage accordingly. It was verified with credit tracker platform output files (VPA specific) /47/ and found to be consistent with the data available in vintage-wise consideration sheet/43/ average lifetime of various models of solar lights have been checked from their technical specifications.
All models distributed in VPA 31 have an average technical life of 5 years or more. However, this is an average estimate of the lifetime which might vary from individual product to product, depending on usage and handling. During verification team's on-site visit, through interviews with project implementer representatives it was confirmed that system is in place for after-sales maintenance services to help the households with issues faced with operationality of the device. The end users were also interviewed to cross check, and it was found that they are aware of the available after-sales services. Additionally, what must also be noted is that CME conducts an annual and quarterly monitoring for all end users to check the usage status of the project device, thus capturing non-operational devices, which are then not accounted in calculation for emission reductions. Therefore, consideration of all solar lighting systems vintages included in the VPA has been accepted by the verification team.

Sample selection:

The samples were randomly selected using a computerized randomizer tool in Microsoft excel, and the verification team has reviewed the calculation. The samples were drawn from the complete sales databases (irrespective of their usage status determined during usage survey) for each relevant VPA-DD/2/. The sample can be confirmed to be representative of the total population in the context of the consideration of vintage of implementation of solar CEPs.

Implementation of survey:
Based on interviews with the CME and surveyors during the onsite surveys, in addition to simply asking this question to the end users, the surveyors were also trained to visually inspect the solar lighting system to corroborate the responses received. Therefore, the implementation of survey was considered reliable.

Monitoring survey (by CME) duration:

The monitoring survey (field survey / tests) was carried out by CME

	representatives between following duration for the current monitoring period: **VPA Ref. No.** / **Technology** / **Survey dates for current monitoring period** GS 11491 / SLS / 03/01/2022 to 14/02/2022 Therefore, it was concluded that the monitoring survey results obtained are applicable for the entire monitoring period. **Reliability and precision calculation:** The verification team has verified the ER calculation spreadsheets/5/ with the monitored data, where the actual achieved precision is calculated against the Guidelines outlined under "Standard for sampling and surveys for CDM project activities and programme of activities"/26/ and can confirm that the calculation of achieved reliability was done correctly. Reliability and precision check are carried out for each monitored sample group under the VPA. The parameters reported in ER spreadsheet were checked for the input values as well as formula applied and were found consistent. The reliability (demonstration of precision achieved after the survey results) is depicted in the ER calculation sheets /5/ corresponding to final Monitoring Report /41/, which were also found appropriate. Based on the verified results the verification team found that the required precision is met in all the cases and therefore the survey results were directly used in the calculation of ERs.
Findings	None
Conclusion	The verification team confirmed that the sampling plan and the parameter values are in accordance with the monitoring plan provided in PoA DD/1/ and the VPA DD/2/.

E.6.6. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	No monitoring equipment required to monitor the parameters, as verified through the registered monitoring plan as outline in the VPA-DD/2/ and PoA-DD/1/.
Findings	No findings raised.
Conclusion	The verification team has determined that no monitoring equipment has been used by the PP. Therefore, there was no requirement of calibration. This was in accordance with the accepted monitoring plan and the applied monitoring methodology.

E.6.7. Assessment of data and calculation of emission reductions or net removals

E.6.7.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

Means of verification	**<u>SDG-13: Climate Action</u>** The verification team verified that a) A complete set of data for the monitoring period was available for the monitoring period and the verification of each monitoring parameter is elaborated under Section E.6.4 of this report. The complete monitoring data is also presented in the corresponding ER calculations sheets /5/ of final Monitoring Report /41/. b) The information provided in the monitoring report was cross checked with other sources, wherever appropriate and available, and such information is also included under Section E.6.4 of this report. c) The calculations of baseline emissions as presented in the

corresponding ER calculations sheet of final Monitoring Report were checked and found to be consistent with the formulae and methods described in the registered monitoring plan of each relevant VPA-DD/2/, PoA-DD/1/ and the applied methodology/10/.

d) All assumptions used in the emission calculations were found appropriate and therefore justified
e) Appropriate emission factors, IPCC default factors/33/ and other reference values have been correctly applied. This has also been elaborated under Section E.6.4 of this report.
f) No standardized baseline was prescribed in the PoA-DD and therefore it has not been applied.
g) There is no pro-rata approach applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol.

The following equations were used to determine the baseline emissions as provided in the monitoring report /41/ and applied in the corresponding ER calculations sheets /5/. The equations used were found consistent with the revised accepted PoA-DD/1/, VPA-DD/2/ and the applied methodology.

AMS-I.A., version 14/10/:

Total ERs achieved in the current monitoring period by all types of SLS distributed in the relevant VPA is calculated using the following equations:

$$BE_v = \sum_{a=1}^{n}(N_{i,a} * d_{i,a,v}) * l_i * h * \frac{1}{LE_{ker}} * EF_{ker} * 10^{-6} * 3.6 * CF_{i,v,LFR}$$

Where:

$BE_{i,v}$	=	Emissions generated in the absence of the project activity in period *v* by all lamps of type *i*
$N_{i,a}$	=	The total number of solar lamps of type *i* deployed in period *a*
$d_{i,a,v}$	=	Average number of days lamps of type *i* that have been deployed in period *a* were operating in period *v*
l_i	=	Nominal lumen output of solar lamps of the type *I* deployed as part of the project activity
h	=	Average number of hours solar lamps are used per day
LE_{ker}	=	The specific light output of kerosene when burnt in a kerosene lantern
EF_{ker}	=	The specific CO_2-emissions of kerosene
$CF_{i,v,LFR}$	=	This factor corrects the total number of lamps of type *i* by the share of these lamps that were found to be operational according to the sampling in period *v*. The statistical error is included in this parameter (confidence level 90%).

And:

$$CF_{i,v,LFR} = 1 - \left(LFR_{i,v} + z * \sqrt{\frac{LFR_{i,v} * (1 - LFR_{i,v})}{n_{i,v,total}}} \right)$$

Where:

$CF_{i,v,LFR}$	=	This factor corrects the total number of lamps of type *i* by the share of these lamps that were found to be operational according to the sampling in period *v*. The statistical error is included in this parameter (confidence level 90%).

	$LFR_{i,v}$ = Share of lamps of lImp type *i* in checked sample group $g_{i,v}$ not operational in period *v*. z = Standard normal for a confidence level of 90% $n_{i,v,total}$ = Total number of lamps checked for which a valid result was obtained. Since there are different models of SLS having different lumen output are distributed/sold under the relevant VPA, hence the emission reductions achieved by each type of solar lighting system is calculated separately. The above equation is used to calculate the ER achieved by particular solar lighting system and total emission reductions are arrived at as summation of the same. $BE_v = \sum_{i=1}^{n} BE_{i,v}$ Where, $BE_{i,v}$ is the emission reductions achieved in the period *v* by all lamps of type *i* The calculation provided as a sample for one of the Partner-Model-State combination in MR/41/ has been reviewed and is found consistent with actual calculations applied in ER calculation sheet/5/ for that specific combination. It is noted that the sample calculation provided in MR is only one example of a specific group, which in no case reflect total baseline emissions from the technology i.e. from SLS distribution.
Findings	No findings
Conclusion	The verification team verified that g) A complete set of data for the monitoring period was available and the verification of each monitoring parameter is elaborated under Section E.6.4.2 of this report. The complete monitoring data is also presented in the corresponding ER calculations sheet /5/ of final Monitoring Report /41/. h) The information provided in the monitoring report was cross checked with other sources, wherever appropriate and available, and such information is also included under Section E.6.4.2 of this report. i) The calculations of baseline emissions as presented in the corresponding ER calculations sheet /5/ of final Monitoring Report /41/ were checked and found to be consistent with the formulae and methods described in the registered monitoring plan of VPA-DD /2/, registered PoA-DD /1/ and the applied methodology/10/. j) All assumptions used in the emission calculations were found appropriate and therefore justified k) Appropriate emission factors, IPCC default factors/33/ and other reference values have been correctly applied. This has also been elaborated under Section E.6.4.1 of this report. l) No standardized baseline was prescribed in the registered PoA-DD/1/.

E.6.7.2. Calculation of project value or estimation of project situation of each SDG Impact

Means of verification	The PoA-DD/1/, VPA-DD/2/ and applied monitoring methodology/10/ does not prescribe any project emissions to be considered. The onsite visit conducted, and project design also did not reveal any potential source to be considered in this regard.
Findings	None
Conclusion	No project emissions are required to be calculated.

E.6.7.3. Calculation of leakage

Means of verification	The PoA-DD/1/, VPA-DD/2/ and applied monitoring methodology/10/ does not prescribe any leakage emissions to be considered. The onsite visit conducted, and project design also did not reveal any potential source to be considered in this regard.
Findings	None
Conclusion	No additional leakage emissions (other than what is already considered in baseline calculations) were required in accordance with the methodology AMS-I.A, version 14 /10/.

E.6.7.4. Calculation of net benefits or direct calculation for each SDG Impact

Means of verification

SDGs Targeted	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	Climate Action	120,019 tCO_2e VERs	0 tCO_2e VERs (for all VPAs)	120,019 tCO_2e VERs
1	No Poverty	0	350,106	350,106
7	Affordable and clean energy	0	343,189	343,189

The calculation methods applied for all the SDG impacts were checked with PoA-DD/1/ and VPA-DD/2/. The verification team confirms that the stated figures were checked and found acceptable.

Findings: None

Conclusion:

The verification team confirms that

e) The complete data was available and is duly reported;

f) As indicated above, the description with regard to cross-check of reported data is included under respective parameter (refer Section E.5.4 and section E.6.4 of this report);

g) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project emissions and leakage emissions were followed;

h) Appropriate emission factors, IPCC default factors/33/ and other reference values were correctly applied.

E.7. Comparison of actual SDG Impacts with estimates in approved PDD

Means of verification

From Section E.5 of the Monitoring Report, it is apparent that estimated values were off while the project monitored its progress.

SDGs Targeted	SDG Impact	Values estimated in ex ante calculation of approved PoA-DD for this monitoring period	Actual values achieved during this monitoring period
13	Climate Action	192,648 tCO_2e VERs	174,018 tCO_2e VERs
1	No Poverty	24,320	20,300

			440,042	350,106
	3	Good Health and well being	100 %	86 %
	5	Gender Equality	100 %	86 %
	7	Affordable and clean energy	21,888	17,458
			440,042	343,189
	8	Decent Work and Economic Growth	20	60

The actual SDG targets against the anticipated values in PoA-DD/01/ and VPA-DD/02/ is lower for all the SDGs except SDG 8 as tabulated above. The primary reason being in the PoA-DD and VPA-DD sales for the respective technology are much lower than expected in the VPA-DD. Thus, the achieved SDG targets are much lower than anticipated.

Findings	None
Conclusion	The actual emission reductions achieved in the current monitoring period for the VPAs is lower than the emission reductions as well as for other SDG targets stated in the VPA-DD/2/. Therefore, it has been accepted by the verification team.

E.7.1. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

Means of verification	The Monitoring Report /41/ and corresponding ER calculations sheet /5/, show that the actual emission reductions achieved for project stove during this monitoring period are less than the estimate provided in VPA-DD/2/.
Findings	None
Conclusion	No justification was sought from the PD because the achievement of emission reductions were lower than what had been estimated.

E.8. Stakeholder Inputs and Legal Disputes

Means of verification	Not applicable
Findings	None
Conclusion	Not Applicable

SECTION F. Internal quality control

The draft verification report that is prepared by the verification team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by Earthood were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable GS4GG requirements. The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the verification team.

During the technical review process, additional findings may be identified, or the closed-out findings may be opened, which needs to be satisfactorily resolved before the request for issuance is submitted to Gold Standard. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the verification team. The decision

taken by the Technical Reviewer is final and is authorized on behalf of Earthood Services Private Limited.

SECTION G. Verification opinion

Earthood Services Private Limited (Earthood), contracted by, has performed the independent verification of the emission reductions for the GS Project GS11491 (VPA 31) in the host country "India" for the monitoring period 01/01/2021 to 31/12/2021 (both dates inclusive), as reported in the Monitoring Report, Version 2.0 dated 30/11/2022/41/. The 'MicroEnergy Credits' is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity. Earthood commenced the verification against the baseline and monitoring methodology "TPDDTEC – "Technologies and Practices to Displace Decentralized Thermal Energy Consumptions, Version 3.1"/09/ and, "AMS I.D – Electricity generation by the user, Version 14.0"/10/, the monitoring plan contained in the VPA-DD and Monitoring Report Version 2.0 dated 30/11/2022/41/.

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

The verification team confirms that:

- The PoA was found completely implemented as per the description given in the registered VPA-DD.
- The actual operation conforms to the description in the registered PoA – DD/01/ and VPA- DD/02/.

SECTION H. Certification statement

ESPL's verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. ESPL planned and performed the verification by obtaining evidence and other information and explanations that ESPL considered necessary to give reasonable assurance that the reported GHG emission reductions are fairly stated.
In our opinion, the GHG emissions reductions reported for the project activity are fairly stated in the Monitoring Report (final) Version 2.0 dated 30/11/2022/41/. ESPL, based on outcome of verification activities, certifies in writing that, during the monitoring period 01/01/2021 to 31/12/2021 (inclusive of both the dates) for the VPA 31, the registered GS PoA – GS11450 "MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India" achieved the verified amount of 174,018 tCO_2e reductions for VPA 31 in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the PoA.
The verified amount of emission reductions is stated below as per implemented VPAs and as per commitment period:

Verified and certified emission reductions as per monitoring period:

Monitoring period	VPA 31
From 01/01/2021 till 31/12/2021	174,018 tCO_2e
Total	174,018 tCO_2e

Appendix 1. Abbreviations

Abbreviations	Full texts
General	
ACM	Approved Consolidated Methodology
AM	Approved Methodology
BE	Baseline Emission
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CME	Coordinating and Managing Entity
CL	Clarification Request
CO2	Carbon dioxide
CP	Crediting Period
DR	Desk Review
EB	Executive Board
EI	External Individual
ESPL	Earthood Services Private Limited
FAR	Forward Action Request
GHG	Green House Gas
GSC/GSP	Global Stakeholder Consultation Process
IPCC	Intergovernmental Panel on Climate Change
IR	Internal Resource
KP	Kyoto Protocol
LSC	Local Stakeholder Consultation Process
MoC	Modalities of Communication
MoV	Means of Verification
MP	Monitoring Plan
ODA	Official Development Assistance
PA	Project Activity
PCP	Project Cycle Procedure
PD	Project Developer
PDD	Project Design Document
PE	Project Emission
PoA	Programme of Activities
PoA DD	Programme of Activities Design Document
PS	Project Standard
RCP	Renewal of Crediting Period
RFR	Request for Registration
tCO2e	tonnes of Carbon di Oxide equivalent
TPH	Tonnes Per Hour
TR	Technical Reviewer
UNFCCC	United Nations Framework Convention on Climate Change
V	Version
VPA	Verified Project Activity
VVB	Validation and Verification Body
VVS	Validation and Verification Standard
Project Specific	

ICS	Improved Cookstove
GS4GG	Gold Standard for Global Goals
EPC	Electric Pressure Cooker
LSC	Local Stakeholder Consultation
MoV	Means of Verification
SDG	Sustainable Development Goals

Appendix 2. Competence of team members and technical reviewers

Competence Statement			
Name	Shifali Guleria		
Education	M.Sc. (Environmental Studies and Resource Management), TERI University		
Experience	3+ year		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	YES (AMS-I.A., AMS-II.G., AMS-II.E., AMS-III.A.V., AMS-I.D, ACM0002)		
Local expert	YES		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (1.2, 3.1)		
Reviewed by	Deepika Mahala	**Date**	16/02/2022
Approved by	Ashok Gautam	**Date**	18/02/2022

Competence Statement			
Name	Shreya Garg		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	9 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS.I.A., AMS.I.C., AMS.I.D., AMS.I.F., AMS.II.D., AMS.II.G., AMS.II.J., AMS.III.AV., AMS.III.BL, ACM0002, ACM0012		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.2, TA 3.1)		
Reviewed by	Shifali Guleria	**Date**	26/04/2022
Approved by	Deepika Mahala	**Date**	26/04/2022

Competence Statement			
Name	Sushant Vashisht		
Education	M.Sc. Environmental science and Technology		
Experience	6 months		
Field	Environment science and technology		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	NO		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Trainee	YES		
Reviewed by	Shifali Guleria (Quality Manager)	**Date**	10/05/2022
Approved by	Deepika Mahala (Technical Manager)	**Date**	10/05/2022

Competence Statement			
Name	Ashish Yadav		
Education	M.Sc Environmental Sciences B.Sc Biotechnology		
Experience	1 Year		
Field	Wastewater treatment		
Approved Roles			
Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	NO		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Trainee	Yes		
Reviewed by	Shifali Guleria (Quality Manager)	**Date**	20/09/2022
Approved by	Deepika Mahala (Technical Manager)	**Date**	20/09/2022

Competence Statement	
Name	Abhishek Koul
Education	Bachelor of Technology in Mechanical Engineering
Experience	-
Field	-
Approved Roles	

Team Leader	NO		
Validator	NO		
Verifier	NO		
Methodology Expert	NO		
Local expert	NO		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Trainee	YES		
Reviewed by	Shifali Guleria (Quality Manager)	**Date**	20/09/2022
Approved by	Deepika Mahala (Technical Manager)	**Date**	20/09/2022

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	MEC	PoA-DD	Version 2.1 dated 15/09/2022	CME
2.	MEC	VPA-DD - VPA 04	Ver.2.0	CME
3.	ESPL	Validation Report for inclusion of VPA	Version 1.0, dated 05/12/2022	Others
4.	GS4GG	Monitoring report template and Guide	Version 1.1, published on 14/10/2020	GS4GG
5.	MEC	ER Calculation Summary Sheet_VPA 31	Pertaining to latest MR	CME
6.	ESPL	On-Site audit records	-	Others
7.	UNFCCC	Community Services Activity Requirements	Version 1.2	Others
8.	IIT Varanasi	Stove test report	-	CME
9.	GS4GG	The Gold Standard Simplified Methodology Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC)	Version 3.1, Dated 25/08/2017	Others
10.	UNFCCC	AMS I.A – Electricity generation by the user	Version 14.0	Others
11.	UNFCCC	Tool 30: Calculation of the fraction of non-renewable biomass	Version 4.0	Others
12.	CDM	CDM webpage of the PoA: https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/B46TH0V2GLIZK1UPWJ3SMNA8QRX7FY/view	Last accessed on /10/2022	Others
13.	The Gold Standard Foundation	GS webpage of the PoA: https://registry.goldstandard.org/projects/details/3501	Last accessed on 13/10/2022	Others
14.	MEC	Carbon Title transfer document	-	CME
15.	MEC	Calibration certificates of weigh balance	Various	CME
16.	MEC	Calibration certificates of Moisture meter	Various	CME

17.	MEC	Spot check user records and the pictures of the stoves	-	CME
18.	MEC	Training records	-	CME
19.	MEC	Monitoring survey reports for parameters monitoring for ICS and SLS	-	CME
20.	MEC	Questionnaire used during the survey for each type of CEP	December 2020	CME
21.	SKDRDP	Technical specifications of ICS – Jumbo stove	-	CME
22.	d.Light	Technical specifications of SLS (Various)	-	CME
23.	MEC	Original copies of sales receipts / invoices/ warranty cards	-	CME
24.	UNFCCC	CDM PS for PoA	Version 3.0	Others
25.	UNFCCC	CDM VVS for PoA	Version 3.0	Others
26.	UNFCCC	Standard: sampling and surveys for CDM project activities and programme of activities	Version 9.0	Others
27.	UNFCCC	Guidelines: sampling and surveys for CDM project activities and programme of activities	Version 4.0	Others
28.	GS4GG	Principle and requirements	Version 1.2	Others
29.	GS4GG	PoA Requirements	Version 2.0	Others
30.	GS4GG	CSA Requirements	Version 1.2	Others
31.	GS4GG	GHG emission reduction and sequestration product requirements	Version 2.1	Others
32.	MEC	Employment Records	-	CME
33.	IPCC	IPCC Guidelines for National Greenhouse Gas Inventories 2.1 (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf)	-	Others
34.	GS4GG	Form: GS-MR-FORM	Version 1.1, Dated 14/10/2020	Others
35.	TASC	Training photos	-	CME
35.1	TASC	Training records	-	TASC
36.	The Gold Standard Foundation	REQUIREMENTS AND GUIDELINES USAGE RATE MONITORING,	-	CME
37.	IPCC	GWP: IPCC AR https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter2-1.pdf	-	Others
38.	IPCC	GWP: IPCC AR5, https://www.ipcc.ch/assessment	-	Others

		-report/ar5/		
39.	MEC	Grievance Logbook	-	Others
40.	MEC	MEC and PO's agreement	-	CME
41.	MEC	Monitoring Report (final)	Version 2.0, dated 30/11/2022	CME
42.	MEC	Quarterly and annual monitoring survey forms	Filled	CME
43.	MEC	Vintage Wise approach (GS11482)	-	CME
44.	MEC	Credit tracker platform screenshots/ online – output file	-	CME
45.	MEC	https://cleancooking.org/binary-data/DOCUMENT/file/000/000/604-1.pdf	March 2018	CME
46.	MEC	Credit Tracker Platform Screenshots	-	CME
47.	MEC	Tracker output file	-	CME

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

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

FAR ID	xx	**Section no.**	xx	**Date :** DD/MM/YYYY
Description of FAR				
There is no finding from validation.				
Project participant response				**Date :** DD/MM/YYYY
NA				
Documentation provided by project participant				
NA				
DOE assessment				**Date:** DD/MM/YYYY
NA				

Table 2. CL from this verification

CL ID	01	**Section no.**	-	**Date:** 28/11/2022
Description of CL				
According to para 8.5.8 of GS document "Programme of Activity requirements, "*The CME shall submit monitoring reports for VPAs for which request of Performance Certification is intended. The CME can submit a combined monitoring report for all VPAs that correspond to same real case VPA as long as VPAs have the same monitoring period start and end date"*. Similar conditions are also found listed in para 7.1.2 of the same document. CME has provided the monitoring report with VPAs 2, 3, 15 for MP "05/01/2020 to 31/12/2021" and VPA 31 with MP "01/01/2021 to 31/12/2021". Please clarify how the requirements quoted above are met.				
Project participant response				**Date:** 30/11/2022
To meet the requirement of 8.5.8 of GS document "Programme of Activity requirements", CME has separated the monitoring report for VPA2,3,15 and VPA31 considering the monitoring period start and end date are different. Revised MR has been submitted.				
Documentation provided by project participant				
Revised MR for VPA2,3,15 and 31				

DOE assessment	Date: 07/12/2022
CME has provided the two separate MR report (1 MR consisting of VPA 2,3, & VPA 15) & (1 MR consisting of VPA 31). And requirement of para 8.5.8 of "Programme of Activity requirements" is now full filled by providing the 2 separate Monitoring report with separate monitoring period start and End date. The MRs has also been reviewed and found to be appropriate. Hence the finding is Closed.	

CL ID	02	Section no.	D.3.1	Date: 28/11/2022
Description of CL				
During site visit and interviews with partner organisation and CME representatives, it was noted that in some cases CEDAR had replaced ESAF as one of the implementing entities. CME is requested to explain the transfer (roles and responsibilities of CEDAR vs ESAF) and scope of this change. Please also provide supporting document for involvement of CEDAR.				
Project participant response				**Date:** 30/11/2022
ESAF and CEDAR are the same entity. ESAF has rebranded itself to CEDAR. There is no change in scope of responsibility for CEDAR. The document proof has been submitted to VVB.				
Documentation provided by project participant				
Name Change Certificate				
DOE assessment				**Date:** 07/12/2022
VVB has verified the scope of change through the Certificate of "Incorporation pursuant to change of name" issued by the Ministry of corporate Affairs, Government of India "Corporate Identification Number: U52100KL2008PTC022142" provided by the CME. Hence, the information found to be Appropriate and reliable. VVB has closed the finding.				

Table 3. CAR from this verification

CAR ID	01	Section no.		Date: 28/11/2022
Description of CAR				
Following observations are found in the Monitoring report: 1. Project developer is requested to provide the ER sheet of VPA 02. 2. The observation has been made in the cover page of Monitoring report that the Version number of the VPA-DD is missing. PP is requested to update the version number's. 3. In the cover page of Monitoring report, The completion date of the monitoring report is inconsistent with the ER sheet (VPA 03, 15 & VPA 31) provided by the PP. 4. In the Table 1 of the Monitoring report under SDG 7 "Affordable and Clean Energy", the Value of the number of beneficiaries (SLS) for VPA 31 is "**343,188**". However the in the ER sheet "SDGs", Cell "D8", the value is "**343,189**". PP is requested to check and correct the inconsistency. 5. It has been observed in the MR that the referencing of only two methodology (AMS-I.A & TPDDTEC) are done in the footnote. PP is requested to provide the referencing for the 3rd Methodology i.e. (AMS-III.AR) throughout the report. PP is requested to make necessary corrections.				
Project participant response				**Date: 30/11/2022**

1. ER sheet for VPA2 has been provided to the VVB.
2. Version number of VPA-DD has been updated in the monitoring report. Revised MR has been submitted.
3. The completion date has been made consistent in the ER sheet and MR. Revised documents have been submitted.
4. In the Table 1 of the Monitoring report under SDG 7 “Affordable and Clean Energy”, the Value of the number of beneficiaries (SLS) for VPA 31 has been made consistent with the ER sheet, Revised MR has been submitted.
5. Referencing for meth AMS III AR v7 has been added to the MR. Revised MR has been submitted.

Documentation provided by project participant	
Revised MR Revised ER VPA2 ER Sheet	
DOE assessment	**Date:07/12/2022**
VVB found that all five points raised in CAR 01 has been resolved by the PD and revised MR, revised ER sheet & ER sheet of VPA 2 has been provided by the PD. Hence the finding stands Closed	

CAR ID	02	**Section no.**	E.5.5	**Date:** 28/11/2022
Description of CAR				
Page 87 of the monitoring report states that “*The survey dates for year 1 monitoring are 08/01/2021 to 24/01/2021*” (VPA 2, ICS). However, calibration data suggests that most equipment were calibrated after 08/01/2021. CME shall clarify how it was ensured that only calibrated equipment is used for field tests, and provided supporting documents.				
Project participant response				**Date: 30/11/2022**
CME has used calibrated equipements in the field for conducting KPTs. CME missed providing the calibration certificate with correct dates. Documents have been provided to VVB.				
Documentation provided by project participant				
Calibration certificate				
DOE assessment				**Date: 07/12/2022**
CME has provided the Calibration certificate (Certificate No: RCPL/20-21/ML/NM1283-01) which clearly indicate the Date of Calibration is prior to the survey date for year 1 (08/01/2021 – 24/01/2021). Hence the finding stands Closed.				

Table 4. FAR from this verification

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