



**Verification and certification report form for
CDM project activities
(Version 02.1)**

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	Efficient Wood Fuel Stove-Cooking-Sets, Lesotho UNFCCC Ref. No.: 5482
Version number of the verification and certification report	02
Completion date of the verification and certification report	06/06/2019
Monitoring period number and duration of this monitoring period	Monitoring Period: 07 th Duration: 01/12/2017 – 30/11/2018 (both days included)
Version number of the monitoring report to which this report applies	2
Crediting period of the project activity corresponding to this monitoring period	29/08/2012 – 28/08/2022 (Fixed)
Project participants	<ul style="list-style-type: none"> • Solar Lights • atmosfair gGmbH • Deutsche Post AG
Host Party	Lesotho
Applied methodologies and standardized baselines	AMS-II.G. "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass" (Version 3.0)
Mandatory sectoral scopes linked to the applied methodologies	3: Energy Demand
Conditional sectoral scope(s) linked to the applied methodologies	N/A
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	37,332 tCO _{2e}
Certified amount of GHG emission reductions or GHG removals for this monitoring period	28,654 tCO _{2e}
Name and UNFCCC reference number of the DOE	E-0052: Carbon Check (India) Private Ltd.

Name, position and signature of the approver of the verification and certification report

Vikash Kumar Singh, Compliance Officer



SECTION A. Executive summary

atmosfair gGmbH (the PP) has appointed the DOE, Carbon Check (India) Private Limited (CCIPL) to perform seventh (07th) periodic verification of the CDM Project Activity “Efficient Wood Fuel Stove-Cooking-Sets, Lesotho” in Lesotho (hereafter “project activity”). The project activity includes distribution of energy efficient stoves for cooking purposes. The emission reductions due to the project activity are achieved due to reduction in consumption of non-renewable biomass as compared to baseline scenario due to replacement of traditional cooking devices by improved cookstoves (ICS).

This report summarises the findings of the verification of the project, performed on the basis of paragraph 62 of the CDM Modalities & Procedures, as well as criteria given to provide for consistent project operations, monitoring and reporting and the subsequent decisions by the CDM Executive Board. Verification is required for all registered CDM project activities intending to confirm their achieved emission reductions and proceed with request for issuance of CERs. This report contains the findings and resolutions from the verification and a certification statement for the certified emission reductions.

Objective:

Verification is the periodic independent review and ex-post determination of both quantitative and qualitative information by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined monitoring period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the project activity for the period 01/12/2017 – 30/11/2018 (including both the days).

The purpose of verification is to review the monitoring results and verify that the monitoring methodology was implemented according to the monitoring plan and monitoring data and used to confirm the reductions in anthropogenic emissions by sources, is sufficient, definitive and presented in a concise and transparent manner. CCIPL’s objective is to perform a thorough, independent assessment of the registered project activity.

In particular, the monitoring plan, monitoring report and the project’s compliance with relevant UNFCCC and host Party criteria are verified in order to confirm that the component project/s has/have been implemented in accordance with the previously registered/included component project design and conservative assumptions, as documented. It is also confirmed if the monitoring plan is in compliance with the registered PDD and the approved monitoring methodology.

Scope:

The scope of the verification is:

- To verify the project implementation and operation with respect to the registered PDD
- To verify the implemented monitoring plan with the registered PDD or approved revised PDD and applied baseline and monitoring methodology.
- To verify that the actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.

- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that the reported emission reductions are complete and accurate in order to be certified.

The verification comprises a review of the monitoring report over the monitoring period from 01/12/2017 to 30/11/2018 and based on the registered PDD /B04/ in part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet, monitoring methodology and all related evidence provided by project participant.

On-site visit and interviews are also performed as part of the verification process.

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 DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader / Technical Expert / Verifier	IR	Anand	Amit	CCIPL	X	X	X	X
2.	Local Expert	ER	Letuka	Mosala	CCIPL		X	X	

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Singh	Vikash Kumar	CCIPL
2.	Approver	IR	Singh	Vikash Kumar	CCIPL

SECTION C. Application of materiality

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.	Human Error: Recording and reporting of the information in the ER spreadsheet.	Medium	All the ER spreadsheet data of the stoves, including sales database, determination of parameter for efficiency testing including calculation. This includes all the parameters to be	The risk will be mitigated by reviewing the training of the personnel involved in the data capture, calculation and by following the monitoring responsibilities. The training records will be reviewed which will also be confirmed during the on-site visit interviews.

			<i>monitored ex-post as per the PDD</i>	
2.	Information System: Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security	Medium	<i>The data is recorded in the spreadsheets based on the raw data collected during the field visits. The access to the spreadsheets for calculation of ERs, monitoring and sales database and Stove efficiency testing records.</i>	<i>The identified risk will be mitigated by reviewing the management of access to the records. It will be confirmed through interviews whether the raw data is collected by the field personnel and then transmitted and stored electronically to the PP's office. The data quality control to be checked.</i>
3.	Accuracy of the measuring equipment	Low	<i>Check the calibration records for the measurement equipment used for efficiency test.</i>	<i>The risk due to accuracy of the measuring equipment will be ensured by planning to check calibration certificates of the measuring equipment used for stove efficiency (water boiling tests (WBTs)).</i>
4.	Competence of personnel involved in conducting standardized tests viz., WBT	Low	<i>Interview of the personnel involved and check the training records / accreditation certificates (applicable in case of institutions) involved in conducting such tests.</i>	<i>The risk will be mitigated by reviewing the training records of the personnel involved in the conducting such tests and by following the monitoring responsibilities. For institutions involved in conducting such tests their accreditation certificates will be checked to establish their competence for conducting such tests. The training records and certificates will be reviewed which will also be confirmed during the on-site visit interviews.</i>
5.	Sample	Medium	<i>Sample size is not suitable; or the surveyed stoves at the project level are not random</i>	<i>Cross-check the procedure to identify the sample size against the sampling guideline and standard and confirm the sample size is calculated correctly.</i>

C.2. Consideration of materiality in conducting the verification

The threshold of materiality was evaluated based on “Guideline: Application of materiality in verifications” (version 02.0) /B08/. It was concluded that the materiality threshold applicable to the project activity based on actual emission reductions achieved is 5% of 28,654 tCO₂e which is equal to 1,433 tCO₂e.

In planning the verification, verification team took cognizance of §11 and 12 of the “Guideline: Application of materiality in verifications” (version 02.0) /B08/ and a materiality threshold of 1,433 tCO₂e is determined for the current verification of the project activity.

The verification has been performed through a desk review and on-site inspection including interviews with relevant personnel. The verification activities in which risks were assessed are the evaluations of:

- Monitoring system including monitoring surveys (for determination of DO_y, CB_y)
- WBT (for determination of efficiency of distributed stoves)
- Calculation spreadsheets.
- Quality of raw data and procedures for its collection.
- Data flow.

- Data control procedures.

The risks identified were mitigated through the review of whole databases /06/ and calculation spreadsheets and cross-check against monitoring survey records /05/ and interview with relevant stakeholders during OSV.

In conducting the verification, DOE took cognizance of §13-17 of the “Guideline: Application of materiality in verifications” (version 02.0) /B08/ and based on the input of data from different sources checked through sampling of records during on-site and off-site. Some mistakes were identified and subsequently corrected. These findings are detailed in Appendix 4 and they were successfully closed. Therefore, related identified mistakes as listed in findings in Appendix 4 to this report have been determined to be immaterial. All identified inconsistencies and clarification requests have been successfully closed.

Based on the assessment carried out, CCIPL confirms with a reasonable level of assurance that the claimed emission reductions are free from material errors, omissions or misstatements.

SECTION D. Means of verification

D.1. Desk/document review

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The verification was performed primarily based on the review of the monitoring report /01/ and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology. Documents reviewed or referenced during the verification are listed in Appendix 3 below.

D.2. On-site inspection

Duration of on-site inspection: 30/04/2019 to 01/05/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	An assessment of the implementation and operation of the registered project activity as per the registered PDD.	Lesotho,	30/04/2019 to 01/05/2019	Amit Anand & Mosala Letuka
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	Lesotho,	30/04/2019 to 01/05/2019	Amit Anand & Mosala Letuka
3.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD.	Lesotho,	30/04/2019 to 01/05/2019	Amit Anand & Mosala Letuka
4.	A 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	Solar Lights office	30/04/2019 to 01/05/2019	Amit Anand & Mosala Letuka
5.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology and corresponding tool(s), where applicable	Solar Lights office	30/04/2019 to 01/05/2019	Amit Anand & Mosala Letuka
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	Solar Lights office	30/04/2019 to 01/05/2019	Amit Anand & Mosala Letuka
7.	An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters	Solar Lights office	30/04/2019 to 01/05/2019	Amit Anand & Mosala Letuka

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Hones	Michael	Solar Lights (Pty) Ltd	30/04/2019 – 01/05/2019	Project implementation and operation, monitoring procedure, data and information flow, Survey records, Sales/Distribution records	Amit Anand & Mosala Letuka
2.	Karpe	Zoltán Müller	atmosfair gGmbH	30/04/2019 – 01/05/2019	Project implementation and operation, monitoring procedure, data and information flow, Survey records, Sales/Distribution records, CER calculation and completeness of monitoring report, Electronic Monitoring system, Sampling Plan, QA/QC Procedures, Quality Assurance – Management and operating system	Amit Anand & Mosala Letuka

D.4. Sampling approach

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The sampling was undertaken by the PP for the following monitoring parameters:

1. Statistically adjusted drop out from total population of SAVE80 in period y (DO_y)
2. Adjustment factor for continued use of baseline appliance of SAVE80 users in period y (CB_y)
3. Adjusted average efficiency of the SAVE80 system being deployed (η_{new})

The total population of the stoves distributed under the project activity is 9,982.

Simple random sampling was separately applied by the PP for selection of the monitoring samples with 90/10 confidence / precision level respectively for the annual monitoring of three parameters. The same is deemed acceptable as per the registered PDD /B04/. Please refer to the section E.3.4.3 of this report on detailed assessment of the sampling plan opted by the PP.

As per §24 of the Sampling Standard (version 07.0) /B07/, the verification team has to verify whether the project participants or the coordinating/managing entity have implemented the sampling and surveys according to the sampling plan in the registered monitoring plan. The verification includes determining:

- (a) Whether the required confidence/precision has been met;
- (b) Whether the selected sample was representative of the population.

In line with §25 of the Sampling Standard /B07/, the verification team has applied a sampling approach for on-site visits and remote surveys as part of verification. Now as the PP had applied sampling approach, the verification team has chosen acceptance sampling for parameters DO_y , n_{new} and CB_y in accordance with §27 of the sampling standard /B07/.

DOE used sampling during verification for checking the operational status and to check if the WBT tests have been done in the households and all the 8 households confirmed that the WBT tests were conducted in their households. Considering that Lesotho is a Least Developed Country (LDC), applying §33 (c) of the sampling standard (version 07.0) /B07/, a sample size for 8 households was chosen (with no non-responses) for the project activity. A sample size of 8 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 10 % and consumer risk used was 20 %. Acceptance number (c) thus determined for the sample is 0. It was observed that all the 8 stoves were in working condition and thus $c=0$, i.e. no discrepant records were observed with the published MR /1/ and ER sheet /3/. Thus, PP’s set of records has been accepted in line with §32 of the sampling standard (version 07.0) /B07/. For parameters DO_y and CB_y a common interview questionnaire was prepared and was used during the survey by the PP. Verification team has cross verified these sample documents during the on-site visit.

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	--	--	--
Compliance of the project implementation and operation with the registered PDD	02	--	--
Post-registration changes	--	--	--
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	--	--	--
Compliance of monitoring activities with the registered monitoring plan	05	01	--
Compliance with the calibration frequency requirements for measuring instruments	01	--	--
Assessment of data and calculation of emission reductions or net removals	--	01	--
Assessment of reported sustainable development co-benefits	--	--	--
Global stakeholder consultation	--	--	--
Others (Supporting Documents)	01	--	--
Total	09	02	00

SECTION E. Verification findings

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

Means of verification	DR, I
Findings	There are no findings on this section of the VR.
Conclusion	<p>PP has used the Monitoring report form for CDM project activities (version 06.0) /B03/. Verification team confirms that the latest available version of monitoring report form /B03/ has been used by the PP and the MR /02/ is in accordance with the monitoring report form with the relevant form and instructions therein /B03/.</p> <p>CC IPL, had made the MR (version 01, dated 21/03/2019) /01/, covering the monitoring period from 01/12/2017 to 30/11/2018 (both days inclusive) publicly available on 29/03/2019.</p> <p>This confirms compliance with the §352 and §353 of CDM VVS for project activities, (version 02.0) /B01-1/.</p>

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

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There are no forward action requests from validation and/or the previous (sixth) verification of the project activity.

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

Means of verification	DR, I																		
Findings	CL 07 and 08 have been raised in this regard. Please refer to Appendix 4 for the detailed closure of the verification findings.																		
Conclusion	<p>The project activity was implemented, and project devices distributed as described in the registered PDD /B05/.</p> <p>The implementation of the project activity is summarized below:</p> <table border="1"> <tr> <td>Project Participants:</td> <td> <ul style="list-style-type: none"> Solar Lights atmosfair gGmbH Deutsche Post AG </td> </tr> <tr> <td>Title of project activity:</td> <td>Efficient Wood Fuel Stove-Cooking-Sets, Lesotho</td> </tr> <tr> <td>UNFCCC registration No:</td> <td>5482</td> </tr> <tr> <td>Applied Baseline and monitoring methodology:</td> <td>AMS-II.G (version 3.0)</td> </tr> <tr> <td>Project Scale:</td> <td>Small</td> </tr> <tr> <td>Host Country:</td> <td>Lesotho</td> </tr> <tr> <td>Type of crediting period:</td> <td>Fixed</td> </tr> <tr> <td>Duration of crediting period</td> <td>29/08/2012 – 28/08/2022</td> </tr> <tr> <td>Reported monitoring Period verified in this verification:</td> <td>01/12/2017 to 30/11/2018</td> </tr> </table> <p>As a part of the site visit, the verification team was able to confirm that the project implementation is in accordance with the project description contained in the registered PDD /B04/ including the applied methodology /B02/.</p> <p>Till the end of the monitoring period 9,982 SAVE80 cookstove units had been disseminated in the project activity. The stoves have been distributed across different locations in the host country of Lesotho.</p> <p>The project activity is to disseminate efficient fuel wood stoves called SAVE80 and heat retaining polypropylene boxes (“Wonderbox”) in several districts of Lesotho. The interior parts of “Save80” are made of stainless steel to ensure a life-span of many years, high efficiency and burning at high temperatures for complete combustion with the low emission of smoke.</p> <p>The information (including data and variables) provided in the MR /02/ have been found to be in line with the details provided in the approved revised PDD /B04/.</p> <p>The starting date of the Project Activity is 25/10/2010, that is when the order for first container of SAVE80 stoves was placed by the PP. The same was checked through review of registered PDD /B04/ and corresponding validation report /B04/. The total number of stoves distributed till the end of monitoring period is 9,982. The same was confirmed through the review of stove sales record /06/. The sample sales receipt provided confirm the CER waiver agreement with the households /08/. Operation of the devices was confirmed during the site visit by the verification team. Following was verified at the project site:</p> <ol style="list-style-type: none"> 1. Stoves numbering system 2. Electronic monitoring system 	Project Participants:	<ul style="list-style-type: none"> Solar Lights atmosfair gGmbH Deutsche Post AG 	Title of project activity:	Efficient Wood Fuel Stove-Cooking-Sets, Lesotho	UNFCCC registration No:	5482	Applied Baseline and monitoring methodology:	AMS-II.G (version 3.0)	Project Scale:	Small	Host Country:	Lesotho	Type of crediting period:	Fixed	Duration of crediting period	29/08/2012 – 28/08/2022	Reported monitoring Period verified in this verification:	01/12/2017 to 30/11/2018
Project Participants:	<ul style="list-style-type: none"> Solar Lights atmosfair gGmbH Deutsche Post AG 																		
Title of project activity:	Efficient Wood Fuel Stove-Cooking-Sets, Lesotho																		
UNFCCC registration No:	5482																		
Applied Baseline and monitoring methodology:	AMS-II.G (version 3.0)																		
Project Scale:	Small																		
Host Country:	Lesotho																		
Type of crediting period:	Fixed																		
Duration of crediting period	29/08/2012 – 28/08/2022																		
Reported monitoring Period verified in this verification:	01/12/2017 to 30/11/2018																		

3. Actual implementation of the stoves
4. Household-representatives were interviewed regarding the usage of stove
5. Whether or not baseline technology was still in use
6. Process of data collection during installation of stove
7. Agreements between households and Project Participant.
8. Water Boiling Tests for efficiency

CCIPL's verification team confirms that the project activity is implemented within the boundary of the project activity as described in the PDD /B04/ and the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PDD /B04/.

In summary, the monitoring period is reasonable, and the operation of the project activity is in accordance with the registered PDD /B04/.

There were no changes observed during OSV from the technology stated during the validation and earlier verifications.

The verified timeline of the project's implementation is as follow:

Milestone of the project activity	Timeline	Assessment by the verification team
Registration of the project activity	29/08/2012	The same was checked through review of UNFCCC website /XX/.
Starting date of operation:	25/10/2010	The date when order for first container of SAVE80 stoves was placed by the PP. This was validated during the registration /B04/ of the project activity.
Crediting period		
1 st monitoring period	29/08/2012 to 30/11/2012	Issuance complete /B09/
2 nd monitoring period	01/12/2012 to 30/11/2013	Issuance complete /B09/
3 rd monitoring period	01/12/2013 to 30/11/2014	Issuance complete /B09/
4 th monitoring period	01/12/2014 to 30/11/2015	Issuance complete /B09/
5 th monitoring period	01/12/2015 to 30/11/2016	Issuance complete /B09/
6 th monitoring period	01/12/2016 to 30/11/2017	Issuance complete /B09/
7 th monitoring period	01/12/2017 to 30/11/2018	Reported monitoring period.

Verification team has assessed the project to check any proposed or actual changes to the project design in accordance with §300 of CDM VVS for project activities (version 02.0) /B01-1/. In the opinion of CCIPL, there is no change to the project design. CCIPL's verification team confirms that the project is implemented within the project boundary as described in the registered PDD /B04/ and the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PDD /B04/.

In accordance with §356 (c) of CDM VVS for project activities (version 02.0) /B01-1/, information (data and variables) provided in the monitoring report that are different from that stated in the registered PDD /B04/, have been assessed. The assessment is summarized below:

Parameter	Ex-ante value in the PDD	Value reported for this monitoring period	Assessment by the verification team
η_{new}	52%	44.08%	The monitored ex-post value of the parameter for the current monitoring period is

	(Adjusted average efficiency of the SAVE80 system being deployed)			not higher than the ex-ante estimated values and are the actual monitored values during the current monitoring period and hence deemed acceptable.
	N_y (Adjusted total number of SAVE80 deployed)	14,350	9,669	The monitored ex-post value of the parameter for the current monitoring period is not higher than the ex-ante estimated values and are the actual monitored values during the current monitoring period and hence deemed acceptable.
	DO_y (Statistically adjusted drop out from total population of SAVE80 in period y)	5%	3.53%	The monitored ex-post value of DO_y for the current monitoring period is higher than the ex-ante estimated values. The reason for this increase is that Save 80 (ICS distributed under this project) is a robust stainless steel still without any ceramic linings, which simply means that the stoves are robust and less prone to physical damages. Furthermore, the users are normal households who have bought the stoves. As they have paid for the stove, they are using it on a regular basis (without any dropout) and directly getting the benefits of fuel savings. Furthermore, as compared to ex-ante value (which is based on assumption), the ex-post values are based on actual monitoring surveys conducted by PP, which were also cross-checked by the VT during the course of OSV through acceptance sampling of random households and found appropriate and deemed acceptable.
	CB_y (Adjustment factor for continued use of baseline appliance of SAVE80 users in period y)	80%	93.75%	The value of CB_y (80%) used for ex-ante estimation of emission reductions was an assumed value which was based on the uncertainty about how well the stove would be accepted by the end-users and meet their cooking needs. This value meant that PP expected that continued used of baseline stoves in parallel to the ICS by the end users. However, the value used of CB_y (93.75%) for this MP is based on actual monitoring data based on sampling. The relevant monitoring survey documents and the calculations were verified

				during the OSV interviews and found to be appropriate by VT.
	Emission reductions per stove/year (tCO ₂ /stove)	2.4	2.96	<p>The value of CB_y for this MP (93.75%) is higher than that assumed for ex-ante (80%) estimation of emission reductions. The higher value of CB_y denotes that lesser number of baseline stoves are being used and which in turns has a positive impact on the number of ERs accrued by the project activity.</p> <p>Similarly, the value of DO_y for this MP (3.53%) is lower than that assumed for ex-ante (5%) estimation of emission reductions. The lower value of DO_y denotes that a greater number of ICS are in use, which in turns has a positive impact on the number of ERs accrued by the project activity.</p> <p>The value of CB_y and DO_y for for this MP is based on actual monitoring data based on sampling. The relevant monitoring survey documents and the calculations were verified during the OSV interviews and found to be appropriate by VT.</p> <p>Hence, increase in ERs per unit in this MP as compared to ex-ante value is acceptable to the VT.</p>
<p>Verification team has assessed the project in order to check any proposed or actual changes to the project design in accordance with §300 of CDM VVS for project activities (version 02.0) /B01-1/. In the opinion of CCIPL, there is no change to the project design. CCIPL's verification team confirms that the project activity is implemented within the project boundary as described in the registered PDD /B04/ and the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PDD /B04/.</p> <p>The verification team took cognizance of §53, 354, 355 and 356 of the CDM VVS for project activities (version 02.0) /B01-1/ to conduct the verification and conducted a site visit in accordance with the §338 and 339 of the CDM VVS for project activities (version 02.0) /B01-1/.</p>				

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines

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N/A

E.4.2. Corrections

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N/A

E.4.3. Change to the start date of the crediting period of the project activity>>
N/A**E.4.4. Inclusion of a monitoring plan**>>
N/A**E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other applied standards or tools**>>
N/A**E.4.6. Changes to the project design**>>
N/A**E.4.7. Changes specific to afforestation and reforestation project activities**>>
N/A**E.5. Compliance of the registered monitoring plan with the methodology including applicable tools and standardized baselines**

Means of verification	DR, I
Findings	--
Conclusion	<p>The verification team is able to confirm that the monitoring plan contained in the registered PDD /B04/ is in accordance with the approved methodology applied by the project activity, i.e. AMS-II.G. (Version 03) /B02/.</p> <p>The monitoring plan is in accordance with the approved methodology, AMS-II.G. (Version 03) /B02/, applied by the component project activity and as provided in the PDD /B04/.</p> <p>The verification took cognizance of §357, 358 and §359 of CDM VVS for project activities (version 02.0) /B01-1/.</p>

E.6. Compliance of monitoring activities with the registered monitoring plan**E.6.1. Data and parameters fixed ex ante or at renewal of crediting period**

Means of verification	DR, I														
Findings	--														
Conclusion	<p>The following parameters have been fixed ex-ante for project activity considered under this monitoring period:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Description of the parameter</th> <th>Value</th> <th>Assessment by VT</th> </tr> </thead> <tbody> <tr> <td>$B_{y,appliance}$ (tonnes/year)</td> <td>Quantity of Biomass used in the absence of the project activity (per appliance)</td> <td>3.71908</td> <td>The value is consistent with registered PDD /B04/ and fixed ex-ante for the duration of the crediting period.</td> </tr> <tr> <td>η^{old} (%)</td> <td>Conversion factor wood to charcoal</td> <td>10</td> <td>The value is consistent with registered PDD</td> </tr> </tbody> </table>			Parameter	Description of the parameter	Value	Assessment by VT	$B_{y,appliance}$ (tonnes/year)	Quantity of Biomass used in the absence of the project activity (per appliance)	3.71908	The value is consistent with registered PDD /B04/ and fixed ex-ante for the duration of the crediting period.	η^{old} (%)	Conversion factor wood to charcoal	10	The value is consistent with registered PDD
Parameter	Description of the parameter	Value	Assessment by VT												
$B_{y,appliance}$ (tonnes/year)	Quantity of Biomass used in the absence of the project activity (per appliance)	3.71908	The value is consistent with registered PDD /B04/ and fixed ex-ante for the duration of the crediting period.												
η^{old} (%)	Conversion factor wood to charcoal	10	The value is consistent with registered PDD												

				/B04/ and fixed ex-ante for the duration of the crediting period.
	$NCV_{biomass}$ (TJ/t)	Net calorific value of the non-renewable woody biomass that is substituted	0.015	The value is consistent with registered PDD /B04/ and fixed ex-ante for the duration of the crediting period.
	$EF_{projected_fossilfuel}$ (tCO ₂ /TJ)	Emission factor for the substitution of non-renewable woody biomass by similar consumers	81.6	The value is consistent with registered PDD /B04/ and fixed ex-ante for the duration of the crediting period.
	L_y (Fraction)	Leakage adjustment factor period y	0.95	The value is consistent with registered PDD /B04/ and fixed ex-ante for the duration of the crediting period.
	$f_{NRB,y}$ (Fraction)	Fraction of woody biomass saved by the project activity in period y that can be established as non-renewable biomass	0.98	The value is consistent with registered PDD /B04/ and fixed ex-ante for the duration of the crediting period.
<p>Verification team confirms that the data and parameters fixed ex-ante are in accordance with the revised and approved PDD /B04/ and the monitoring plan.</p> <p>The verification took cognizance of §360 of CDM VVS for project activities (version 02.0) /B01-1/.</p>				

E.6.2. Data and parameters monitored

Means of verification	DR, I
Findings	CL 01 and 02 have been raised in this regard. Please refer to Appendix 4 for the detailed closure of the verification findings.
Conclusion	The Verification team is able to confirm that the Data and parameters monitored are in accordance with the revised and approved PDD /B04/ and the monitoring plan /B04/. A complete assessment of each of the monitored parameters has been provided in Appendix 5 of the verification report. The verification took cognizance of §360, §361, §363 and §364 of CDM VVS for project activities (version 02.0) /B01-1/.

E.6.3. Implementation of sampling plan

Means of verification	DR, I
Findings	CAR 1 and CL 04, 05 and 06 have been raised in this regard. Please refer to Appendix 4 for the detailed closure of the verification findings.
Conclusion	The sampling was undertaken by the PP for the following monitoring parameters: <ol style="list-style-type: none"> 1. Statistically adjusted drop out from total population of SAVE80 in period y (DO_y) 2. Adjustment factor for continued use of baseline appliance of SAVE80 users in period y (CB_y) 3. Adjusted average efficiency of the SAVE80 system being deployed (η_{new})

The total population of the stoves distributed under the project activity is 9,982. The same was confirmed through the review of stove sales record /06/.

Simple random sampling was separately applied by the PP for selection of the monitoring samples with 90/10 confidence / precision level respectively for the annual monitoring of three parameters. The same is deemed acceptable as per the registered PDD /B04/.

A single sampling frame was applied for determining the parameters “DO_y” and “CB_y” as the stoves type distributed were same including the end users that are domestic households. As for the thermal efficiency of the stoves (η_{new}) another single sampling frames was chosen.

The number of samples for each of the parameters covered during the monitoring activity is as given below:

Parameter	Calculated Sample Size (n)	Calculated Sample Size (n)	Samples covered during monitoring
	At 100% response rate	At 91% response rate	
DO _y	7	8	85
CB _y	22	24	85
η_{new}	3	5	12

The calculated sample size in the case of DO_y and CB_y was not less than either the calculated sample size or the minimum sample size as per the PDD /B04/, the sample size covered by the PP was accepted.

However, for parameter η_{new} the calculated sample size was less than 30 and hence a student's t-distribution test in accordance with §13 of *Standard: Sampling and surveys for CDM project activities and programmes of activities (Version 07.0)* was applied to re-calculate the sample size (n). The sample size arrived at after applying the student's t-distribution test was four (04) As these sample sizes were still less than ten (10), which is the minimum number of samples to be undertaken for determination of efficiency of ICS in accordance with the registered PDD and so, the PP conducted 12 WBTs. Hence, the sample size covered by PP was deemed acceptable by VT.

It was found that for all the parameters, the respective confidence/precision (90/10) was met.

DOE used sampling during verification for checking the operational status and to check if the WBT tests have been done in the households and all the 8 households confirmed that the WBT tests were conducted in their households. Considering that Lesotho is a Least Developed Country (LDC), applying §33 (c) of the sampling standard (version 07.0) /B07/, a sample size for 8 households was chosen (with no non-responses) for the project activity. A sample size of 8 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 10 % and consumer risk used was 20 %. Acceptance number (c) thus determined for the sample is 0. It was observed that all the 8 stoves were in working condition and thus c=0, i.e. no discrepant records were observed with the published MR /01/ and ER sheet /03/. Thus, PP's set of records has been accepted in line with §32 of the sampling standard (version 07.0) /B07/. For parameters DO_y and CB_y a common interview questionnaire was prepared and was used during the survey by the PP. Verification team has cross verified these sample documents during the on-site visit.

Verification team confirms that the sampling approach applied by the PP is in accordance with the registered PDD /B04/ including the Guidelines: Sampling and surveys for CDM project activities and programmes of activities (version 04.0) /B06/ and Standard: Standard for sampling and surveys for CDM project activities and programme of activities (version 07.0) /B07/

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	DR, I																		
Findings	CL 03 has been raised in this regard. Please refer to Appendix 4 for the detailed closure of the verification findings.																		
Conclusion	<p>The efficiency of ICSs is determined through Water Boiling Tests (WBTs) conducted in line with the guidance provided by the PP in the PDD /B04/ The monitoring equipment used for conducting the stove efficiency tests are thermometer and weighing scale. This equipment has been calibrated by Department of Physics and Electronics, National university of Lesotho. The details of equipment and the calibration results are as:</p> <table border="1"> <thead> <tr> <th>Equipment</th> <th>Weighing Scale</th> <th>Thermocouple</th> </tr> </thead> <tbody> <tr> <td>Type</td> <td>KD 7000</td> <td>Greisinger Präzisionsthermometer GMH 3710</td> </tr> <tr> <td>Serial number</td> <td>ESN56784224992T</td> <td>32402671</td> </tr> <tr> <td>Accuracy Class</td> <td>+/- 1 g</td> <td>+/- 0.03°C</td> </tr> <tr> <td>Date of Calibration</td> <td>18/02/2019</td> <td>18/02/2019</td> </tr> <tr> <td>Result</td> <td>Within the accuracy class</td> <td>Within the accuracy class</td> </tr> </tbody> </table> <p>As assessed in section above, the accuracy class of the monitoring equipment is in compliance with that required by the WBT protocol.</p> <p>The registered PDD /B04/ does not specify the frequency of calibration. The PP requested the National University of Lesotho to perform a calibration check and conduct accuracy tests of the scale and thermometer before their use in WBTs. By checking the calibration certificates of the weighing scale /12/ and thermometer /12/, the verification team confirms that the equipment is reliable for measurement at the time of conducting the WBTs.</p> <p>The appropriate QA/QC procedures have been followed for the monitoring parameters.</p> <p>The verification took cognizance of section 10.2.6 of CDM VVS for project activities (version 02.0) /B01-1/.</p>	Equipment	Weighing Scale	Thermocouple	Type	KD 7000	Greisinger Präzisionsthermometer GMH 3710	Serial number	ESN56784224992T	32402671	Accuracy Class	+/- 1 g	+/- 0.03°C	Date of Calibration	18/02/2019	18/02/2019	Result	Within the accuracy class	Within the accuracy class
Equipment	Weighing Scale	Thermocouple																	
Type	KD 7000	Greisinger Präzisionsthermometer GMH 3710																	
Serial number	ESN56784224992T	32402671																	
Accuracy Class	+/- 1 g	+/- 0.03°C																	
Date of Calibration	18/02/2019	18/02/2019																	
Result	Within the accuracy class	Within the accuracy class																	

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	DR, I															
Findings	--															
Conclusion	<p>The equations for baseline emissions, as provided in the monitoring report /2/ and confirmed with the registered PDD /B04/ and the methodology AMS-II.G (Version 03) /B02/, are:</p> $ER_y = B_{y,savings} \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel}$ <p>Where:</p> <table border="1"> <tr> <td>ER_y</td> <td>=</td> <td>Emission reductions of the project activity in period y</td> </tr> <tr> <td>$B_{y,savings}$</td> <td>=</td> <td>Quantity of biomass that is saved in tonnes in period y</td> </tr> <tr> <td>$f_{NRB,y}$</td> <td>=</td> <td>Fraction of biomass saved by the project activity that can be established as non-renewable biomass</td> </tr> <tr> <td>$NCV_{biomass}$</td> <td>=</td> <td>Net calorific value of the non-renewable biomass that is substituted</td> </tr> <tr> <td>$EF_{projected_fossilfuel}$</td> <td>=</td> <td>Emission factor for the substitution of non-renewable biomass by similar consumer</td> </tr> </table>	ER_y	=	Emission reductions of the project activity in period y	$B_{y,savings}$	=	Quantity of biomass that is saved in tonnes in period y	$f_{NRB,y}$	=	Fraction of biomass saved by the project activity that can be established as non-renewable biomass	$NCV_{biomass}$	=	Net calorific value of the non-renewable biomass that is substituted	$EF_{projected_fossilfuel}$	=	Emission factor for the substitution of non-renewable biomass by similar consumer
ER_y	=	Emission reductions of the project activity in period y														
$B_{y,savings}$	=	Quantity of biomass that is saved in tonnes in period y														
$f_{NRB,y}$	=	Fraction of biomass saved by the project activity that can be established as non-renewable biomass														
$NCV_{biomass}$	=	Net calorific value of the non-renewable biomass that is substituted														
$EF_{projected_fossilfuel}$	=	Emission factor for the substitution of non-renewable biomass by similar consumer														

$B_{y,savings}$ is calculated according to the following approach (AMS II.G., par. 6, Option 2, equation 3):

$$B_{y,savings} = B_{old} \cdot \left(1 - \frac{\eta_{old}}{\eta_{new,y}}\right)$$

Where:

B_{old}	=	Quantity of biomass used in the absence of the project activity
η_{old}	=	Efficiency of the system being replaced
η_{new}	=	Efficiency of the system being deployed as part of the project activity

B_{old} is calculated according to the following formula:

$$B_{old} = B_{y,appliance} \cdot N_y \cdot (1 - DO_y) \cdot CB_y \cdot \frac{mP_{length}}{365} \cdot L_y$$

Where:

$B_{y,appliance}$	=	Average annual consumption of woody biomass per appliance
DO_y	=	Statistically adjusted drop out from total population of appliances in period y
mP_{length}	=	Length of monitoring period y in days
L_y	=	Leakage adjustment for period y
N_y	=	Total number of appliances deployed in period y
CB_y	=	Adjustment factor for continued use of baseline appliance of SAVE80 users in period y

From the above equation and the parameter values, emission reductions are calculated as 28,654 tCO₂e (ER_y).

The verification team confirms that the calculation of baseline emission and emission reductions is in accordance with the applied methodological equation and the PDD /B04/. Calculations have been checked and confirmed from the ER spread sheet /04/.

The verification took cognizance of § 372 of CDM VVS for project activities (version 02.0) /B01-1/.

E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

Means of verification	DR, I
Findings	--
Conclusion	There are no project emissions identified in the monitoring methodology /B02/ and the PDD /B04/.

E.8.3. Calculation of leakage GHG emissions

Means of verification	DR, I
Findings	--
Conclusion	A default (0.95) Net to gross adjustment factor to account for leakages (LE _{NRB}) has been considered by the project and thus it is in line with the requirement of monitoring methodology /B02/ and the PDD /B04/.

E.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	DR, I
Findings	CAR 02 has been raised in this regard. Please refer to Appendix 4 for the detailed closure of the verification findings.
Conclusion	Verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based

	<p>on verifiable evidence and calculations are done in accordance with the pre-defined formulae from registered PDD /B04/. The total number of CERs achieved during the monitoring period is 28,654 tCO₂e.</p> <p>In summary, verification team confirms that actual emission reduction is lower than the estimate of the registered PDD for the current monitoring period.</p>
--	--

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	DR, I
Findings	--
Conclusion	<p>The ex-ante estimated value of the emission reductions for the monitoring period as per the registered PDD is 37,332 tCO₂e and the actual emission reductions achieved for the monitoring period is 28,654 tCO₂e. Verification team confirms that actual emission reduction is lower than the estimate of the registered PDD for the current monitoring period.</p> <p>The verification team took cognizance of §372 of CDM VVS for project activities (version 02.0) /B01-1/.</p>

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	DR, I
Findings	--
Conclusion	Verification team confirms that actual emission reduction is lower than the estimate of the registered PDD for the current monitoring period.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	DR, I
Findings	--
Conclusion	<p>CER achieved upto 31st Dec 2012 = 0 tCO₂e. CER achieved from 1st Jan 2013 = 28,654 tCO₂e</p>

E.9. Assessment of reported sustainable development co-benefits

Means of verification	Not applicable
Findings	-
Conclusion	Not applicable

E.10. Global stakeholder consultation

Means of verification	Not applicable (this is not first MP)
Findings	-
Conclusion	Not applicable (this is not first MP)

SECTION F. Internal quality control

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The final verification report passed a technical review before being submitted to the UNFCCC Executive Board. A technical reviewer qualified in accordance with the CCIPL's qualification scheme for CDM validation and verification has performed the technical review.

SECTION G. Verification opinion

Carbon Check (India) Private Ltd. (CC IPL) has performed the third periodic verification of the registered CDM Project Activity “Efficient Wood Fuel Stove-Cooking-Sets, Lesotho” (UNFCCC Ref. No.: 5482).

The verification team assigned by the DOE concludes that the project activity as described in the registered PDD (Version 3, date 25/08/2012) /B04/ and the Monitoring report (version 02, dated 06/06/2019) /02/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM M & P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the requirements of CDM VVS for project activities, (version 02.0) /B01-1/.

Verification methodology and process:

The Verification team confirms the contractual relationship signed on 23/01/2019 between the DOE, Carbon Check (India) Private Ltd. and the Project Participant, (atmosfair gGmbH). The team assigned to the verification meets the CC IPL’s internal procedures including the UNFCCC requirements for the team composition and competence. The verification team has conducted a thorough contract review as per UNFCCC and CC IPL’s procedures and requirements.

The verification has been performed as per the requirements described in the CDM VVS for project activities (version 02.0) and constitutes the review and completion of the following steps:

- Reviewing the registered PDD (Version 3, date 25/08/2012), including the monitoring plan and the corresponding validation report /B04/;
- Publication of the MR (version 01, dated 21/03/2019) /1/ on the UNFCCC website on 29/03/2019
- Desk review of the validation report, MR and other relevant documents including documents related to the project activities emission reductions
- Review of the applied monitoring methodology AMS II.G (version 03.0) /B02/;
- Review of any CMP and EB decisions, clarifications and guidance /B05/;
- On-site assessment (30/04/2019 – 01/05/2019)
- Resolution of CARs and CLs raised during verification
- Issuance of Verification Report

The project activity was correctly implemented according to selected monitoring methodology, monitoring plan and the registered PDD. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on site visit the verification team confirms that the project activity has resulted in the 28,654 tCO₂e emission reductions during the third monitoring period.

Verified emission reductions for the project activity: 28,654 tCO₂e.

The break-up of emission reduction up-to 31/12/2012 and 01/01/2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO ₂ e)	0	28,654

CC IPL as a DOE is therefore pleased to issue a positive verification opinion expressed in the attached Certification statement.

SECTION H. Certification statement

Carbon Check (India) Private Ltd., the DOE, has performed the seventh (07) periodic verification of the registered project activity “Efficient Wood Fuel Stove-Cooking-Sets, Lesotho” (UNFCCC Ref. No.: 5482). The project activity includes distribution of energy efficient stoves for cooking purposes. The emission reductions due to the project activity are achieved due to reduction in consumption of non-renewable biomass as compared to baseline scenario due to replacement of traditional cooking devices by improved cookstoves (ICS).

The project activity is designed to generate emission reductions by installation of the ICS in the host country of Lesotho. The PP is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions. It is DOE's responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity. The DOE does not express any opinion on the selected baseline scenario or on the validated and registered PDD. The verification is carried out in-line with the requirements of CDM VVS for project activities (version 02.0).

The verification was performed to identify the compliance with implementation and monitoring requirements, and to verify the actual amount of achieved emission reductions, through obtaining evidence and information on-site that included:

- i) Checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and
- ii) The collection of evidence supporting the reported data.

The verification is based on:

- Reviewing the registered PDD (Version 3, date 25/08/2012) and the corresponding validation report /B04/;
- Approved monitoring methodology AMS II.G (version 03.0) /B02/;
- Monitoring reports versions 1 (dated 21/03/2019) and version 2 (dated 06/06/2019)

This statement covers verification period from 01/12/2017 to 30/11/2018 (including both the dates).

The DOE has raised nine (09) clarification requests and two (02) corrective action request, all of which have been resolved by the PP.

The DOE considers necessary to give reasonable assurance that reported GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology and the monitoring plan contained in the registered PDD are fairly stated.

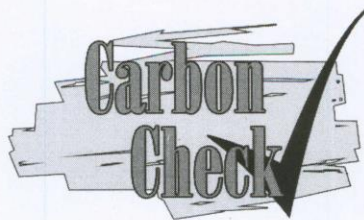
The DOE, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 28,654 tCO₂ equivalent and all monitoring requirements have been fulfilled and is substantiated by an audit trail that contains evidence and records. The break-up of emission reduction up-to 31/12/2012 and 01/01/2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO ₂ e)	0	28,654

Appendix 1. Abbreviations

Abbreviations	Full texts
AQL	Acceptable Quality Limit
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CAR	Corrective Action Request
CC IPL	Carbon Check (India) Private Ltd.
CER	Certified Emission Reduction
CL	Clarification Request
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent
DR	Document Review
DOE	Designated Operational Entities
DVR	Draft Verification Report
EB	CDM Executive Board
EF	Emission Factor
EI	External individual
FA	Final Approval
FAR	Forward Action Request
FVR	Final verification Report
GHG	Greenhouse gas(es)
GWh	Giga Watt Hour
I	Interview
IPCC	Intergovernmental Panel on Climate Change
IR	Internal resource
MP	Monitoring period
MR	Monitoring report
MWh	Mega Watt Hour
PP	Project Participant
OSV	On Site Visit
QC/QA	Quality control/ Quality assurance
TA	Technical Area
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
UQL	Unacceptable Quality Limit
VVS	Validation and Verification Standard
WBT	Water boiling test

Appendix 2. Competence of team members and technical reviewers



Carbon Check (India) Private Ltd.

Amit Anand

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

Validator Team Leader Technical reviewer
 Verifier Technical Expert Local Expert¹

In the following Technical Areas:

TA 1.1 TA 3.1 TA 5.2 TA 9.2 TA 13.2
 TA 1.2 TA 4.1 TA 8.1 TA 10.1 TA 14.1
 TA 2.1 TA 5.1 TA 9.1 TA 13.1

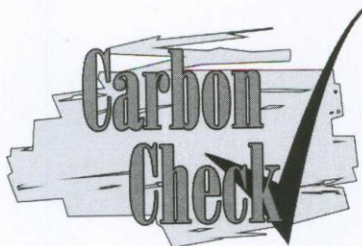
Mr. Vikash Kumar Singh
Compliance Officer

Date of Approval	Valid Till
24/12/2018	23/12/2019

Revision History of the Document	
26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2016	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision

¹ India, South Africa

CARBON CHECK (INDIA) PRIVATE LIMITED
 Registered in India: U74930DL2012PTC232495
 Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
 Corporate off: G 49 & 50, 3rd Floor, Sector - 3, NOIDA (Uttar Pradesh) - 201301
 Tel: +91 120 4373114 | URL: www.carboncheck.co.in
 e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Vikash Kumar Singh

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

- Validator Team Leader Technical reviewer
 Verifier Technical Expert Local Expert¹

In the following Technical Areas:

- TA 1.1 TA 3.1 TA 5.2 TA 9.2 TA 13.2
 TA 1.2 TA 4.1 TA 8.1 TA 10.1 TA 14.1
 TA 2.1 TA 5.1 TA 9.1 TA 13.1

Mr. Amit Anand
CEO

Date of Approval
24/12/2018

Valid Till
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Revision History of the Document	
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 Corporate off: G 49 & 50, 3rd Floor, Sector - 3, NOIDA (Uttar Pradesh) - 201301
 Tel: +91 120 4373114 | URL: www.carboncheck.co.in
 e-mail: info@carboncheck.co.in

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/01/	atmosfair	Webhosted Monitoring Report Interim Monitoring Report	Version 1; Dated:21/03/2019 Version 1; Dated:22/05/2019	PP
/02/	atmosfair	Final Monitoring report	Version 02; Dated: 06/06/2019	PP
/03/	atmosfair	Emission reduction calculation spread sheets corresponding to /01/	N/A	PP
/04/	atmosfair	Emission reduction calculation spread sheets corresponding to /02/	N/A	PP
/05/	atmosfair	Monitoring survey database	-	PP
/06/	atmosfair	Stove distribution records including evidence for the dates of distribution		PP
/07/	Koch	Manufacturer's specification for Save80 cookstoves	Dated: 03/05/2011	PP
/08/	atmosfair	Sample sales agreement: Proof of Carbon Credits waiver by End user	N/A	PP
/09/	atmosfair	WBT records and calculation sheet	-	PP
/10/	MyWeigh	Technical details of weighing scale (type KD 7000)	-	PP
/11/	Greisinger	Technical specification of thermocouple (type Greisinger Präzisionsthermometer GMH 3710)	-	PP
/12/	National university of Lesotho	calibration records of the monitoring equipment used for WBT: • Weighing Scale • Thermocouple	Dated: 18/02/2019; Dated: 18/02/2019	PP
/13/	atmosfair	Training Records and certificates	-	PP
/14/	atmosfair	List of random samples generated for monitoring surveys and random sample generator	-	PP
/15/	atmosfair	WBT Testing Protocol Standards and Procedures	Version: 1.5; Dated: 11/09/2014	PP
/16/	atmosfair	Evidence for unique identification of each of the project stoves	-	PP
/17/	atmosfair	Sample: Monitoring survey questionnaire template	-	PP
/18/	atmosfair	Standard Operating Procedure – Sampling	Version: 1; Dated: 01/12/2012	PP
/19/	Ministry of Tourism, Environment and Culture, Govt. of Lesotho	Environmental clearance for manufacturing of efficient wood fuel stove cooking sets	Ref. No.: MTEC/NES/PRO/21 Dated: 29/03/2011	PP
/20/	atmosfair	Evidence for traceable “identity check” of the appliances visited during sampling	-	PP
/21/	atmosfair	Copies of agreement between the atmosfair gGmbH and Solar Lights (Pty) Ltd.,	Dated: 18/12/2010	PP
/22/	atmosfair	Copy of duly filled and signed monitoring survey questionnaires	-	PP
/B01/	UNFCCC	1. CDM VVS for Project Activities (version 02.0)	http://cdm.unfccc.int/	Others

		2. CDM PS for Project Activities (version 02.0) 3. CDM PCP for Project Activities (version 02.0)		
/B02/	UNFCCC	Applied baseline and monitoring methodology, AMS-II.G (version 03)	http://cdm.unfccc.int/	Others
/B03/	UNFCCC	Instructions for filling out the monitoring report form for CDM project activities (version 06.0)	http://cdm.unfccc.int/	Others
/B04/	UNFCCC	Registered PDD (Version 3 dated 25/08/2012) and Corresponding validation reports.	http://cdm.unfccc.int/	Others
/B05/	Web sites	Websites: http://cdm.unfccc.int/	=	Others
/B06/	UNFCCC	Guidelines: Sampling and surveys for CDM project activities and programmes of activities (version 04.0)	http://cdm.unfccc.int/	Others
/B07/	UNFCCC	Standard: Standard for sampling and surveys for CDM project activities and Programme of Activities (version 07.0)	http://cdm.unfccc.int/	Others
/B08/	UNFCCC	Guideline: Application of materiality in verifications" (version 02.0)	http://cdm.unfccc.int/	Others
/B09/	UNFCCC	Monitoring Reports and Verification Reports of the MP 1, 2, 3, 4, 5, and 6.	http://cdm.unfccc.int/	Others

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

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

FAR ID	xx	Section no.	E.2	Date: DD/MM/YYYY
Description of FAR				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Table 2. CL from this verification

CL ID	01	Section no.	E.6.2	Date: 21/04/2019
Description of CL				
<p><i>The PP is requested to provide the following supporting documents to the DOE for review:</i></p> <p><i>a. Supporting documents (excel sheet) for determination of DO_y and CB_y.</i></p> <p><i>b. WBT test results (excel sheet and hard copy records).</i></p>				
Project participant response				Date: 22/05/2019
<p><i>Supporting documents (excel sheet) for determination of DO_y and CB_y are provided in the CER Calculation excel sheet under the tab "daverage and mp length MP7"</i></p> <p><i>WBT test results (excel sheet and hard copy records) are provided in folder 05_WBT</i></p>				
Documentation provided by project participant				
<p><i>02_Lesotho_5482_CER_Calculation_MP7.xls</i></p> <p><i>06_WBT folder</i></p>				
DOE assessment				Date: 03/06/2019
<p>The supporting documents as requested above have been provided by the PP for review and have been found to be correct and acceptable.</p> <p>Finding is closed.</p>				

CL ID	02	Section no.	E.6.2	Date: 21/04/2019
Description of CL				
<p><i>In section E.2 of MR, the value for efficiency (η_{new}) of cookstoves for has been provided as 44.08% for this MP. However, it has been observed that there is an increase of 1.51% in the value of efficiency provided for this MP (44.08%) as compared to the value (42.57%) provided for the previous MP.</i></p> <p><i>PP shall provide a reason for the increase in the efficiency of the cookstoves.</i></p>				
Project participant response				Date: 22/05/2019
<p><i>The efficiencies of the Save80 stoves are measured in the field using the WBT protocol. There can be slight differences in obtained efficiencies from one MP to another due to factors like weather conditions (e.g. wind) and skill of the WBT staff. As can be seen from following list, the value obtained in MP7 is in the range of values obtained in the previous 6 monitoring periods.</i></p> <p><i>MP1 42.64%</i></p> <p><i>MP2 42.67%</i></p> <p><i>MP3 43.78%</i></p> <p><i>MP4 45.20%</i></p> <p><i>MP5 44.92%</i></p> <p><i>MP6 42.57%</i></p> <p><i>MP7 44.08%</i></p>				
Documentation provided by project participant				
<p>Previous Monitoring Reports (https://cdm.unfccc.int/Projects/DB/RWTUV1323354971.78/view?cp=2)</p>				

DOE assessment	Date: 03/06/2019
<p>PP has justified the increase in the efficiency of the cook stoves for this MP as compared to previous MP by saying that the result of WBTs are dependent on other external factors such as weather conditions, quality of fuel and also the skills of WBT staff (which are duly trained and were interviewed during the OSV and training certificates have also been checked by the VT). The reason as provided by PP is acceptable to the VT.</p> <p>Furthermore, the VT calculated that standard deviation (0.010247) and variance (0.000122) between the efficiency of ICS obtained through WBTs during all the MPs (including the current MP) are insignificant, which means that the efficiency values as obtained during all the MPs don't significantly vary from the mean value (43.69%). Moreover, the value of efficiency (44.08%) as obtained during this MR is still lower than the thermal efficiency of ICS (52%) as confirmed in the manufacturer's specifications amounts to 52% (Refer to B.7.1. of PDD, version 3). The ex-post values are still below this value which is feasible under field conditions.</p> <p>Finding is closed.</p>	

CL ID	03	Section no.	E.7	Date: 21/04/2019
Description of CL				
<p><i>For the monitoring parameter "Adjusted average efficiency of the SAVE80 system being deployed", details of monitoring equipment have been provided.</i></p> <p><i>However, no information has been provided on whether the equipment used were duly calibrated and within their errors within the permissible accuracy class before conducting the WBTs.</i></p> <p><i>Furthermore, substantiate through documentary evidences that the personnel responsible for conducting these tests are qualified and trained to conduct such tests.</i></p>				
Project participant response				Date: 22/05/2019
<p><i>Information on the duly calibration of the equipment used for the WBTs has been provided.</i></p>				
Documentation provided by project participant				
<p>06_WBT folder: Calibration Certificates folder WBT Preparation form signed.pdf WBT Tester 1 signed agreements.pdf WBT Tester 2 signed agreements.pdf</p>				
DOE assessment				Date: 03/06/2019
<p>PP has provided the calibration certificates for the monitoring equipment (weighing Scale: KD 8000; Thermocouple: Greisner GMH 3710). The equipment was calibrated by National University of Lesotho on 18/02/2019, which is before the WBT for the ICS were conducted in the field. The WBT started from 20/02/2019. The same is acceptable to the VT.</p> <p>Furthermore, the personnel responsible for conducting the WBT were interviewed during the OSV on the process followed for conducting the WBTs and training imparted to them before carrying out the tests. All the testers were trained by Michael Hone (Solar Lights), who is a qualified engineer and has submitted a master's thesis on Efficiency testing of ICS and was further trained by atmosfair on how to conduct WBTs.</p> <p>However, PP has not provided the training certificates for all the testers involved in conducting the WBTs during this MP.</p> <p>Finding is not closed.</p>				
Project participant response				Date: 06/06/2019
<p>Training certificates for all the testers involved in conducting the WBTs have been provided.</p>				
Documentation provided by project participant				
<p>MP7_WBT training certificates.pdf</p>				
DOE assessment				Date: 06/06/2019
<p>PP has provided the training certificates for all the testers involved in conducting WBT during this MP.</p> <p>Finding is closed.</p>				

CL ID	04	Section no.	E.6.3	Date: 21/04/2019
Description of CL				

<i>During the initial sampling efforts, the sample size calculated for parameter η_{new} was two (02). Moreover, as per the registered PDD a minimum of 10 samples shall be tested for determination of efficiency of project ICS whereas the PP has tested 12 ICS for the same purpose.</i>	
<i>However, all the sample sizes are still below the minimum sample size of 30 stipulated for cases where parameter of interest is mean as in this case. So, why a Student's t-distribution was not used to calculate the sample size in accordance with § 13 of Standard: Sampling and surveys for CDM project activities and programmes of activities (Version 07.0).</i>	
Project participant response	Date: 22/05/2019
Calculation of minimum sample size using Student's t-distribution was added and values obtained used in MR	
Documentation provided by project participant	
07b_Lesotho_5482_Sample Size Precision calculation_MP7.xlsx00	
DOE assessment	Date: 03/06/2019
The ER sheet for this monitoring period has been revised and a Student's t-distribution has been applied to calculate the sample size in accordance with § 13 of Standard: Sampling and surveys for CDM project activities and programmes of activities (Version 07.0).	
applying the student's t-distribution test the sample size arrived at is four (04) samples. Even after applying a response rate of 90% the revised sample size comes to five (05) samples.	
As the sample size obtained after applying student's t-distribution is still below the minimum number of samples (10) to be tested for determination of efficiency of ICS as specified in the registered PDD. Hence, the VT concludes that the 12 samples tested for determining the efficiency of ICS for the project activity is found in compliance with the registered sampling plan and § 13 of Standard: Sampling and surveys for CDM project activities and programmes of activities (Version 07.0).	
Finding is closed.	

CL ID	05	Section no.	E.6.3	Date: 21/04/2019
Description of CL				
<i>In the registered PDD, it has been stated that the minimum sample size to be considered for determination of CB_y shall be 85.</i>				
<i>However, upon review of the MR and the sample size calculation sheet it was observed that only 82 households were interviewed for determination of CB_y. In light of the above observation, PP shall clarify, why additional sampling efforts were not made to meet the minimum sample size of 85</i>				
Project participant response				Date: 22/05/2019
85 households were interviewed to determine CB_y and DO_y . The value was corrected in the MR.				
Documentation provided by project participant				
Lesotho_5482_Monitoring Report_MP7_v2_22.05.2019				
DOE assessment				Date: 03/06/2019
The MR and sample size calculation sheet have now been revised to correctly state that 85 households were interviewed for determination of CB_y . The same was also verified and cross-checked by VT through review of hard copy of Monitoring survey form during the OSV.				
Finding is closed.				

CL ID	06	Section no.	E.6.3	Date: 21/04/2019
Description of CL				

In the sample size and precision calculation sheet (Lesotho_5482_Sample Size_Precision_calculation_MP7.xlsx), for all the parameters (DO_y , CB_y , η_{new}), following 4 type of sample sizes are provided:

1. n (calculated sample size)
2. $n + \text{response rate}$
3. n (minimum ss as per PDD)
4. minimum ss + response rate

PP shall clarify the following:

- (a) Which sample size values out of the above four are considered for carrying out the monitoring survey?
- (b) Significance of calculating “minimum ss + response rate”
- (c) If “minimum ss + response rate” is the final sample size of households that needs to be visited for determination of the parameters as listed above then why additional sampling effort was not carried out by PP to meet the sample size for parameter DO_y ($n=85$) and CB_y ($n=82$), which is lower than the value of “minimum ss + response rate” ($n=94$).

Project participant response	Date: 22/05/2019
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- (a) “3” is the minimum sample size to be met for the monitoring survey as it is the higher value compared to “1”.
- (b) Minimum ss + response rate (“4”) is an estimation of how many households should be contacted during the monitoring campaign in order to get responses of a sufficient number of households to meet the minimum ss as per PDD (“3”).
By having a sample size of 94 households we can expect to survey the necessary minimum sample size of 85 households when considering the historic response rate of 91%.
- (c) As explained above the final sample size of households that needs to be visited for determination of the parameters as listed above is the minimum ss as per PDD (“3”). This corresponds to $n=30$ for DO_y and $n=85$ for CB_y which were both satisfied by the sample size of 85.

Calculation of “4” was removed from the sample size and precision calculation sheet to prevent confusion.

Documentation provided by project participant

07b_Lesotho_5482_Sample Size_Precision_calculation_MP7.xlsx

DOE assessment	Date: 03/06/2019
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PP has explained above that:

- (a) Minimum sample size as per PDD is the size of sample that is considered for carrying out the monitoring survey. The same has been found acceptable through review of sample size and precision calculation sheet (Lesotho_5482_Sample Size_Precision_calculation_MP7.xlsx) and also through review of hard copies of monitoring survey questionnaires during OSV.
- (b) “minimum ss + response rate” is calculated by PP to estimate the number of households that should be contacted at the start of monitoring survey to get responses from a sufficient number of households to meet the minimum ss as per PDD.
- (c) “minimum ss + response rate” is not the final sample size of households but is used to estimate the number of households that should be contacted at the start of monitoring survey to get responses from a sufficient number of households to meet the minimum ss as per PDD. The size of sample that is considered for carrying out the monitoring survey is the Minimum sample size as per PDD.

Finding is closed.

CL ID	07	Section no.	E.3	Date: 13/05/2019
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Description of CL

During the review of MR and ER sheet it was observed that the emissions reductions per unit of stoves for this monitoring period (2.96 tCO₂/stove) are higher than the ex-ante value (2.4 tCO₂/stove). PP shall explain the reason for this increase.

Project participant response	Date: 31/05/2019
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For the ex-ante calculation values for CB_y and DO_y were estimated to be 80% and 5%, respectively. Due to the high quality of the Save80 stove and the high acceptance and satisfaction level of stove users with the Save80 stove set as observed during monitoring (see response to CL08) values for CB_y and DO_y for MP7 are higher and lower, respectively than the ex-ante estimations. This results in higher reductions (per unit of stoves) according to equations for B_y , savings and Bold of the PDD (page 35 and 36).

Documentation provided by project participant

N/A

DOE assessment	Date: 03/06/2019
<p>The value of CB_y for this MP (93.75%) is higher than that assumed for ex-ante (80%) estimation of emission reductions. The higher value of CB_y denotes that lesser number of baseline stoves are being used and which in turns has a positive impact on the number of ERs accrued by the project activity.</p> <p>Similarly, the value of DO_y for this MP (3.53%) is lower than that assumed for ex-ante (5%) estimation of emission reductions. The lower value of DO_y denotes that a greater number of ICS are in use, which in turns has a positive impact on the number of ERs accrued by the project activity.</p> <p>The value of CB_y and DO_y for this MP have been cross-checked through review of ER sheet and monitoring survey questionnaires and through interview with end-users during the OSV.</p> <p>Hence, the reason provided by PP for increase in ERs per unit in this MP as compared to ex-ante value is acceptable to the VT.</p> <p>Finding is closed.</p>	

CL ID	08	Section no.	E.3	Date: 13/05/2019
Description of CL				
<p><i>During the review of MR and ER sheet it was observed that the value for parameter CB_y (Adjustment factor for continued use of baseline appliance of SAVE80 users in period y) for this monitoring period (93.75%) are higher than the ex-ante value (80%). PP shall explain the reason for this increase.</i></p>				
Project participant response				Date: 31/05/2019
<p><i>The ex-ante estimation of CB_y involved a degree of uncertainty. The Save80 stove was a new technology in Lesotho which necessitated some adaption to the cooking behaviour compared to the traditional three stone fire: e.g. using thinner wood pieces which are more frequently inserted into the burning chamber. It was, therefore, uncertain how the long-term use would develop.</i></p> <p><i>During Monitoring we could, however, observe that the Save80 cooking set was very well accepted. Among others, the fast cooking speed, low fuel wood consumption and the convenience of the Wonderbox are appreciated.</i></p> <p><i>This explains the higher than initially estimated usage of the Save80 stove (CB_y) which could already be observed in previous monitoring periods.</i></p>				
Documentation provided by project participant				
N/A				

DOE assessment	Date: 03/06/2019
<p>As explained by PP above, the value of CB_y (80%) used for ex-ante estimation of emission reductions was an assumed value which was based on the uncertainty about how well the stove would be accepted by the end-users and meet their cooking needs. This value meant that PP expected that continued used of baseline stoves in parallel to the ICS by the end users.</p> <p>However, the value used of CB_y(93.75%) for this MP is based on actual monitoring data based on sampling. The relevant monitoring survey documents and the calculations were verified during the OSV interviews and found to be appropriate by VT.</p> <p>Finding is closed.</p>	

CL ID	09	Section no.	Others (Supporting Documents)	Date: 13/05/2019
Description of CL				
<p><i>PP is requested to submit the following documentary evidence to DOE for cross-checking:</i></p> <ol style="list-style-type: none"> <i>1. Stove distribution records including evidence for the dates of distribution</i> <i>2. Evidence for the stove specifications for stove type SAVE80 distributed including the efficiency</i> <i>3. Proof of Carbon Credits waiver by End user</i> <i>4. Sample copies sales receipt / user agreement</i> <i>5. Training records</i> <i>6. Water boiling test records</i> <i>7. Sampling plan along with sample number generator evidence</i> <i>8. Copy of the protocol for conducting WBT for the cook stoves</i> <i>9. Evidence of compliance to national applicable Environmental regulations</i> <i>10.Evidence for unique identification of each of the ICS stoves</i> <i>11.Copies of MOM for the measures for continuous improvement</i> <i>12.Evidence for traceable "identity check" of the appliances visited during sampling</i> 				

13. Copies of Agreement in between the implementing entities
 14. Monitoring survey questionnaire template
 15. Evidence for the monitoring records for the sustainable development parameters:
 a. Training Records (for indicator quality of employment)
 b. Cash return records (for indicator livelihood of the poor)

Project participant response	Date: 31/05/2019
<i>Documentation has been provided</i>	
Documentation provided by project participant	
1 01_Lesotho_Database_MP7.xls	
2 02-Manufactures-Specification_Save80A.pdf	
3 03_Participation and sales contract folder	
4 03_Participation and sales contract folder	
5 06 WBT folder/WBT Preparation form signed.pdf, WBT Tester 1 signed agreements.pdf, WBT Tester 2 signed agreements.pdf	
6 06_WBT folder	
7 07a_SOP_Sampling_Procedure.pdf 07b_Lesotho_5482_Sample Size_Precision_calculation_MP7.xlsx 07c_Lesotho_Randomizer_MP7.xls	
8 08_atmosfair WBT Protocol, Standards and Procedures.pdf	
9 09-Environment letter 2011.pdf	
10 12_MP7 Photos Stove IDs folder	
11 15_GS files folder	
12 12_MP7 Photos Stove IDs folder	
13 13_Service Contract solar lights atmosfair SIGNED.pdf	
14 14_Monitoring Survey Questionnaire MP7 Template.doc	
15 15a: 15_GS files folder 15b 15_GS files folder/MP7 SUG incentive money usage for projects.pdf	
DOE assessment	Date: 03/06/2019
All the supporting documents as requested have been provided by PP except the training certificates for all the testers involved in conducting the WBTs during this MP.	
Finding is still open.	

Project participant response	Date: 06/06/2019
Training certificates for all the testers involved in conducting the WBTs have been provided.	
Documentation provided by project participant	
MP7_WBT training certificates.pdf	
DOE assessment	Date: 06/06/2019
PP has provided the training certificates for all the testers involved in conducting WBT during this MP.	
Finding is closed.	

Table 3. CAR from this verification

CAR ID	01	Section no.	E.6.3	Date: 21/04/2019
Description of CAR				
<i>The summary table provided for sampling in section D.3 doesn't provide information on the following:</i>				
<ul style="list-style-type: none"> (a) Calculated sample size (b) Adjusted sample size after considering response rate (c) Actual number of households sampled to meet the sample size. 				
Project participant response				Date: 22/05/2019
The requested values were added to the summary table.				
Documentation provided by project participant				
Lesotho_5482_Monitoring Report_MP7_v1_22.05.2019				
DOE assessment				Date: DD/MM/YYYY
The summary table provided for sampling in the section D.3 of revised MR now provides information on the following:				
<ul style="list-style-type: none"> (a) Calculated sample size (b) Adjusted sample size after considering response rate (c) Actual number of households sampled to meet the sample size. 				
Finding is closed.				

CAR ID	02	Section no.	E.8.4	Date: 21/04/2019
Description of CAR				
<i>In section E.4 and E,5 of MR, the value of emission reductions (28.654) provided is incorrect and not consistent with the value provided for the same on the cover page of the MR.</i>				
Project participant response				Date: 22/05/2019
Value of emission reductions was corrected to 28,654.				
Documentation provided by project participant				
Lesotho_5482_Monitoring Report_MP7_v1_22.05.2019				
DOE assessment				Date: 03/06/2019
The value of ER has been corrected in section E.4 of MR but the error still exists in section E.5.				
Finding is not closed.				
Project participant response				Date: 06/06/2019
The value of emission reductions (28.654) in E.5 was also corrected to 28,654.				
Documentation provided by project participant				
Lesotho_5482_Monitoring Report_MP7_v3_06.06.2019_trackchange.doc				
Lesotho_5482_Monitoring Report_MP7_v3_06.06.2019_trackchange.pdf				
Lesotho_5482_Monitoring Report_MP7_v3_06.06.2019_clean.doc				
Lesotho_5482_Monitoring Report_MP7_v3_06.06.2019_clean.pdf				
DOE assessment				Date: 06/06/2019
The value of emission reduction has been corrected in section E.5 of MR.				
Finding is closed.				

Table 4. FAR from this verification

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

DOE assessment	Date: DD/MM/YYYY

Appendix 5. Ex-post Monitoring Parameters

Monitoring Parameter Requirement	Assessment/ Observation by the DOE																		
Data / Parameter: (as in monitoring plan of PDD):	η_{new}																		
Description of parameter	Adjusted average efficiency of the system being deployed																		
Data Unit	%																		
Reported Value	44.08																		
Measuring/reading/recording frequency	Annual																		
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes																		
Details of monitoring equipment:	<p>Details of monitoring equipment and their calibration are as:</p> <table border="1"> <thead> <tr> <th>Equipment</th> <th>Weighing Scale</th> <th>Thermocouple</th> </tr> </thead> <tbody> <tr> <td>Type</td> <td>KD 7000</td> <td>Greisinger Präzisionsthermometer GMH 3710</td> </tr> <tr> <td>Serial number</td> <td>ESN56784224992T</td> <td>32402671</td> </tr> <tr> <td>Accuracy Class</td> <td>+/- 1 g</td> <td>+/- 0.03°C</td> </tr> <tr> <td>Date of Calibration</td> <td>18/02/2019</td> <td>18/02/2019</td> </tr> <tr> <td>Result</td> <td>Within the accuracy class</td> <td>Within the accuracy class</td> </tr> </tbody> </table>	Equipment	Weighing Scale	Thermocouple	Type	KD 7000	Greisinger Präzisionsthermometer GMH 3710	Serial number	ESN56784224992T	32402671	Accuracy Class	+/- 1 g	+/- 0.03°C	Date of Calibration	18/02/2019	18/02/2019	Result	Within the accuracy class	Within the accuracy class
Equipment	Weighing Scale	Thermocouple																	
Type	KD 7000	Greisinger Präzisionsthermometer GMH 3710																	
Serial number	ESN56784224992T	32402671																	
Accuracy Class	+/- 1 g	+/- 0.03°C																	
Date of Calibration	18/02/2019	18/02/2019																	
Result	Within the accuracy class	Within the accuracy class																	
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	PDD does not specify the accuracy of the monitoring equipment. Verification team confirms that the accuracy of the monitoring equipment as stated in the MR represent good monitoring practice based on sectoral expertise.																		
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	The calibration frequency has not been specified in the PDD or the monitoring methodology. Annual calibration frequency has been adopted by the PP and is deemed acceptable by the verification team based on its sectoral expertise.																		
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The calibration frequency has not been specified in the PDD or the monitoring methodology. Annual calibration frequency has been adopted by the PP and is deemed acceptable by the verification team based on its sectoral expertise.																		
Company performing the calibration (internal or external calibration):	External. Calibration performed by Department of Physics and electronics, National university of Lesotho																		
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes																		
Is (are) calibration(s) valid for the whole reporting period?	Yes																		
If applicable, has the reported data been cross-checked with other available data?	The data has been cross-checked with the WBT test documents /09/. For the stove efficiency parameter, WBT have been performed and this has been checked by the verification team with the related spreadsheets. Furthermore, the verification team has cross checked all the raw data input records in the WBT calculation spread sheets including the calculation procedure for the sampled households and found																		

	them to be correct. All the raw data forms for the WBT carried out for efficiency parameter were checked by the verification team and thus no sampling of data is required.
How were the values in the monitoring report verified?	The values in the MR were verified from the WBT records /09/ and the ER spread sheet /04/.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. As the monitoring parameter under consideration is determined by standardized test procedures (WBT), the QA/QC and calibrations are at the test conduction by the measuring team for WBT. Accordingly, the verification team has focused on abilities, qualifications and recognition of involved personnel and institutions of the measuring team involved in the WBT. The WBT has been carried by the internal team of PP. The WBT has been carried out by the well-trained personnel and training certificate of the personnel has been provided to the verification team in this respect /13/. The training content /13/ has also been provided to the verification team. During the on-site visit it was confirmed that the team was qualified as confirmed by reviewing the competency documents and trained to carry out WBT in line with the protocol /15/.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable. Full data is available for the monitoring period.

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	N_y
Description of parameter	Adjusted total number of SAVE80 deployed
Data Unit	Number
Reported Value	9669
Measuring/reading/recording frequency	Continuous
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Not Applicable. This parameter is calculated based on Sales receipts/user agreements and sales/distribution records database for project activity
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable as this a calculated parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Not applicable as this a calculated parameter.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Not applicable as this a calculated parameter.
Company performing the calibration (internal or external calibration):	Not applicable as this a calculated parameter.

Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable as this a calculated parameter.
Is (are) calibration(s) valid for the whole reporting period?	Not applicable as this a calculated parameter.
If applicable, has the reported data been cross-checked with other available data?	The reported data have been cross-checked from the stove sales and distribution database /06/.
How were the values in the monitoring report verified?	The values in the monitoring report have been verified from the review of stoves sales and distribution database /06/ and the ER spread sheet /04/
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The necessary QA/QC for this parameter is in place. The verification team has cross checked the audit trail of the data management for this parameter (stove sales and distribution database /06/, Sales agreements /08/.). Furthermore, the verification team confirmed the competence of the team involved in monitoring and recording during the on-site visit interviews and by reviewing the training documents /13/.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable. Full data is available for the monitoring period.

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	DO _y
Description of parameter	Statistically adjusted drop out from total population of SAVE80 in period y
Data Unit	%
Reported Value	3.53
Measuring/reading/recording frequency	Annual
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Not Applicable. This parameter is calculated based on the response provided by the end-users of stove during the monitoring survey and is recorded in monitoring survey questionnaires.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable as this a calculated parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Not applicable as this a calculated parameter.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Not applicable as this a calculated parameter.
Company performing the calibration (internal or external calibration):	Not applicable as this a calculated parameter.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable as this a calculated parameter.

Is (are) calibration(s) valid for the whole reporting period?	Not applicable as this a calculated parameter.
If applicable, has the reported data been cross-checked with other available data?	Yes. The information provided in the monitoring survey database /05/ were verified randomly during the site visit with the survey forms/records /22/ and further cross-checked through interview of the household representatives.
How were the values in the monitoring report verified?	Data have been checked from the review monitoring survey database /05/, sample survey records /22/ and the average calculation has been checked through review of ER calculation sheet /04/.
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	The necessary QA/QC for this parameter is in place. The verification team has cross checked the audit trail of the data management for this parameter (stove sales database /06/, Sales agreements /08/, monitoring survey database /05/ and records /22/). Furthermore, the verification team confirmed the competence of the team involved in monitoring and recording during the on-site visit interviews and by reviewing the training documents /13/.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable. Full data is available for the monitoring period.

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	CB_y
Description of parameter	Adjustment factor for continued use of baseline appliance of SAVE80 users in period y
Data Unit	%
Reported Value	93.75
Measuring/reading/recording frequency	Annual
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Not Applicable. This parameter is calculated based on the response provided by the end-users of stove during the monitoring survey and is recorded in monitoring survey questionnaires.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable as this a calculated parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Not applicable as this a calculated parameter.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Not applicable as this a calculated parameter.
Company performing the calibration (internal or external calibration):	Not applicable as this a calculated parameter.

<p>Did calibration confirm proper functioning of monitoring equipment? (Yes / No):</p>	<p>Not applicable as this a calculated parameter.</p>
<p>Is (are) calibration(s) valid for the whole reporting period?</p>	<p>Not applicable as this a calculated parameter.</p>
<p>If applicable, has the reported data been cross-checked with other available data?</p>	<p>Yes. The information provided in the monitoring survey database /05/ were verified randomly during the site visit with the survey forms/records /22/ and further cross-checked through interview of the household representatives.</p>
<p>How were the values in the monitoring report verified?</p>	<p>Data have been checked from the review monitoring survey database /05/, sample survey records /22/ and the calculation has been checked through review of ER calculation sheet /04/.</p>
<p>Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?</p>	<p>The necessary QA/QC for this parameter is in place. The verification team has cross checked the audit trail of the data management for this parameter (stove sales database /06/, Sales agreements /08/, monitoring survey database /05/ and records /22/). Furthermore, the verification team confirmed the competence of the team involved in monitoring and recording during the on-site visit interviews and by reviewing the training documents /13/.</p>
<p>In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?</p>	<p>Not applicable. Full data is available for the monitoring period.</p>

Appendix 6. Assessment of Monitoring parameters monitored through sampling/surveys

Sl. No.	Checklist Questions	Assessment												
1.	Does the Monitoring Report apply sampling for determination of ex-post monitoring parameters?	Yes, there are ex-post monitoring parameters determined through the sampling effort.												
2.	Is the applied sampling plan in accordance with the sampling plan proposed in the registered PoA-DD/ PDD?	Yes, the applied sampling plan is in accordance with the sampling plan proposed in the registered PDD.												
3.	List the parameters determined through sampling and respective parameters of interest.	<p>Parameters determined through sampling and respective parameters of interest are:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Description of Parameter</th> <th>Parameter of Interest</th> </tr> </thead> <tbody> <tr> <td>DO_y</td> <td>Statistically adjusted drop out from total population of SAVE80 in period y</td> <td>Proportion</td> </tr> <tr> <td>CB_y</td> <td>Adjustment factor for continued use of baseline appliance of SAVE80 users in period y</td> <td>Proportion</td> </tr> <tr> <td>η_{new}</td> <td>Adjusted average efficiency of the SAVE80 system being deployed</td> <td>Mean</td> </tr> </tbody> </table>	Parameter	Description of Parameter	Parameter of Interest	DO_y	Statistically adjusted drop out from total population of SAVE80 in period y	Proportion	CB_y	Adjustment factor for continued use of baseline appliance of SAVE80 users in period y	Proportion	η_{new}	Adjusted average efficiency of the SAVE80 system being deployed	Mean
Parameter	Description of Parameter	Parameter of Interest												
DO_y	Statistically adjusted drop out from total population of SAVE80 in period y	Proportion												
CB_y	Adjustment factor for continued use of baseline appliance of SAVE80 users in period y	Proportion												
η_{new}	Adjusted average efficiency of the SAVE80 system being deployed	Mean												
4.	Is the sample size calculated in accordance with the formula presented in the registered PoA-DD/PDD?	Yes, the sample size calculated is in accordance with the formula presented in the registered PDD												
5.	Are the assumptions used for calculation of sample size appropriate and correct? P.S.: Provide assessment on appropriateness of value of proportion (p), standard deviation (STDEV) or variance (v) used for calculation of sample size.	Simple random sampling was applied for annual monitoring with 90/10 confidence/precision. The same is deemed acceptable as per the PDD. The standard deviation (STDEV) or variance (v) used for calculation of sample size is found to be appropriate. All assumptions for the calculation of sample size were used from the previous monitoring period.												
6.	What are the sample sizes obtained for the parameters being monitored? Is the determined sample size deemed adequate for the parameter of interest being monitored? P.S.: If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion. If the parameter of interest is a numeric mean value (i.e. not a	<p>It was found that with the monitored samples, the desired confidence/precision was met. The number of samples for the parameter covered during the monitoring activity is as given below:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Samples covered during monitoring</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Parameter	Samples covered during monitoring										
Parameter	Samples covered during monitoring													

	<p>proportion or percentage) the Student's t-distribution shall be used if the resulting sample size is less than 30.</p>	<table border="1"> <tr> <td>DO_y</td> <td>85</td> </tr> <tr> <td>CB_y</td> <td>85</td> </tr> <tr> <td><i>η_{new}</i></td> <td>12</td> </tr> </table> <p>The same is found appropriate and acceptable.</p>	DO_y	85	CB_y	85	<i>η_{new}</i>	12		
DO_y	85									
CB_y	85									
<i>η_{new}</i>	12									
<p>7.</p>	<p>Has reliability specification been applied to determine the sampling requirements for each individual parameter value determined through a sampling effort?</p> <p>P.S.: If there is more than one parameter to be estimated in a CDM project activity, then a sample size calculation should be done for each of them. Then either the largest number for the sample size is chosen for the sampling effort with one common survey, or the sampling effort and survey is repeated for each of the parameters. A random sub-sample within the common survey is allowed as long as: (i) the reliability specification (e.g. 90/10 confidence/precision for small-scale CDM project activities and 95/10 for large scale CDM project activities) is achieved for each individual parameter; and (ii) the random sub-sample is consistent with the design of the survey and the corresponding sample size calculation.</p>	<p>It was found that for the parameter, the confidence/precision was met (90/10).</p>								
<p>8.</p>	<p>Is the assumed response rate reasonable (appropriate and correct) for the determination of samples to be surveyed?</p>	<p>Yes, the assumed response rate is reasonable (appropriate and correct) for the determination of samples to be surveyed for the parameter of interest.</p>								
<p>9.</p>	<p>Is the sample selected by PP for determination of the monitored parameters unbiased (random) and representative?</p>	<p>Yes, verification based on review of Microsoft excel random number generator as provided by the PP confirms that sample selected by the PP for determination of the monitored parameters are random. It can be considered as representative of the population.</p>								
<p>10.</p>	<p>Has minimum target level of precision been achieved based on estimates from the actual samples?</p>	<p>Yes, the minimum target level of precision been achieved based on estimates from the actual samples. The achieved precision is as:</p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Achieved precision</th> </tr> </thead> <tbody> <tr> <td>DO_y</td> <td>3.40%</td> </tr> <tr> <td>CB_y</td> <td>4.59%</td> </tr> <tr> <td><i>η_{new}</i></td> <td>1.49%</td> </tr> </tbody> </table> <p>This has been checked and confirmed by reviewing Survey database provided by the PP.</p>	Parameter	Achieved precision	DO_y	3.40%	CB_y	4.59%	<i>η_{new}</i>	1.49%
Parameter	Achieved precision									
DO_y	3.40%									
CB_y	4.59%									
<i>η_{new}</i>	1.49%									
<p>11.</p>	<p>In case the minimum target level of precision has not been achieved based on estimates from the actual samples, please specify the approach adopted by PP to reach the required precision and also justify the appropriateness of the</p>	<p>Not applicable since as assessed above the target level of precision has been achieved.</p>								

	adopted approach in accordance with the applied methodology or paragraph 17 of Sampling and surveys for CDM project activities and programmes of activities (Version 07.0).	
12.	<p>Has VT applied acceptance sampling to verify that the results of sampling efforts undertaken by PP for determination of ex-post parameters. If yes, please provide a detailed justification of the approach adopted including information on (but not limited to):</p> <ul style="list-style-type: none"> (a) Selected AQL Level (b) Selected UQL Level (c) Selected Consumer Risk Level (d) Selected Producer Risk Level (e) Sample Size chosen for acceptance sampling (f) Acceptance number (c) <p>Approach adopted by VT to in case value of greater than c discrepant records were observed in the sample</p>	<p>In line with paragraph 25 of the Sampling Standard, the verification team has applied a sampling approach for on-site visits as part of verification. Now as the PP had applied sampling approach, the verification team has chosen acceptance sampling for the parameters in accordance with paragraph 27 of the sampling standard /B07/.</p> <p>DOE used sampling during verification for checking the operational status and to check if the WBT tests have been done in the households and all the 8 households confirmed that the WBT tests were conducted in their households. Considering that Lesotho is a Least Developed Country (LDC), applying §33 (c) of the sampling standard (version 07.0) /B07/, a sample size for 8 households was chosen (with no non-responses) for the project activity. A sample size of 8 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 10 % and consumer risk used was 20 %. Acceptance number (c) thus determined for the sample is 0. It was observed that all the 8 stoves were in working condition and thus $c=0$, i.e. no discrepant records were observed with the published MR /1/ and ER sheet /3/. Thus, PP's set of records has been accepted in line with §32 of the sampling standard (version 07.0) /B07/. For parameters DO_y and CB_y a common interview questionnaire was prepared and was used during the survey by the PP. Verification team has cross verified these sample documents during the on-site visit.</p>
13.	Are the procedures for the selected survey and data collection method unambiguously defined and do they adequately provide for minimizing non-sampling errors?	Verification team based on on-site inspection interviews and review of documented procedure confirms that the selected survey and data collection method is unambiguously defined. This also adequately ensure minimizing non-sampling errors.
14.	Have potential sources of bias inherent in the selected data collection method, such as self-selection and under-coverage, been anticipated? Have mechanisms for mitigating these been considered?	Review of sampling records, documented procedure and on-site inspection interviews with the personnel who conducted surveys does not reveal any sources of biasness in the selected data collection.
15.	Is the quality control and assurance strategy adequate?	Verification team based on review of provided documents and on-site inspection interviews confirms that the quality control and assurance strategy is adequate.
16.	Are the proposed skill sets, qualifications and experience of the personnel/institutions engaged to conduct the standardized tests/data collection exercise adequate?	For the monitoring parameter, data were collected following a specially designed survey form. The verification team has confirmed the ability of the personnel who conducted the surveys during the on-site visit.
17.	Does the PP have a process in place to ensure data quality is maintained to a high standard? This should include:	Verification team based on review of provided documents and on-site inspection interviews confirms the following:

	<ul style="list-style-type: none"> a) Are the personnel trained and experienced? b) What is the level of supervision and guidance provided to staff? c) Is there a standardized system for data entry and analysis to produce final result? d) Is there a system or process in place to minimize the introduction of errors? e) Is there a system in place to ensure all collected data is processed; f) Are quality checks performed on data entered, for example range checks, g) inconsistency checks, checking of subsamples of data by supervisors; h) is there a system to check for errors, record and report errors reported and document the remedial action taken; i) What is the level of security and type of backup processes to guarantee data integrity, for example methods to prevent fraud and accidental deletion? 	<ul style="list-style-type: none"> ✓ the personnel involved in the surveys are trained and experienced. ✓ there exists a standardized system for data entry. ✓ there exist a system or process in place to minimize the introduction of errors. ✓ there a system in place to ensure all collected data is processed. ✓ there exists a quality checks of data entered.
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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.

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