




**Validation report form for post-registration changes for  
component project activities**

**(Version 01.0)**

**BASIC INFORMATION**

<b>Title and UNFCCC reference number of the component project activity (CPA)</b>	CPA No. 01: "Domestic Cooking Stoves in Maputo (Mozambique)" 9981-0001
<b>Version number of the validation report on CPA PRCs</b>	03
<b>Completion date of the validation report on CPA PRCs</b>	25/09/2018
<b>Version number of PoA-DD and CPA-DD applicable to this validation report</b>	PoA DD, Version 05 CPA-DD, Version 09
<b>Title and UNFCCC ref. no. of the registered PoA into which the CPA is included</b>	Domestic Cooking Stoves substitution programme in Mozambique (9981)
<b>Type(s) of CPA PRCs</b>	<input type="checkbox"/> Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines <input checked="" type="checkbox"/> Corrections <input type="checkbox"/> Changes to the start date of the crediting period <input type="checkbox"/> Inclusion of monitoring plan <input type="checkbox"/> Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools <input checked="" type="checkbox"/> Changes to the project design <input type="checkbox"/> Changes specific to afforestation and reforestation activities
<b>Coordinating/managing entity</b>	Fondazione AVSI
<b>Host Parties</b>	The Republic of Mozambique
<b>Applied methodologies and standardized baselines</b>	AMS-II.G. Energy efficiency measures in thermal applications of non-renewable biomass. Version 05.0
<b>Mandatory sectoral scopes linked to the applied methodologies</b>	03: Energy demand
<b>Conditional sectoral scopes linked to the applied methodologies, if applicable</b>	NA
<b>Name and UNFCCC reference number of the DOE</b>	EPIS Sustainability Services Private Limited (E-0062)
<b>Name, position and signature of the approver of the validation report on CPA PRCs</b>	 K. Sudheendra, Head Operations

**SECTION A. Executive summary**

The small-scale CPA (SSC-CPA) “Domestic Cooking Stoves in Maputo (Mozambique)” is a part of the PoA Domestic Cooking Stoves substitution programme in Mozambique (9981) and was included on 12<sup>th</sup> July 2016. The CPA 01 is designed to improve energy efficiency of cookstove by substituting inefficient traditional cookstoves with more effective models which simultaneously also improves the social, economic and environmental conditions of the local population. The target population resides in the districts of Chamanculo C and Xipamanine, in Maputo city, Mozambique. The objective of the project is to distribute around 10,000 energy efficient stoves to households during its crediting period with total estimated reductions of 130,694 CO<sub>2</sub>-e and average annual reductions of 18,671 tCO<sub>2</sub>-e.

**SECTION B. Validation team, technical reviewer and approver****B.1. Validation 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			
						Document review	On-site inspection	Interviews	Validation findings
1.	Team Leader	IR	D	Siddaramu	EPIC	X	X	X	X
2.	Auditor	IR	Vijayaraghavan	Radhamadhavan	EPIC	X			X
3.	Host Country Expert	ER	Muzima	Adelio	EPIC	X	X	X	X

**B.2. Technical reviewer and approver of the validation report on CPA PRCs**

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	Vishnu	Govindarao	EPIC
2.	Technical expert assisting Technical reviewer	ER	Subramanyam	G	EPIC
3.	Approver	IR	Sudheendra	Krishnachar	EPIC

**SECTION C. Means of validation****C.1. Document review**

As per VVS 01, EPIC has considered a desk review of the documentation and site visit and follow up interviews with both CME and local stakeholders sufficient to determine the compliance of the revised CPA-DD.

The revised Component Project activity design document (CPA-DD) submitted by the CME and additional background documents related to the CPA design and baseline were reviewed. Furthermore, cross checks were made between information provided in the PoA-DD <sup>a)</sup> and validated CPA-DD <sup>b)</sup> information from sources other than those used, and independent background investigations. A list of documents reviewed and referenced is found in Appendix 3.

To address the corrective action and clarification requests, the CME revised the CPA-DD Version <sup>c)</sup> based on which the validation conclusions are presented in this report.

**C.2. On-site inspection**

Duration of on-site inspection: 10/04/2018 to 14/04/2018				
No.	Activity performed on-site	Site location	Date	Team member
1.	Document review and interview with company management	District of Chamanculo C and Xipamanine Maputo city, Mozambique	10 & 14 April 2018	Validation team
2	Visit to households & interview with stakeholders	District of Chamanculo C and Xipamanine Maputo city, Mozambique	10 to 13 April 2018	Validation team

**C.3. Interviews**

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Galimberti	Alessandro	AVSI	10 & 14 April 2018	Usage Survey, Project design, Distribution system of cookstoves, Baseline fuel usage, Type of cookstoves used.	Validation team
2.	Cumbi	Cristina	AVSI	10 & 14 April 2018		Validation team
3.	Guiso	Antonio	Carbon Sink	10 & 14 April 2018		Validation team
4.	27 households in following localities were visited in Maputo		Households	10 to 13 April 2018	Usage Survey, Distribution system of cookstoves, Baseline fuel usage, Type of cookstoves used.	Validation team
	Chamanculo B					
	Urbanização					
	Chamanculo D					
	Aeroporto A					
	Urbanização					
	Chamanculo A					
	Aeroporto B					
	Malanga					
	Minkadjuine					
Mafalala						

**C.4. Clarification requests, corrective action requests and forward action requests raised**

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with CPA-DD form		2	
Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines			
Corrections			
Changes to the start date of the crediting period			
Inclusion of monitoring plan			
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools			
Changes to the project design	2		
Changes specific to afforestation and reforestation project activities			
Others (please specify)			
<b>Total</b>	<b>2</b>	<b>2</b>	<b>0</b>

**SECTION D. Validation findings****D.1. Compliance with CPA-DD form**

<b>Means of validation</b>	Validation involved crosschecks between versions of the CPA-DD form used and the valid CPA-DD forms provided in the CDM website. The CPA-DD was reviewed for compliance with instructions for filling-in PoA-DD forms contained in the forms.
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<b>Findings</b>	CAR 1 was raised as the CPA – DD form submitted, Version 05, uses version 3 of the template which is not valid.
<b>Conclusion</b>	The submitted revised CPA-DD form (version 08) uses Version 8.1 which is the valid version.

## D.2. Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines

<b>Means of validation</b>	There were no temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines.
<b>Findings</b>	Not Applicable
<b>Conclusion</b>	Not Applicable

## D.3. Corrections

<b>Means of validation</b>	Modifications to the submitted CPA-DD were assessed whether it falls under the category of correction as specified in the CDM requirements. The corrections were also verified during the field visit.
<b>Findings</b>	<p>-</p> <p>-The following corrections of typos have been made in the CPA-DD, Version 09</p> <ol style="list-style-type: none"> <li>1. Under Section A.3, Technologies and Measures, the different types of cookstove models which are added in addition to the existing model validated as per the CPA are included. Table A-1 is updated to reflect the change from the previous version of validated CPA-DD by including the technical specifications of the 5 proposed cookstove models to be distributed under CPA 1.</li> <li>2. The word “family” has been replaced with “household” updated in Section A.1. and in Section A.3 for clarity.</li> <li>3. The estimation of the number of the distributed stoves and the distribution timeline have been updated. Moreover, it is specified now in clear way that is a free choice of the project households to decide if they buy one or two project stoves and that the estimations presented in this document are only estimations. Moreover, the estimated stove usage rates has been updated to be more conservative in line with the first monitoring results achieved from the project area and that the (Please refer Sections A.1, A.3, B.4.3, B.5.1 and B.5.2 and ER calculation spreadsheet)</li> <li>4. The word “coal” has been replaced with “charcoal” in Section A.1 for clarity.</li> <li>5. The word “ex-ante” has been replaced with terms “CPA validation” or “CPA validation stage” in Section A.3 and B.4.3 for clarity.</li> <li>6. The fact that for this CPA two different determination methods for <math>B_{y,savings}</math> are used is written now in clearer way Sections B.4.1, B.4.2 and B.4.3.</li> <li>7. The CPA-DD template has been updated for the latest version (version 08.1) and consequently the numbering of the figures and tables has been updated to respect the order within the new CPA-DD template and thus also referring to the relevant figures, tables, sections and appendix have been updated within the text.</li> <li>8. Lastly, the contact details in Section A.4 and Appendix 1 have been updated for AVSI and CarbonSinkGroup.</li> </ol>
<b>Conclusion</b>	The validation team reviewed the revised CPA-DD against applicable additionality and methodological requirements, and found that the proposed changes will not adversely affect the conclusions of the validation report on the registered CDM PoA or the included CPA. Hence the proposed changes are accepted in line with para 278 of CDM validation and verification standard for programmes of activities Version 01.0. The corrections proposed are accurate and reflect the actual project information in line with para 257 of VVS-PoA, version 01.

**D.4. Changes to the start date of the crediting period**

<b>Means of validation</b>	There were no changes to the CPA-DD related to start date of the crediting period.
<b>Findings</b>	Not Applicable
<b>Conclusion</b>	Not Applicable

**D.5. Inclusion of monitoring plan**

<b>Means of validation</b>	The updated CPA-DD was validated to assess whether the monitoring plan has been newly added (not validated before).
<b>Findings</b>	As the validated plan has been validated and there were no changes no findings were raised
<b>Conclusion</b>	The updated CPA-DD contains no inclusions of the monitoring plan as it is already validated.

**D.6. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools**

<b>Means of validation</b>	The updated CPA-DD was validated to assess whether there were any permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools.
<b>Findings</b>	The CPA-DD applies AMS-II.G. Energy efficiency measures in thermal applications of non-renewable biomass Version 05.0, which is the version applicable during inclusion of the CPA. Hence no findings were raised.
<b>Conclusion</b>	The updated CPA-DD confirms to the requirements of this section.

**D.7. Changes to the project design**

<b>Means of validation</b>	The updated CPA-DD was validated to assess whether there were any changes to the project design. The changes which were assessed were validated by means of document review, onsite visit and interviews.
<b>Findings</b>	<p><b><u>First proposed change:</u></b></p> <p>This CPA DD was validated as part of the PoA 9981. During the first years of the project implementation of the Project CPA No. 01, the PP observed that the ex-ante estimation on the average charcoal consumed per device does not represent correctly the real situation in the field. The ex-ante estimation was based on the assumption that the households using single-mouth stoves would consume less charcoal (approx. 50% less) than the households using the double-mouth stoves. The baseline survey that was referred (Cooperação para o Desenvolvimento e Morada Humana, July 2012<sup>d)</sup>) in the validated CPA-DD indicated that on an average household in the project area uses 80 kg of charcoal in month and 61% of the households in the project area uses traditionally two-fire charcoal stoves and around 39% single-fire stove.</p> <p>However review of the baseline survey document during this validation indicated that there are no big differences in charcoal usage between these two groups. This is also crosschecked by the results shown in the page 11 (table “Monthly expense for the purchase of coal”) of the Baseline Survey (Cooperação para o Desenvolvimento e Morada Humana, July 2012), which shows that the monthly consumption of charcoal with single-mouth stoves is on an average 75.2 kg/single-mouth device (631.49MT / 8.4MT/kg = 75.2 kg) and average of 84.9 kg/double-mouth device (713.37 MT / 8.4MT/kg = 84.9 kg). Hence this translates in to 81.1 kg/ device / month as compared to 55.6 kg/device/month indicated in the validated CPA-DD.</p> <p>Based on this survey the difference between the different stove types is only on an average 11% and not 50% as estimated in ex-ante calculations. The usage pattern of the different stove types and usage of coal in each stove type was observed during the site visit and was found to match with the survey data as per the reference quoted above. So, on average, wood consumption in baseline households = 6.9486 tonnes of wood per household per year. Since the baseline household contained one stove, wood consumption in baseline households = 6.9486 tonnes of wood per baseline device per year.</p> <p>Wood consumption in baseline households (<math>B_{old, hh} = 6.9486</math> tonnes of wood per baseline hh) equals to the wood consumption per device for the households with one project stove. For the households with two project stoves conservative approach of dividing <math>B_{old, hh}</math> in two. For ER calculations a conservative assumption</p>

	<p>that 60% of the project hhs would acquire two project stoves and 40% only one project stoves is applied.</p> <p><b><u>Second proposed change:</u></b></p> <p>The PP has updated the assumption of the ex-ante estimated stove usage rate (which was 80% for all the project years) to be more conservative (Ex-ante calculations, sub-page "Total CERs", cells 54B and 55B) in the submitted CER sheet <sup>e)</sup>.</p> <p>Considering that the distributed stoves were fully operational during the whole period, it is assumed that 80% of the households are using the distributed new stoves during the first project years, and averagely 60% during the later project years. Accordingly the excel sheet calculations were revised to reflect this (Usage Rate for 2014-2016 is 0.8 and Usage rate for 2017-2021 is 0.6).</p> <p><b><u>Third proposed change:</u></b></p> <p>Section A. 3 is now updated to include other stove models distributed to the households in addition to the model CH-2200 as per the validated CPA. A new table, A.1, summarising the technical specifications of the five different type of cookstove models is no included in the revised CPA DD.</p> <p><b><u>Fourth proposed change:</u></b></p> <p>In Section B.5.1 the option for eventual biannual monitoring mentioned for project Kitchen Performance Test (KPT) is now updated to be either "biennial" or "annual" monitoring in line with the applied methodology and the registered PoA-DD. In Section B.5.2 the biannual monitoring mentioned for Usage Survey is now updated to be "biennial" monitoring in line with the applied methodology and registered PoA-DD</p> <p><b><u>Fifth proposed change:</u></b></p> <p>The required precisions for monitoring surveys are corrected to be, in line with the registered PoA-DD and applied methodology, for biennial surveys 95/10 and for annual surveys 90/10 in Section B.5.1 and B.5.2.</p> <p><b><u>Sixth proposed change:</u></b></p> <p>The description of the made Baseline Survey (sample size, implementation months, etc.) and its results is made now in more complete and precise way throughout the document (Sections A.1, A.3, B.3, B.4.1, B.4.2 and B.4.3). The Baseline Survey "Cooperação para o Desenvolvimento e Morada Humana (CDM)_2012" is including a sample of 537 households resulted that 94.42% (i.e., 507 households) are using charcoal stoves, 3.17% gas stoves, 1.49% wood stoves and 0.93% electric stoves. Please further note, that project stoves were provided to the households who used charcoal. Other households (5.58% of the households surveyed) were removed from the baseline survey for further calculation</p>
<b>Conclusion</b>	<p>EPIC has validated that all the changes described above fall in the category of project design changes.</p> <p>For the first change, the information used for calculation of charcoal consumption in the baseline stoves during the validation of the CPA has been incorrectly referred without taking account of the actual data indicated in the usage survey document referred (page 11 of the ref document). The basis for assuming that the coal consumption in single-mouth stoves is 50% lesser than double mouth stoves has no scientific basis nor is based upon any valid survey reference or usage pattern. The correct interpretation and calculation (11% lesser) as per the baseline survey document, which reflects the actual usage pattern is now</p>

correctly indicated in the updated CPA-DD. Hence the Post Registration Change for the updation of the value of baseline fuel consumption is considered appropriate. In Accordance with paragraph 14 of the methodology, the quantity of woody biomass ( $B_{old}$ ) is determined by using a credible local conversion factor determined from literature. Here the conversion factor of 7.14 is chosen based on the study of Brouwer and Falcão, 2004 as per the validated CPA DD. The final calculation is as below:

Number of households surveyed and considered for the baseline calculation = 507

Percentage of households that used single mouth charcoal stove = 39%

Percentage of households that used double mouth charcoal stove = 61%

Charcoal consumption in baseline households which used single mouth stove = 75.2 kg of charcoal /household/month

Charcoal consumption in baseline households which used double mouth stove = 84.9 kg of charcoal /household/month

So, on average, charcoal consumption in baseline households =  $39\% \times 75.2 \text{ kg} + 61\% \times 84.9 = 81.1 \text{ kg of charcoal/household/month or } 973.2 \text{ kg of charcoal/household/year}$ .

Accordance to paragraph 14 of the methodology, the quantity of woody biomass ( $B_{old}$ ) is determined by using a credible local conversion factor determined from literature. Here the conversion factor of 7.14 is chosen based on the study of Brouwer and Falcão, 2004<sup>1</sup>.

So, the validation team accepted that on average, wood consumption in baseline households = 6.9486 tonnes of wood per household per year. Since the baseline household contained one stove, wood consumption in baseline households = 6.9486 tonnes of wood per baseline device per year.

The CPA-DD and the ER calculations have been updated accordingly based on which the ER has reduced from 26,672 tCO<sub>2</sub>-e to 18,671 for CPA 1 which is accepted as a conservative estimate. In the Section B.5.1 of the CPA-DD, the approach of dividing  $B_{y,new,KPT}$  in two is described as applied for the cases where the households are having two project stoves

EPIC has validated that the second change has been necessitated by the observation that the usage rate of the distributed stoves was based on the ex-ante value applied in another similar project (GS 3078) as per the validated CPA-DD. The usage rate applied now reflects the actual usage pattern and is more realistic and conservative. The monitoring results of the PP achieved in the project area served as a basis for the change in the usage rate as verified during the site visit.

EPIC has validated that the third change reflects the actual models of the cookstoves proposed to be distributed based on availability in the region and is in line with the cookstove models included in the subsequent validated CPAs (CPA 2 and CPA 3). Hence this change is accepted.

EPIC has verified section B.5.2 for the fourth change and found that "biannual monitoring" is now corrected to "biennial monitoring", which is in line with the applied methodology. Hence accepted.

EPIC has verified the latest CPA-DD for the fifth change and found that the required precisions for monitoring surveys are corrected to be, in line with the registered PoA-DD and applied methodology, for biennial surveys 90/10 (for KPT)

<sup>1</sup> Brouwer, R. and Falcão, M. P., 2004. Wood fuel consumption in Maputo, Mozambique. Biomass and Bioenergy. Volume 27, Issue 3, September 2004, Pages 233–245. Available at [www.sciencedirect.com](http://www.sciencedirect.com)

	<p>and for annual surveys 90/10 (for usage rate) in Section B.5.1 and B.5.2.</p> <p>The sixth change was verified by reviewing the baseline survey report. The validation team found that a sample size of 537 households was selected for the survey. From this only 94.42% (i.e., 507 households) were found using charcoal stoves and the rest 3.17% gas stoves, 1.49% wood stoves and 0.93% electric stoves<sup>d)</sup>. The CME has distributed project cookstoves to the households who were using charcoal. Other households (i.e., 5.58% of the households surveyed) were removed from the baseline survey and for further calculation.</p> <p>The validation team reviewed the revised CPA-DD against applicable additionality and methodological requirements, and found that the proposed changes will not adversely affect the conclusions of the validation report on the registered CDM PoA or the included CPA. Hence the proposed changes are accepted in line with para 278 of CDM validation and verification standard for programmes of activities Version 01.0. The proposed changes does not reduce the level of accuracy and completeness in the monitoring and verification process as it is in line with applied methodology, registered PoA-DD and section 9.3.5 of VVS-PoA, version 1.0.</p>
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#### D.8. Changes specific to afforestation and reforestation project activities

<b>Means of validation</b>	As this project is a cookstove project under Sector 3 of the applicable methodology, this section is not applicable.
<b>Findings</b>	Not Applicable
<b>Conclusion</b>	Not Applicable

#### SECTION E. Internal quality control

After the completion of assessment by the validation team all the relevant documentation is submitted to a qualified, Independent Technical reviewer as part of EPIC' internal quality control system. A Technical reviewer team is appointed to review the draft final validation report (Draft FVR). The comments made by the Technical reviewer team are taken into consideration and incorporated in the final FVR. The technical reviewer team assesses whether all the reporting requirements have been fulfilled and whether all the issues raised were closed satisfactorily by the validation team with justification. The technical review process can also raise issues in this regard which is resolved further by the validation team to the satisfaction of the technical reviewer. The technical reviewer team either accepts or rejects the report made by the validation team. The final report (after resolutions of all findings) is then submitted to the Head-operations for review and approval.

#### SECTION F. Validation opinion

EPIC has performed a validation of the Post Registration Changes of the CPA No. 01: "Domestic Cooking Stoves in Maputo (Mozambique)", which is located in Mozambique. The validation was performed on the basis of UNFCCC criteria for the CDM, and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation consisted of the following three phases: i) desk review of the programme design document and additional background documents; ii) site visit and follow-up interviews with CME and project stakeholders; iii) resolution of outstanding issues and the issuance of the final validation report and opinion.

The review of the CPA DD and documentation and the subsequent follow-up interviews have provided the validation team with sufficient evidence to determine the fulfilment of stated criteria. In our opinion, the revised CPA, version 09 meets all relevant UNFCCC requirements for the CDM and the relevant host country criteria. EPIC thus requests the changes via this notification as per the CDM project cycle procedure for programmes of activities, version 1.0, to the CPA 001 under the PoA Domestic Cooking Stoves substitution programme in Mozambique 9981. As per requirements of the project cycle procedure for PoA version 1.0, the changes have been validated to fall in the category of correction and changes in project design which help in further estimating the generated emission reductions in a fair and transparent manner. Hence EPIC considers that estimated amount of annual average GHG emission reductions as 18,671 tCO<sub>2e</sub> to be a more accurate and realistic estimate of the expected emission reductions.



## Appendix 1. Abbreviations

Abbreviations	Full Texts
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reduction
CL	Clarification Request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
CPA DD	CPA design document
DNA	Designated National Authority
EIA	Environmental Impact Assessment
FAR	Forward Action Request
GHG	Greenhouse gas(es)
PoA	Programme of Activities
PoA - DD	PoA Design Document
PS	Project Standard
QA/QC	Quality control/Quality assurance
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

## Appendix 2. Competence of team members and technical reviewers

Name	Dr D. Siddaramu	Mr. R.Vijayaraghavan	Mr. Adelio Muzuma	Dr G. Vishnu	Mr G. Subramanyam
Role	Lead Auditor	Auditor	Host country & technical expert	Technical Reviewer	Technical expert assisting Technical review
Competence in the Sector	NA	Sector 03	Sector 03	NA	Sector 03
Responsibility	Doc review, Interview, DVR preparation, DVR resolution, FVR preparation	Doc review, DVR preparation,	Interview with PP, Doc review	Technical review	Assisting in Technical review

A brief summary of the personnel involved in the validation is indicated below

**Dr. D. Siddaramu** holds a M.Sc., Ph.D in Environmental Science, with over 16 years of experience. A qualified Clean Development Mechanism (CDM) Lead Auditor, successfully registered more than 30 projects with United Nations Framework Convention on Climate Change (UNFCCC) and Verified Carbon Standard registry (VCS) registry; well versed with both National and International legal regime. Has hands on experience in Environmental Impact Assessment (EIA) studies pertaining to different Ecosystem; monitoring, collection & analyzing environmental samples and conducting socio-economic surveys; data analysis. Conducting CDM/VCS audits, preparation of validation protocols and reports. He is qualified for Sector 1 based on CDM accreditation requirements and qualified lead auditor as per GS4GG EPIC accreditation.

**Mr Adelio Muzuma** holds a Degree in Applied Physics. From 2016 onwards has been working as freelancer for data collection and Surveys for household and community level projects implemented in multiple locations in Mozambique. He has performed several verification, validation, satisfaction surveys, CES, KPT based on random visits to beneficiaries of the systems and reported to the implementing partners. He has working knowledge of the sector and is qualified as Technical and Host Country Expert for TA 3.1 Energy demand in accordance with the procedures of EPIC.

**Mr. R. Vijayaraghavan** holds BE in Mechanical Engineering, M.Tech in Energy Conservation and Management and MBA in Technology Management. He is certified as Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has 10 years of working experience in energy sector including

validation / verification of fifty CDM and VCS/GS projects and has undergone extensive training on CDM validation and verification and has been qualified as technical reviewer for several sectoral scopes. He is also an ISO 26000 lead auditor certified by Professional Evaluation and Certification Board (PECB).

**Dr. G. Vishnu** holds a Masters and Doctorate in Environmental Science. He has around 8 years of experience in the field of research and consultancy related to water, wastewater, solid waste management systems, implementation of new, Cleaner Production technologies and biomass assessment studies. He has more than four years" experience in validation verification of more than thirty CDM, projects and has undergone extensive training on GHG validation and verification. He is a Lead Auditor for various technical areas. He is also an ISO 26000 lead auditor and ISO 50001 auditor certified by Professional Evaluation and Certification Board (PECB). He is a Certified Sustainability Assurance Practitioner (CSAP) from Account Ability, UK. He is qualified as Lead Auditor based on EPICs CDM accreditation procedures.

**Mr. G. Subramanyam**, holds a Degree in Chemical Engineering and post graduate diploma in Energy management. He is a qualified Bureau of Energy Efficiency (BEE) Certified Energy Auditor with over 20 years of proven success in undertaking Energy Conservation and CDM projects. He has served as Divisional head (Carbon Advisory) with leading consultancy company at Hyderabad and has expertise in energy management, project management, financing and implementation of energy efficiency projects, as well as policy analysis. He has worked with National Productivity Council (NPC) for 19 years in various capacities since 1988. His area of specialization includes energy and conservation studies, CDM, energy efficiency surveys and policy studies, demand side management studies, Accelerated Power Development & Reform (APDRP) Studies, Municipal water pumping/street lighting studies, Renewable energy studies, implementation of energy conservation turnkey projects etc. He is qualified as Technical Expert for TA 3.1 Energy demand in accordance with the procedures of EPIC sustainability services ltd

### Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	AVSI	PoA DD Version 05 dated 10/10/2014	a)	UNFCCC website
2	AVSI	CPA DD version 05 dated 10/10/2014	b)	UNFCCC website
3	AVSI	CPA DD version 09 dated 24/09/2018	c)	AVSI
4	CDM - Cooperação para o Desenvolvimento e Morada Humana	Baseline Survey (Cooperação para o Desenvolvimento e Morada Humana, 2012)	d)	AVSI
5	AVSI	CPA 1 CER calculation sheet revised	e)	AVSI

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

Table 1. CLs from this validation

<b>CL ID</b>	01	<b>Section no.</b>	B.4.3	<b>Date:</b> 27/04/2018
<b>Description of CL</b>				
Clarify how it was estimated that the single mouth cookstove has 50% lesser consumption of coal than the double mouth cookstove as both the submitted survey document and the onsite observations indicated that regardless of the type of cookstove the coal usage is not vastly different?				
<b>CME's response</b>				<b>Date:</b> 14/05/2018
<p>During the first years of the project implementation of the Project "CPA No. 02: Domestic Cookstoves in Maputo (Mozambique), phase II", the PP has been able to experience that the ex-ante made estimation on the average charcoal consume per device doesn't represent correctly the real situation in the field. The ex-ante estimation was based on the assumption that the households using single-mouth stoves would consume less charcoal than the households using the double-mouth stoves and to be sure to be conservative it was assumed that the difference would be 50% less for the households using single-mouth stoves in comparison with the households with double-mouth stoves.</p> <p>The direct experiences achieved on the field have showed instead that in reality there are no big differences between these two groups. This same can be confirmed by the results shown in the page 11 (table "Monthly expence for the purchase of coal") of the Baseline Survey (Cooperação para o Desenvolvimento e Morada Humana, 2012), which shown that the monthly consume with single-mouth stoves to be average 75.2 kg/single-mouth device (<math>631.49\text{MT} / 8.4\text{MT/kg} = 75.2 \text{ kg}</math>) and 84.9 kg/double-mouth device (<math>713.37 \text{ MT} / 8.4\text{MT/kg} = 84.9 \text{ kg}</math>). Based on this survey the difference between the different stove types is only averagely 11% and not 50% as estimated in ex-ante calculations.</p> <p>For this reason, PP requests a Post Registration Change for the value of baseline fuel consumption (<math>B_{old}</math>).</p> <p>However based on the recent query raised by CDM team, a conservative approach as below is applied as explaine in various sections of the revised CPA-DD:</p> <p><math>B_{old} = 6.9486 \text{ t of wood/device/year for the hhs with one project stove}</math>  <math>B_{old} = 0.5 \cdot 6.9486 \text{ t of wood/device/year for the hhs with two project stoves}</math></p>				
<b>Documentation provided by CME</b>				
Updated CPA DD				
<b>DOE assessment</b>				<b>Date:</b> 25/05/2018

EPIC has validated that both the change described above falls in the category of project design changes. The information used for calculation of charcoal consumption in the baseline stoves during the validation of the CPA has been incorrectly referred without taking account of the actual data indicated in the usage survey document referred (page 11 of the ref document). The basis for assuming that the coal consumption in single-mouth stoves is 50% lesser than double mouth stoves has no scientific basis nor is based upon any valid survey reference or usage pattern. The correct interpretation and calculation (11% lesser) as per the baseline survey document, which reflects the actual usage pattern is now correctly indicated in the updated CPA-DD. Hence the Post Registration Change for the updation of the value of baseline fuel consumption is considered appropriate. Accordance to paragraph 14 of the methodology, the quantity of woody biomass (Bold) is determined by using a credible local conversion factor determined from literature. Here the conversion factor of 7.14 is chosen based on the study of Brouwer and Falcão, 2004 as per the validated CPA DD. The final calculation is as below:

$$973.2 \text{ kg (charcoal)/device/year} * 7.14 = 6.9486 \text{ t (wood)/device/year}$$

However based on recent submission, the conservative approach for the households with two project stoves is instead applied in which dividing  $B_{old, hh}$  in two. For ER calculations is done and a conservative assumption that 60% of the project hhs would acquire two project stoves and 40% only one project stoves is applied. The CPA-DD and the ER calculations have been updated accordingly.

<b>CL ID</b>	02	<b>Section no.</b>	B.4.3	<b>Date:</b> 27/04/2018
<b>Description of CL</b>				
Clarify how the usage rate is indicated in page 18 of the CPA DD as 80% for devices distributed under the project activity operational during the first project years and averagely 70% during the latter project years? Provide references. Also the submitted excel sheet provides a different value?				
<b>CME's response</b>				<b>Date:</b> 14/05/2018
The updated CPA-DD is provided to address the inconsistency				
<b>Documentation provided by CME</b>				
Updated CPA DD				
<b>DOE assessment</b>				<b>Date:</b> 25/05/2018
EPIC has validated that the change has been necessitated by the observation that the usage rate of the distributed stoves was based on the ex-ante value applied in another similar project (GS 3078) as per the validated CPA-DD. The usage rate applied now reflects the actual usage pattern and is more realistic and conservative. The monitoring results of the PP achieved in the project area served as a basis for the change in the usage rate as verified during the site visit.				

**Table 2. CARs from this validation**

<b>CAR ID</b>	01	<b>Section no.</b>	NA	<b>Date:</b> 27/05/2018
<b>Description of CAR</b>				
CPA – DD form submitted, Version 05, uses version 3 of the template which is not valid.				
<b>CME's response</b>				<b>Date:</b> 01/06/2018
The latest CPA DD using valid template version 8.1 is now submitted				
<b>Documentation provided by CME</b>				
CPA DD version 9				
<b>DOE assessment</b>				<b>Date:</b> 01/06/2018
The latest CPA-DD submitted has used the valid template				

<b>CAR ID</b>	02	<b>Section no.</b>	F	<b>Date:</b> 27/05/2018
<b>Description of CAR</b>				
The CPA DD version 07 using valid template version 8.1 does not correctly fill in the section F as per template requirements				
<b>CME's response</b>				<b>Date:</b> 01/06/2018
Updated CPA DD is now submitted				

<b>Documentation provided by CME</b>	
Updated CPA DD	
<b>DOE assessment</b>	<b>Date:</b> 01/06/2018
The submitted CPA DD meets the requirements of the section F.	

**Table 3. FARs from this validation**

<b>FAR ID</b>	xx	<b>Section no.</b>		<b>Date:</b> DD/MM/YYYY
<b>Description of FAR</b>				
<i>Not Applicable</i>				
<b>CME's response</b>				<b>Date:</b> DD/MM/YYYY
<i>Not Applicable</i>				
<b>Documentation provided by CME</b>				
<i>Not Applicable</i>				
<b>DOE assessment</b>				<b>Date:</b> DD/MM/YYYY

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	29 December 2017	Initial publication.
Decision Class: Regulatory		
Document Type: Form		
Business Function: Registration		
Keywords: post-registration change, component project activity, validation report		