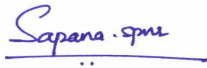




**Verification and certification report form for  
CDM programme of activities  
(Version 03.0)**

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

**BASIC INFORMATION**

<b>Title and UNFCCC reference number of the programme of activities (PoA)</b>	Tanzania Renewable Energy Programme Ref. no. 9904	
<b>Version number(s) of the PoA-DD(s) to which this report applies</b>	Version 08 dated 23/04/2014	
<b>Version number of the verification and certification report</b>	02.0	
<b>Completion date of the verification and certification report</b>	07/06/2019	
<b>Monitoring period number and duration of this monitoring period</b>	Second monitoring period From 01/01/2017 to 31/12/2017 (first and last days included)	
<b>Number and version number of the monitoring report to which this report applies</b>	Monitoring Report number 01, version 03	
<b>Coordinating/managing entity (CME)</b>	Rural Energy Agency (REA)	
<b>Host Parties</b>	<b>Host Parties of the PoA</b>	<b>Is this a host Party to a CPA covered in this report? (yes/no)</b>
	United Republic of Tanzania	Yes
<b>Applied methodologies and standardized baselines</b>	AMS I.D. Grid connected renewable electricity generation, Version 17 AMS I.F. Renewable electricity generation for captive use and mini-grid, Version 02	
<b>Mandatory sectoral scopes</b>	01 - Energy Industries (renewable / non-renewable sources)	
<b>Conditional sectoral scopes, if applicable</b>	Not Applicable	
<b>Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report</b>	49,698 tCO <sub>2</sub> e	
<b>Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report</b>	19,871 tCO <sub>2</sub> e	
<b>Name and UNFCCC reference number of the DOE</b>	Bureau Veritas India Pvt Ltd (BVI) Ref. no. E-0009	
<b>Name, position and signature of the approver of the verification and certification report</b>	 Sapana Pednekar – Global Quality Manager	

## SECTION A. Executive summary

Bureau Veritas India Pvt Ltd (also referred to as the DOE in this report) has conducted the second periodic verification of the PoA “Tanzania Renewable Energy Programme”; UNFCCC reference number 9904. The PoA is coordinated and managed by the Rural Energy Agency (REA) and is located in the United Republic of Tanzania. The PoA’s goal is to increase access to modern energy services in Tanzania by promoting both the off-grid (isolated mini-grid) and national grid connected renewable energy projects, within the country. The technologies promoted by the PoA include: photovoltaic, wind, hydro and biomass technologies for electricity generation. The PoA applies the following two methodologies: AMS.I-D “Grid connected renewable electricity generation”, Version 17 and AMS.I-F “Renewable electricity generation for captive use and mini-grid”, Version 02. CPAs can be included into the PoA in any one of the following three categories of generic CPAs, by fulfilling the requirements therein:

a) CPA Category 1: comprises installation of one or more renewable energy technologies (hydro, wind, biomass or PV) not exceeding 15 MW, and supply the generated electricity to the main national grid. The CPAs are required to comply with the requirements of methodology AMS-I.D version 17.

b) CPA Category 2: comprises installation of one or more renewable energy technologies (hydro, wind, biomass or PV) not exceeding 15 MW, and supply the generated electricity to an existing mini-grids being operated by either the national utility (TANESCO), or to a new isolated mini-grids or both, to serve new areas. The CPAs are required to comply with the requirements of methodology AMS-I.F version 02.

c) CPA Category 3: comprises installation of one or more renewable energy technologies (hydro, wind, biomass or PV) not exceeding 15 MW, and supply the generated electricity both to the main national grid and existing mini-grids being operated by the national utility (TANESCO), and/or to new isolated mini-grids to serve new areas. The CPAs are required to comply with the requirements of both methodology AMS-I.D version 17 and AMS-I.F version 02.

Monitoring activities for the PoA in this second period have been reported in a single monitoring report. This verification and certification report covers activities as reported in the monitoring report number 01, version 03. The monitoring report covers the following six CPAs, included in the PoA, in their respective categories:

- a) Mbinga hydroelectric project, UNFCCC reference number 9904-0003; a CPA in category 2
- b) Yovi Small Hydro Power Project, UNFCCC reference number 9904-0004; a CPA in category 3
- c) Tulila hydroelectric plant, UNFCCC reference number 9904-0005; a CPA in category 3
- d) Ngombeni biomass power plant project, UNFCCC reference number 9904-0007; a CPA in category 2
- e) Ikondo micro hydro power plant, UNFCCC reference number 9904-0008, a CPA in category 3
- f) Darakuta Mini Hydro Project, UNFCCC reference number 9904-0009, a CPA in category 1

The verification scope is defined as a periodic independent review and ex post determination, by the Designated Operational Entity, of the monitored reductions in GHG emissions during the defined verification period. Bureau Veritas India Pvt Ltd’s verification consisted of the following three phases:

- i) Desk review of the PoA and CPA design documents, the baseline, monitoring plan, reported parameters and ER calculations;
- ii) Onsite observations, crosschecks with plant logs and follow-up interviews with PoA stakeholders;

iii) Resolution of outstanding issues and the issuance of the final verification report and opinion.

The verification is not meant to provide any consulting towards the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

The overall verification, from contract review to verification report and Opinion, was conducted using Bureau Veritas India Pvt Ltd.'s internal procedures. The first output of the verification process was a list of Clarification Request, Corrective Actions Requests, Forward Actions Requests (CL, CAR and FAR), presented in Appendix 4.

In summary, Bureau Veritas India Pvt Ltd confirms that the PoA has been implemented as planned and described in the validated and registered PoA design document. The respective CPAs have been implemented in accordance with their latest approved versions of CPA design documents, with the exception of Darakuta Mini Hydro Project (CPA 9904-0009), where the existing plant was not yet connected to the grid as planned. Installed equipment, for the CPAs mentioned above, being essential for generating emission reduction, runs reliably; except for Ngombeni biomass power plant project (CPA 9904-0007) which was not operational in the monitoring period. The monitoring system is in place and the other five CPAs are generating GHG emission reductions.

Bureau Veritas India Pvt Ltd has determined that the GHG emission reductions are calculated without material misstatements, applying most conservative approach. The emission reductions verified totalize **19,871 tCO<sub>2</sub>e** for all the six CPAs.

Bureau Veritas India Pvt Ltd.'s opinion relates to the PoA's resulting GHG emission reductions for the monitoring report number 01, version 03; comprising six CPAs as mentioned above; and related to the valid and registered baseline, approved monitoring plan and the associated documents for the CPAs.

CPA no.	Reporting period	Baseline emissions (tCO <sub>2</sub> e)	Project emissions (tCO <sub>2</sub> e)	Leakage emissions (tCO <sub>2</sub> e)	Emission Reductions (tCO <sub>2</sub> e)
9904-0003	01/01/2017 – 31/12/2017	2,142	0	0	2,142
9904-0004	01/01/2017 – 31/12/2017	2,573	0	0	2,573
9904-0005	01/01/2017 – 31/12/2017	14,694	0	0	14,694
9904-0007	01/01/2017 – 31/12/2017	0	0	0	0
9904-0008	01/01/2017 – 31/12/2017	425	0	0	425
9904-0009	12/12/2017 – 31/12/2017	37	0	0	37
<b>Total</b>	<b>01/01/2017 – 31/12/2017</b>	<b>19,871</b>	<b>0</b>	<b>0</b>	<b>19,871</b>

## SECTION B. Verification team, technical reviewer and approver

### B.1. Verification team members

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	Onsongo	Samuel	Bureau Veritas India Pvt Ltd	x	x	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	Chirchir	James	Bureau Veritas India Pvt Ltd
2.	Support Technical Reviewer	IR	Patankar	Sanjay	Bureau Veritas India Pvt Ltd
3.	Approver	IR	Pednekar	Sapana	Bureau Veritas India Pvt Ltd

## SECTION C. Application of materiality in conducting the verification

### C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	<i>Human error in the quantification of emissions</i>	<i>medium</i>	<p><b>Likelihood</b> – may occur if personnel are not trained on monitoring requirements.</p> <p><b>Impact</b> – Unreliable data, hence ERs claimed may not be verifiable</p>	<i>The DOE planned and carried out onsite assessment to check information flow, retracing the reported information to source (i.e. plant logs). The DOE also evaluated the CME's application of its proposed QA/QC procedures.</i>
2.	<i>Reliance on a poorly designed information system</i>	<i>Medium</i>	<p><b>Likelihood</b> – may occur due to the use of excel spreadsheet without adequate controls</p> <p><b>Impact</b> – over estimation of ERs claimed.</p>	<i>The DOE carried out an independent calculation using the verified data and following the formulae indicated in the approved versions of CPA-DDs and the applied monitoring methodologies</i>

### C.2. Consideration of materiality in conducting the verification

In line with the CDM VVS version 02.0, the DOE has verified the PoA, applying the concept of materiality. Consideration of materiality began by determining the materiality threshold to be applied. While assessing the risks indicated in C.1 above, the DOE applied a threshold of 5% as provided for in paragraph 308 (d) of the standard. The risks above were assessed as follows:

**Risk No. 1:** The DOE performed on-site assessment between 23/04/2018 and 30/04/2018. Following the concept of materiality, the following CPA were included in the on-site assessment, since they contributed more than 5% of the total emission reductions for the POA: Mbinga hydroelectric project, Yovi Small Hydro Power Project and Tulila hydroelectric plant. Additionally, Darakuta Mini Hydro Project was also included in the on-site assessment, because this was the first verification of the CPA after its inclusion in the PoA. During the onsite assessment, the DOE was able to retrace the reported values to plant logs. All sets of data were traceable to the plant logs and no errors was noted.

**Risk No. 2:** The DOE has carried out an independent calculation of the ER claimed by each of the five CPAs that were operational and confirms that the calculation has been done without material miss statement or omissions. No emission reductions are claimed for the single CPA that was not operational in the monitoring period (i.e. Ngombeni biomass power plant project CPA 9904-0007).

## SECTION D. Means of verification

### D.1. Desk/document review

The assessment of the PoA documentation provided by the CME is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report submitted to the DOE. Qualitative information comprises information on internal management controls, calculation procedures, and procedures for transfer of data, frequency of emissions reports, review and internal audit of calculations.

The monitoring report (MR) version 01 dated 20/02/2018 (refer to doc 1 in Appendix 3) submitted by the project participant was web hosted on the UNFCCC-CDM web site on 23/03/2018 and thus, was available in the public domain. The report consisted of the following six CPAs: 9904-0003, 9904-0004, 9904-0005, 9904-0007, 9904-0008 and 9904-0009.

In addition to the monitoring documentation provided by the project participants, the DOE reviewed:

- (a) Previous set of verification and certification reports (refer to doc 3 and doc 4 in Appendix 3)
- (b) Previous set of Monitoring reports (refer to doc 5 and doc 6 in Appendix 3)
- (c) The registered PoA-DD (refer to doc 7 Appendix 3)
- (d) the applied methodologies (refer to doc 8 and doc 9 in Appendix 3)
- (e) Specific case CPA-DDs and their corresponding validation reports (docs 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 and 23 in Appendix 3)
- (f) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board; (PRC-9904-003, PRC-9904-002)
- (g) Emission reduction calculation spreadsheet version 01 and final version 02 dated 04/03/2019 (refer to docs 2 and 24 respectively in Appendix 3).
- (h) Any other information and references relevant to the project activity's resulting emission reductions (e.g. IPCC reports, data on electricity generation and calibration).
- (i) Other documents were reviewed onsite (including invoices, bill, plant logs, etc.).

A full list of documents and records reviewed is provided in Appendix 3

## D.2. On-site inspection

Duration of on-site inspection: 23/04/2018 to 30/04/2018				
No.	Activity performed on-site	Site location	Date	Team member
1.	a) Introductory meeting with Team b) Assessment of records (Invoices, bills and monthly reports) for Ikondo Micro-Hydro Power plant c) assessment of meter calibration for Ikondo Micro-Hydro Power plant	Arusha	23/04/2018	Samuel Onsongo
2.	a) Interview the manager of Darakuta Hydropower Development Company Limited b) Tour of the Darakuta Hydropower power plant c) Assessment of data logging d) Assessment of data transmission and reporting e) assessment of meter calibration	Darakuta Hydropower Development Company Limited, Babati	24/04/2018	Samuel Onsongo
3.	a) Interview the manager of Yovi Hydro Power Company Ltd b) Tour of the Yovi Hydro Power plant c) Assessment of data logging d) Assessment of data transmission and reporting e) assessment of meter calibration	Yovi Hydro Power Company Ltd, Yovi	26/04/2018	Samuel Onsongo
4.	a) Interview the manager of Tulila Hydro-electric Plant Company Limited b) Tour of the Tulila hydroelectric plant c) Assessment of data logging d) Assessment of data transmission and reporting e) assessment of meter calibration	Tulila Hydro-electric Plant Company Limited, Tulia-Mbinga	29/04/2018	Samuel Onsongo
5.	a) Travel to Mbinga b) Interview the manager of Andoya Hydroelectric Power Company Ltd c) Tour of the Andoya Hydroelectric	Andoya Hydroelectric Power Company Ltd, Mbinga	30/04/2018	Samuel Onsongo

Power plant d) Assessment of data logging e) Assessment of data transmission and reporting f) assessment of meter calibration g) Closing meeting	town		
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**D.3. Interviews**

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Varadharaj	Baraneedharan	The World Bank Group (PP/CME)	Various dates	<ul style="list-style-type: none"> <li>- Compliance with CDM rules.</li> <li>- PoA implementation, operation</li> <li>- Monitoring Plan and management procedures</li> <li>- Data collection</li> <li>- QA/QC</li> <li>- ER calculations</li> <li>- Monitoring reports</li> <li>- Changes to CPAs</li> </ul>	Samuel Onsongo
2.	Mbwilo	Sayuni	REA (CME)	Various dates from 23/04/2018 to 30/04/2018	<ul style="list-style-type: none"> <li>- PoA implementation, operation</li> <li>- Monitoring Plan and management procedures</li> <li>- Data collection</li> <li>- QA/QC</li> <li>- Implementation of CPAs</li> </ul>	Samuel Onsongo
3.	Bapsc	Florian	Darakuta Hydropower power plant (CPA implementer)	24/04/2018	<ul style="list-style-type: none"> <li>- CPA implementation</li> <li>- Operation of the power plant</li> <li>- Technology</li> <li>- Training on CDM</li> </ul>	
4.	Kolowoga	Fr. Godfrey	Yovi Hydro Power Company Ltd. (CPA implementer)	26/04/2018	<ul style="list-style-type: none"> <li>- CPA implementation</li> <li>- Operation of the power plant</li> <li>- Technology</li> <li>- Training on CDM</li> </ul>	Samuel Onsongo
5.	Mapunda	Sr. Jane	Tulila Hydro-Electric Plant Co. Ltd. (CPA Implementer)	29/04/2018	<ul style="list-style-type: none"> <li>- CPA implementation</li> <li>- Implemented technology and its efficiency</li> <li>- Normal and abnormal Plant operation</li> <li>- Data logging</li> </ul>	Samuel Onsongo

					- Calibration of measuring equipment - Training on CDM	
6.	Andoya	Alex	AHEPO CO. Ltd (CPA implementer)	30/04/2018	- CPA implementation	Samuel Onsongo
7.	Haule	John	AHEPO CO. Ltd (CPA implementer)	30/04/2018	- Record keeping procedure - Training on CDM	Samuel Onsongo
8.	Bubelwa	Jasper	AHEPO CO. Ltd (CPA implementer)	30/04/2018	- Implemented technology and its efficiency - Normal and abnormal Plant operation - Data logging - Calibration of measuring equipment	Samuel Onsongo

**D.4. Sampling approach**

Not applicable

**D.5. Clarification requests, corrective action requests and forward action requests raised**

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
<b>General</b>			
Compliance of the monitoring report with the monitoring report form	1	4	
Remaining forward action requests from validation and/or previous verifications			
CPAs considered for verification and covered in this report			
<b>Programme of activities</b>			
Compliance of the programme implementation with the registered PoA-DD	1		
Implementation and operation of the management system			
Post-registration changes			
• Corrections			
• Inclusion of a monitoring plan			
• Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents <sup>1</sup>			
• Changes to the programme design			
• Addition of CPA inclusion template			
• Change of coordinating/managing entity			
• Changes specific to afforestation and reforestation activities			
<b>Component project activities</b>			
Compliance of the CPA implementation with the included			

<sup>1</sup> Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

CPA design document			
Post-registration changes			
<ul style="list-style-type: none"> <li>Temporary deviations from registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents</li> </ul>			
<ul style="list-style-type: none"> <li>Corrections</li> </ul>			
<ul style="list-style-type: none"> <li>Changes to the start date-of the crediting period</li> </ul>			
<ul style="list-style-type: none"> <li>Inclusion of a monitoring plan</li> </ul>			
<ul style="list-style-type: none"> <li>Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents</li> </ul>			
<ul style="list-style-type: none"> <li>Changes to the project design</li> </ul>			
<ul style="list-style-type: none"> <li>Changes specific to afforestation and reforestation activities</li> </ul>			
Compliance of the registered monitoring plan with applied methodologies and standardized baselines			
Compliance of monitoring activities with the registered monitoring plan			
<ul style="list-style-type: none"> <li>Data and parameters fixed ex ante or at renewal of crediting period</li> </ul>			
<ul style="list-style-type: none"> <li>Data and parameters monitored</li> </ul>		1	
<ul style="list-style-type: none"> <li>Implementation of sampling plan</li> </ul>			
Compliance with the calibration frequency requirements for measuring instruments			
Assessment of data and calculation of emission reductions or net removals		1	
<ul style="list-style-type: none"> <li>Calculation of baseline GHG emissions or baseline net GHG removals by sinks</li> </ul>			
<ul style="list-style-type: none"> <li>Calculation of project GHG emissions or actual net GHG removals by sinks</li> </ul>			
<ul style="list-style-type: none"> <li>Calculation of leakage GHG emissions</li> </ul>			
<ul style="list-style-type: none"> <li>Summary of calculation of GHG emission reductions or net GHG removals by sinks</li> </ul>			
<ul style="list-style-type: none"> <li>Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA</li> </ul>			
<ul style="list-style-type: none"> <li>Remarks on difference from estimated value in included CPA</li> </ul>			
Assessment of reported sustainable development co-benefits			
Global stakeholder consultation			
Others (please specify)			
<b>Total</b>	<b>2</b>	<b>6</b>	<b>0</b>

## SECTION E. Verification findings

### E.1. General

#### E.1.1. Compliance of the monitoring report with the monitoring report form

<b>Means of verification</b>	Document reviewed: The monitoring report version 01 dated 20/02/2018 and subsequent revisions of the report were reviewed against the current valid forms in the UNFCCC CDM website for compliance with instructions for filling in monitoring report forms contained in the forms.
<b>Findings</b>	It was noted that the CME had not complied with instruction for filling in monitoring report form; two CARs and a CL were raised as a result. Refer to CAR 1, CAR 2, CAR 3, CAR 4 and CL 1 in Appendix 4

<b>Conclusion</b>	<p>Bureau Veritas India Pvt Ltd hereby confirms that the final Monitoring report version 03, dated 07/06/2019 provided by the CME after addressing the CL and CARs, complies with the latest form and the guidelines therein.</p> <p>(CDM VVS 339)</p>
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**E.1.2. Remaining forward action requests from validation and/or previous verifications**

No FARs were raised at validation or during previous verification.

**E.1.3. CPAs considered for verification and covered in this report**

Title and UNFCCC reference number of the CPA included in the PoA as of the end of this monitoring period	Is the CPA considered for this verification? (yes/no)	The date when the CPA was included	Version of the PoA-DD	Confirmation that a request for issuance including the CPA has been published for the previous monitoring period (Y/N)
9904-0001	No	08/05/2014	Version 08	N
9904-0002	No	05/08/2014	Version 08	N
9904-0003	Yes	06/11/2015	Version 08	Y
9904-0004	Yes	06/11/2015	Version 08	Y
9904-0005	Yes	06/11/2015	Version 08	Y
9904-0006	No	07/07/2016	Version 08	N
9904-0007	Yes	11/08/2016	Version 08	Y
9904-0008	Yes	14/10/2016	Version 08	Y
9904 - 0009	Yes	12/12/2017	Version 08	N/A

**E.2. Programme of activities****E.2.1. Compliance of the programme implementation with the registered programme design document**

Means of verification	<b>Document review,</b> The DOE reviewed the registered PoA-DD version 08, the Monitoring Report.	
	<b>Interview with stakeholders:</b> On various dates, between 23/04/2018 to 30/04/2018, the DOE held interviews with the CME's and PP's representatives and the CPA implementers for the four CPAs (CPA 9904-0003 (Mbinga), CPA 9904-0004 (Yovi), CPA 9904-0005 (Tulila), and CPA 9904-0009 (Darakuta)) included in this monitoring report to confirm the implementation structure, the management and operation plan; and reporting structure of the PoA.	
	<b>Onsite inspection</b> The DOE further conducted an onsite assessment from 23/04/2018 to 30/04/2018, to ascertain that all physical features (i.e. technology, project equipment, and monitoring and measuring equipment) for the CPAs were in place and that the CPAs had been operated as per their respective CPA-DDs.	
Findings	A clarification request was raised as a result of the review. Refer to CL 2, in Appendix 4	
Conclusion	Bureau Veritas India Pvt Ltd hereby confirms that the program has been implemented in accordance with the registered PoA-DD. The implementation status of the PoA is that: it was registered on 08/05/2014 and since registration up until the end of the monitoring period 31/12/2017, nine (9) CPAs have been included into the PoA in accordance with the established PoA management structure. CPAs have been included as follows:	
	Description of CPA Category	Implementation status

	<p><b>CPA Category 1:</b> This comprises CPAs that install one or more renewable energy technologies (hydro, wind, biomass or PV) not exceeding 15 MW, and supply the generated electricity to the main national grid. The CPAs are required to comply with the requirements of methodology AMS-I.D version 17. The following CPAs have been included in this category:</p>	Up to the end of the monitoring period only one category 1 CPA had been included i.e. Darakuta Mini Hydro Project, CPA 9904-0009.
	<p><b>CPA Category 2:</b> This comprises CPAs that install one or more renewable energy technologies (hydro, wind, biomass or PV) not exceeding 15 MW, and supply the generated electricity to an existing mini-grids being operated by the national utility (TANESCO), or to new isolated mini-grids to serve new areas. The CPAs are required to comply with the requirements of methodology AMS-I.F version 02. The following CPAs have been included in this category:</p>	<p>Up to the end of the monitoring period the following three CPAs have been included under category 2:</p> <ul style="list-style-type: none"> <li>- NextGen Solar Project, Kigoma Region, CPA 9904-0002</li> <li>- Mbinga Hydroelectric Project, CPA 9904-0003</li> <li>- Ngombeni Biomass Power Plant Project, CPA 9904-0007</li> </ul>
	<p><b>CPA Category 3:</b> This comprises CPAs that install one or more renewable energy technologies (hydro, wind, biomass or PV) not exceeding 15 MW, and supply the generated electricity the main national grid and an existing mini-grids being operated by the national utility (TANESCO), and/or to new isolated mini-grids to serve new areas. The CPAs are required to comply with the requirements of both methodology AMS-I.D version 17 and AMS-I.F version 02. The following CPAs have been included in this category:</p>	<p>Up to the end of the monitoring period the following 5 CPAs have been included under category 3:</p> <ul style="list-style-type: none"> <li>- Mapembasi Hydro Power Project, CPA 9904-0001</li> <li>- Yovi Small Hydro Power Project, CPA 9904-0004 (<i>the CPA was included as category 2 however due to post registration change, it is now a category 3 CPA</i>)</li> <li>- Tulila Hydro-electric Plant, CPA 9904-0005</li> <li>- Maguta Small Hydro Power Project, CPA 9904-0006</li> <li>- Ikondo Micro Hydro Power Plant, CPA 9904-0008</li> </ul>
<p>Bureau Veritas India Pvt Ltd hereby confirms that the CME has implemented the PoA as described in the registered PoA-DD.</p> <p>(CDM VVS 342)</p>		

### E.2.2. Implementation and operation of the management system

<b>Means of verification</b>	<p><b>Document review:</b> The DOE reviewed documents including the registered PoA-DD version 08, validation reports for the PoA and the CPA-DDs (including the revised approved versions, where applicable) for the following six CPAs: 9904-0003, 9904-0004, 9904-0005, 9904-0007, 9904-0008 and 9904-0009 together with their respective validation reports and previous verification reports.</p> <p><b>Onsite inspection and interview with stakeholders:</b> From 23/04/2018 to 30/04/2018, the DOE held interviews with the CME representatives, the PP representatives and CPA implementers; to confirm the implementation structure, the management and operation plan; and reporting structure of the PoA.</p>
<b>Findings</b>	Compliant
<b>Conclusion</b>	The management system in the registered PoA-DD has been implemented as

	<p>follows:</p> <p>a) Since the registration of the PoA on 08/05/2014, until 31/12/2017 (the end of this monitoring period), nine (9) CPAs have been included into the PoA in accordance with the established Operational and management plan. This was confirmed through the validation reports. Further, during onsite assessment, it was confirmed that the operation structure is implemented; where REA is the CME and the implemented CPAs, each has a manager with responsibilities as described in the registered PoA-DD. Records are kept as proposed in the PoA-DD</p> <p>b) REA (the CME) has carried out training and kept relevant records which were made available onsite including: CDM operators manual and Powerpoint slides used for training, of CPA level CDM Operations. The CPA managers also confirmed they had received training on CDM and CPA operation and monitoring.</p> <p>c) It was also confirmed through interviews with the CME, PP representatives and the CPA implementers, that the meetings for the purpose of improving the management system had been conducted for the CPAs.</p> <p>Bureau Veritas India Pvt Ltd hereby confirms that the CME has implemented and operated the management system described in the registered PoA-DD.</p> <p>(CDM VVS para 332)</p>
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### **E.2.3. Post-registration changes**

#### **E.2.3.1. Corrections**

There were no post registration changes for the PoA

#### **E.2.3.2. Inclusion of a monitoring plan**

There were no post registration changes for the PoA

#### **E.2.3.3. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents**

There were no post registration changes for the PoA

#### **E.2.3.4. Changes to the programme design**

There were no post registration changes for the PoA

#### **E.2.3.5. Addition of CPA inclusion template**

There were no addition of CPA inclusion template

#### **E.2.3.6. Change of coordination/managing entity**

There was no change to the CME.

#### **E.2.3.7. Changes specific to afforestation and reforestation activities**

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Not applicable

### **E.3. Component project activities**

Section E is not repeated for each CPA, since assessment of the CPAs has been made as a single group of all the six CPAs included in the monitoring report. The CPAs comprise:

- a) Category 1 CPAs that involve Power plants supplying power only to national grid. Only one CPA (9904-0009) is included in this verification.

- b) Category 2 CPAs that involve Power plants supplying power only to a mini-grid (isolated mini-grids operated by TANESCO and/or others mini-grids not operated by TANESCO). They include the following two CPAs: CPA 9904-0003 (referred to as Mbinga in the monitoring report) and CPA 9904-0007 (referred to as Ngombeni in the monitoring report)
- c) Category 3 CPAs that involve Power plants supplying power to both the TANESCO national grid and mini-grids (Isolated mini-grids operated by TANESCO and/or other mini-grids not operated by TANESCO). They include the following two CPAs: CPA 9904-0005 (referred to as Tulila in the monitoring report) and CPA 9904-0008 referred to as Ikondo in the monitoring report)

In all the CPAs the key parameters to be monitored are similar

### E.3.1. Compliance of the CPA implementation with the included CPA design document

Means of verification	<b>Review of documents</b> The DOE reviewed the monitoring report and CPA DDs (in the case of CPA 9904-0004 and 9904-0007 the revised approved versions)															
	<b>Onsite inspection</b> From 23/04/2018 to 30/04/2018 the DOE carried out onsite inspection and interviews with stakeholders (CME, PP representatives and CPA Implementers) for the CPA 9904-0003 (Mbinga), CPA 9904-0004 (Yovi), CPA 9904-0005 (Tulila) and CPA 9904-0009 (Darakuta); to ascertain that all physical features (technology, project equipment, and monitoring and measuring equipment) of the included CPAs were in place. The selection of the CPAs for site inspection was informed by the risks analysis and materiality threshold as described in section C of this report. The DOE conducted onsite assessment for each of these CPAs on the following dates:															
	<table><tr><td>CPA number</td><td>Onsite assessment date</td><td>Location</td></tr><tr><td>9904-0003</td><td>30/04/2018</td><td>Mbinga</td></tr><tr><td>9904-0004</td><td>26/04/2018</td><td>Yovi</td></tr><tr><td>9904-0005</td><td>29/04/2018</td><td>Tulila</td></tr><tr><td>9904-0009</td><td>24/04/2018</td><td>Darakuta</td></tr></table>	CPA number	Onsite assessment date	Location	9904-0003	30/04/2018	Mbinga	9904-0004	26/04/2018	Yovi	9904-0005	29/04/2018	Tulila	9904-0009	24/04/2018	Darakuta
	CPA number	Onsite assessment date	Location													
	9904-0003	30/04/2018	Mbinga													
9904-0004	26/04/2018	Yovi														
9904-0005	29/04/2018	Tulila														
9904-0009	24/04/2018	Darakuta														
Assessment of the other CPAs (i.e. CPA 9904-0007 (Ngombeni) and CPA 9904-0008 (Ikondo), was based on document review (Monitoring report and CPA-DDs) and interview with the CME (REA) and PP (World Bank) representatives.																
Findings	Compliant															
Conclusion	Bureau Veritas India Pvt Ltd hereby confirms that the CPAs included in the monitoring report have been implemented in accordance with their respective CPA DDs and where applicable the revised approved CPA-DD as follows:															
	a) The implementation status of the CPAs is as follows:															
	<table><tr><td>CPA number</td><td>Implementation status</td></tr><tr><td>9904-0003</td><td>It was proposed that the CPA will be implemented in two phases. In this monitoring period only phase 1, constituting 560 kW hydro-power plant, has been implemented. The project was commissioned on 19/03/2015. Implementation of phase 2 is not yet started, the CPA implementer cited financial constrains as a cause.</td></tr><tr><td>9904-004</td><td>It was proposed that the CPA will be implemented in two phases. Phase 1 was to constitute installation of 1 MW hydro-power plant and Phase 2 to increase the capacity by 1.3 MW. Phase 1 has been implemented. Implementation of phase 2 is not yet started, the CPA implementer cited financial constrains as a cause. In the first monitoring period, the CPA underwent a post registration change that was approved refer to PRC-9904-003.</td></tr><tr><td>9904-0005</td><td>It was proposed that the CPA be implemented in two phases. Phase 1 was to constitute installation 5 MW hydro-power plant and Phase 2 to increase the capacity by 2.5 MW. Phase 1 has been implemented as planned. The project was commissioned</td></tr></table>	CPA number	Implementation status	9904-0003	It was proposed that the CPA will be implemented in two phases. In this monitoring period only phase 1, constituting 560 kW hydro-power plant, has been implemented. The project was commissioned on 19/03/2015. Implementation of phase 2 is not yet started, the CPA implementer cited financial constrains as a cause.	9904-004	It was proposed that the CPA will be implemented in two phases. Phase 1 was to constitute installation of 1 MW hydro-power plant and Phase 2 to increase the capacity by 1.3 MW. Phase 1 has been implemented. Implementation of phase 2 is not yet started, the CPA implementer cited financial constrains as a cause. In the first monitoring period, the CPA underwent a post registration change that was approved refer to PRC-9904-003.	9904-0005	It was proposed that the CPA be implemented in two phases. Phase 1 was to constitute installation 5 MW hydro-power plant and Phase 2 to increase the capacity by 2.5 MW. Phase 1 has been implemented as planned. The project was commissioned							
	CPA number	Implementation status														
9904-0003	It was proposed that the CPA will be implemented in two phases. In this monitoring period only phase 1, constituting 560 kW hydro-power plant, has been implemented. The project was commissioned on 19/03/2015. Implementation of phase 2 is not yet started, the CPA implementer cited financial constrains as a cause.															
9904-004	It was proposed that the CPA will be implemented in two phases. Phase 1 was to constitute installation of 1 MW hydro-power plant and Phase 2 to increase the capacity by 1.3 MW. Phase 1 has been implemented. Implementation of phase 2 is not yet started, the CPA implementer cited financial constrains as a cause. In the first monitoring period, the CPA underwent a post registration change that was approved refer to PRC-9904-003.															
9904-0005	It was proposed that the CPA be implemented in two phases. Phase 1 was to constitute installation 5 MW hydro-power plant and Phase 2 to increase the capacity by 2.5 MW. Phase 1 has been implemented as planned. The project was commissioned															

		on 12/09/2015. Implementation of Phase 2 is still within the plan.
	9904-0007	The CPA constitutes an installation of 2.5 MW biomass power plant. This has been implemented in full as planned. The project was commissioned on 27/01/2014. In the first monitoring period, the CPA underwent a post registration change that was approved refer PRC-9904-002. However during this verification, the CPA was not operational due to technical problems with the boiler. No emission reductions are claimed for the CPA in this verification period.
	9904-0008	The CPA constitutes addition of capacity, by 350 kW, to an existing 80 kW hydro-power plant. This has been implemented in full as planned. The project was commissioned on 26/01/2016.
	9904-0009	The CPA constitutes addition of capacity, of 1 MW, to an existing 75 kW hydro-power plant. Implementation was proposed to be in 2 phases (320 kW + 680 kW). In this verification cycle, Phase 1 has already been implemented. The project was commissioned on 19/04/2016. It was however noted that the existing 75 kW plant had not yet been connected to the grid as planned. A temporary deviation has been requested by the CME and has been reviewed by the DOE (refer to section E.3.2.1 of this report).
	b) The operation of the CPAs is in accordance with their respective registered CPA-DDs and revised approved CPA-DDs where applicable is as follows:	
	CPA number	Operation
	9904-0003	The CPA was designed to supply electricity to a mini-grid. During the period 01/01/2017 - 31/12/2017 the CPA has supplied power to the TANESCO mini-grid and directly to villages through an isolated mini-grid.
	9904-004	According to the revised approved CPA DD, the CPA is to supply electricity to the national grid and a mini-grid. During the period 01/01/2017 - 31/12/2017 the CPA has supplied power to TANESCO grid only. No electricity was supplied to a mini-grid in the monitoring period since the mini-grid has not yet been constructed.
	9904-0005	The CPA was designed to supply electricity to the national grid and a mini-grid. During the period 01/01/2017 - 31/12/2017 the CPA has supplied power to TANESCO mini-grid only. No electricity was supplied to the TANESCO nation grid in the monitoring period, since the national grid has not been extended the area.
	9904-0007	The CPA was designed to supply electricity to a mini-grid. During the period 01/01/2017 - 31/12/2017 the CPA was not operational due to technical problems with the boiler. No emission reductions are claimed for the CPA in the monitoring period.
	9904-0008	The CPA was designed to supply electricity to the national grid and a mini-grid. During the period 01/01/2017 - 31/12/2017 the CPA has supplied power to both the national grid (Operated by TANESCO) and a mini-grid operated by Matembwe Village Company Limited.
	9904-0009	The CPA was designed to supply electricity to the national grid. During the period 01/01/2017 - 31/12/2017, the CPA has supplied electricity to the national grid. Accounting for emission reductions start from the date of its inclusion on 12/12/2017. It was however noted that the existing 75 kW plant had not yet been connected to the grid as planned. A temporary deviation has been requested by the CME and assessed by the DOE (refer to section E.3.2.1 of this report).

	<p>c) Information (data and variables) reported are lower than projected in the respective CPA-DDs for the CPAs indicated above. Appropriate emission factors (0.530 tCO<sub>2</sub>e/MWh for electricity supplied to the grid and 0.8 tCO<sub>2</sub>e/MWh for electricity supplied to mini-grids) have been used in accordance with the included CPA DDs and revised approved CPA-DD (for the case of CPA-9904-0004 and CPA-9904-0007).</p> <p>d) There is no increase in the actual GHG emission reductions achieved by the CPAs in the current monitoring period as compared to the ex-ante estimates.</p> <p>(CDM VVS 342)</p>
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### E.3.2. Post-registration changes

#### E.3.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

In this monitoring period, the CME has proposed a temporary deviation from the registered monitoring plan for the CPA 9904-0009 (Darakuta). According to the registered monitoring plan for the CPA, the CPA implementer was required to monitor both the total net electricity supplied to the national grid by all units (i.e. existing units and new units) and electricity supplied to the grid by the existing unit. However, during the monitoring period 01/01/2017 - 31/12/2017, only total net electricity ( $EG_{PJ,add,y,grid}$ ) supplied to the national grid has been monitored while monitoring of electricity from the existing unit ( $EG_{actual,y}$ ) has not been done.

Monitoring of  $EG_{actual,y}$  is necessary in order to determine  $EG_{BL,Existing,y,grid}$  which is determined as

$$EG_{BL,Existing,y,grid} = \text{MAX} (EG_{actual,y}, EG_{estimated,y}) \text{until DATE}_{BaselineRetrofit}$$

The main reason for lack of monitoring, as indicated by the CPA implementer, is that the existing unit had not been connected to the grid as planned.

To account for the deviation, the CME has estimated  $EG_{BL,Existing,y,grid}$  assuming that the existing unit would operate at maximum ideal capacity (i.e. 100% efficiency and plant load factor of 1), were it to be connected to the grid. The DOE has confirmed that, in the absence of the required monitoring, the CME's approach would lead to a more conservative estimate of emissions reduction. This is because the formula for determining baseline emissions reduction i.e.

$$BE_{Add,CO2,y,grid} = (EG_{PJ,add,y,grid} - EG_{BL,existing,y,grid}) * EF_{CO2}$$

requires that quantity of electricity  $EG_{BL,Existing,y,grid}$ , supplied by the existing unit, be deducted from the total net electricity  $EG_{PJ,add,y,grid}$  supplied to the grid by the project.

Bureau Veritas India Pvt Ltd, has reviewed the change and proposed alternative; and considers the change to be in line with paragraph 228 of the CDM project standard for programmes of activities version 02.

#### E.3.2.2. Corrections

There were no related post registration changes in this monitoring period 01/01/2017 - 31/12/2017. The change indicated in the monitoring report was covered in the previous verification cycle.

#### E.3.2.3. Changes to the start-date of the crediting period

There were no related post registration changes in this monitoring period 01/01/2017 - 31/12/2017.

#### E.3.2.4. Inclusion of a monitoring plan

There were no related post registration changes in this monitoring period 01/01/2017 - 31/12/2017

### E.3.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

There were no related post registration changes in this monitoring period 01/01/2017 - 31/12/2017

### E.3.2.6. Changes to the project design

There were no related post registration changes in this monitoring period 01/01/2017 - 31/12/2017. The change indicated in the monitoring report was covered in the previous verification cycle.

### E.3.2.7. Changes specific to afforestation and reforestation activities

Not applicable

### E.3.3. Compliance of the registered monitoring plan with applied methodologies and standardized baselines

<b>Means of verification</b>	<b>Document review</b> The DOE reviewed the CPA-DDs (CPA DD for 9904-0003, 9904-0005, 9904-0008 and 9904-0009) and revised approved CPA DDs (for CPA 9904-0004 and 9904-0007), and the applied methodologies; to establish whether the monitoring plan, as reported in the monitoring report for each of the CPAs, is in line with the monitoring methodologies.
<b>Findings</b>	Compliant
<b>Conclusion</b>	Bureau Veritas India Pvt Ltd has verified the monitoring plan, including: the data and parameters required to be monitored, measurement procedures, monitoring frequency and QC/QA procedures as described in the latest versions of the respective CPA DDs.  Corresponding to the paragraph 345 of CDM VVS version 02.0, the Bureau Veritas India Pvt Ltd confirms that the monitoring plan in the registered CPA DDs and revised approved CPA-DDs is in accordance with the approved methodologies AMS-I.D version 17 and AMS-I.F version 02.  (CDM VVS 345)

### E.3.4. Compliance of monitoring activities with the registered monitoring plan

#### E.3.4.1. Data and parameters fixed ex ante or at renewal of crediting period

<b>Means of verification</b>	<b>Document review:</b> For the parameters determined and fixed ex ante, the DOE has crosschecked the values as reported in the monitoring report version 03 dated 07/06/2019 (ref doc 1 in Appendix 3) with values provided in the respective CPA DDs (for CPA 9904-0003, 9904-0005, 9904-0008 and 9904-0009), including the approved revised CPA DDs (for CPA 9904-0004 and 9904-0007). The DOE also assessed the application of the values in calculation of emission reductions (refer to doc 13 in Appendix 3).
<b>Findings</b>	Compliant
<b>Conclusion</b>	<b><u>For category 1 CPAs (CPA 9904-0009)</u></b>  The following parameters are fixed ex ante in accordance with the monitoring requirements of Category 1 CPAs, under which CPA 9904-0009 is included:  - $EF_{CO_2,grid,y}$ (CO <sub>2</sub> emission factor of the grid in year y). The value reported in the monitoring report version 03 dated 07/06/2019 and applied in ER calculations has been crosschecked with the value in the CPA-DDs and found to be correct. The value 0.530 tCO <sub>2</sub> e/MWh is reported correctly.  - $EF_{CO_2,m,i,y}$ (CO <sub>2</sub> emissions factor of fossil fuel type i used in power unit m in year y). The values reported in the monitoring report version 03 dated 07/06/2019 have

been crosschecked with the values in the CPA-DDs and found to be correct. The parameter is not used for direct ER calculation but rather for the determination of the grid emission factor ( $EF_{CO_2,grid,y}$ ), is determined and fixed ex-ante for the first crediting period. The following values are reported correctly: Gas Oil/Diesel Oil – 0.0726 tCO<sub>2</sub>/GJ and Natural Gas – 0.0543 tCO<sub>2</sub>/GJ

-  $EF_{EL,m,y}$  (CO<sub>2</sub> emissions factor of power unit m considered in grid emission factor calculation in year y). The values reported in the monitoring report version 03 dated 07/06/2019 have been crosschecked with the values in the CPA-DDs and found to be correct. The parameter is not used for direct ER calculation but rather for the determination of the grid emission factor ( $EF_{CO_2,grid,y}$ ). The following values are reported:

Plants	Emission Factor $EF_{EL,m,y}$ (tCO <sub>2</sub> /MWh)
Zuzu	0.69
Tegeta Gas Plant (TGP)	0.46
Ubungo Gas Plant (UGP)	0.45
SONGAS UGT 1 & 2	0.57
SONGAS UGT 3, 4, 5 & 6	0.54
IPTL	0.70
NYAKATO	0.69
AGR (TG)	0.66
AGR (UB)	0.66
UGP 2	0.53
SYMB UB GP	0.49
SYMB UB JET A	0.66
SYMB (AR)	0.66
SYMB (DD)	0.66

-  $\eta_{m,y}$  (Average net energy conversion efficiency of power unit m in year y). The values reported in the monitoring report version 03 dated 07/06/2019 have been crosschecked with the values in the CPA-DDs and found to be correct. The parameter is not used for direct ER calculation but rather for the determination of the grid emission factor ( $EF_{CO_2,grid,y}$ ). The following values have been reported correctly:

Plants	Type of fuel	Technology used	Efficiency (%)
Zuzu	Diesel & Industrial oil	Open cycle	37.8%
Tegeta Gas Plant (TGP)	Natural Gas	Open cycle	42.4%
Ubungo Gas Plant (UGP)	Natural Gas	Open cycle	43.0%
SONGAS UGT1&2	Natural Gas	Open cycle	34.1%
SONGAS UGT3,4,5&6	Natural Gas	Open cycle	36.4%
IPTL	HFO	Open cycle	39.0%
NYAKATO	Diesel & Industrial oil	Open cycle	38.0%
AGR (TG)	Diesel & Industrial oil	Open cycle	39.5%
AGR (UB)	Diesel & Industrial oil	Open cycle	39.5%
UGP 2	Natural Gas	Open cycle	37.0%
SYMB UB GP	Natural Gas	Open cycle	39.5%
SYMB UB JET A	Diesel & Industrial oil	Open cycle	39.5%
SYMB (AR)	Diesel & Industrial oil	Open cycle	39.5%
SYMB (DD)	Diesel & Industrial oil	Open cycle	39.5%

-  $EG_{m,y}$  (Net quantity of electricity generated and delivered to the grid by power unit m in year y). The parameter has been reported in the monitoring report version 03 dated 07/06/2019 in accordance with CPA-DDs and found to be correct. Values are in the Excel spreadsheet and have been reviewed and found to be correct. Refer to the excel sheet "Grid emission factor".

- **EG<sub>k,y</sub>** (Net quantity of electricity generated and delivered to the grid by power unit k in year y (by low-cost/must-run power plants). The parameter has been reported in the monitoring report version 03 dated 07/06/2019 in accordance with the revised approved CPA-DD and found to be correct. Values are in the Excel spreadsheet and have been reviewed and found to be correct. Refer to the excel sheet “Grid emission factor”

**For category 2 CPAs (CPA 9904-0003 and CPA 9904-0007)**

The following parameter is fixed ex ante in accordance with the monitoring requirements of Category 2 CPAs, under which CPA 9904-0003 and 9904-0007 are included:

- **EF<sub>CO<sub>2</sub>,y</sub>** (CO<sub>2</sub> emission factor for displacement of electricity in the mini-grid and/or the captive power plant). The value reported in the monitoring report version 03 dated 07/06/2019 is 0.8 tCO<sub>2</sub>e/MWh and is in accordance with the CPA-DDs.

**For category 3 CPAs (CPA 9904-0004, CPA 9904-0005 and CPA 9904-0008)**

For Category 3, all parameters included in category 1 and category 2 CPAs as indicated above are applicable. In addition, the following parameters are fixed for CPA 9904-0008:

- **EG<sub>BL,existing,y,grid</sub>** (Estimated net electrical energy that would have been produced and supplied to grid by the existing units). The value reported in the monitoring report version 03 dated 07/06/2019 and applied in ER calculations has been crosschecked with the value in the CPA-DD and found to be correct. The value 69 MWh is reported correctly.

- **EG<sub>BL,existing,y,MG</sub>** (Estimated net electrical energy that would have been produced and supplied to a mini-grid by the existing units). The value reported in the monitoring report version 03 dated 07/06/2019 and applied in ER calculations has been crosschecked with the value in the CPA-DD and found to be correct. The value 175 MWh is reported correctly.

Bureau Veritas India Pvt Ltd confirms that the parameters fixed ex ante have been correctly reported and applied in emission reductions calculation

### E.3.4.2. Data and parameters monitored

Means of verification					
	<p><b><u>Category 1 CPAs:</u></b></p> <p>Only one CPA (9904-0009) falls in this category. The monitored parameters have been verified as follows:</p> <p><b>Parameter 1: EG<sub>PJ,add,y,grid</sub></b> - (Total net electrical energy supplied to a grid in year y by all units, existing and new project units)</p> <p><b>MoV:</b> Verification involved onsite review of records (i.e. plant logs) and monthly energy reports for the monitoring period. The DOE also crosschecked the data against the invoice to TANESCO for electricity that was supplied. The CPA has produced electricity throughout the period. The table below shows the amount of electricity supplied to the national grid for the monitoring period:</p> <table border="1"> <thead> <tr> <th>CPA</th><th>Amount of EG<sub>PJ,add,y,grid</sub></th></tr> </thead> <tbody> <tr> <td>CPA 9904-0009</td><td>106.62 MWh</td></tr> </tbody> </table> <p><b>Parameter 2: EG<sub>actual,y</sub>/EG<sub>BL,existing,y,grid</sub></b> - (Quantity of net electricity supplied to the national grid by the existing units in year y)</p> <p><b>MoV:</b> Verification involved onsite review of records and interview with CPA</p>	CPA	Amount of EG <sub>PJ,add,y,grid</sub>	CPA 9904-0009	106.62 MWh
CPA	Amount of EG <sub>PJ,add,y,grid</sub>				
CPA 9904-0009	106.62 MWh				

implementer, CME and PP representative (world Bank Consultant). It was noted that the project had not been implemented as planned and therefore the parameter was not monitored. A corrective action request was raised refer to CAR 5 in Appendix 4. The CME has requested a temporary deviation from the monitoring plan and in its place proposed to apply the maximum possible electricity that can be generated from the existing plant, were it to operate in an ideal condition i.e. 100% efficiency and a PLF of 1. The following value is applied:

CPA	Maximum $EG_{BL,existing,y,grid}$ for existing 75 kW unit for the period 12/12/2017 to 31/12/2017
CPA 9904-0009	36 MWh

The DOE confirms that this approach will lead to a conservative estimate of emission reductions (refer to section E.3.2.1 of this report).

#### **Category 2 CPAs:**

Two CPAs (9904-0003 and 9904-0007) fall in this category.

For CPA 9904-0003 (Mbinga), the monitored parameters have been verified as follows:

**Parameter 1:  $EG_{BL,y}$**  (Quantity of net electricity displaced in year y)

**MoV:** Verification involved onsite review of records (i.e. plant logs) and monthly energy reports for the entire monitoring period (refer to 23 in Appendix 3). The DOE also crosschecked the data against invoices to TANESCO for electricity fed into TANESCO's mini-grid, and bills (invoices) for electricity supplied to consumers in the Isolated mini-grid. The following values are reported and have been correctly applied in baseline emission calculation:

CPA	Quantity of net electricity displaced in TANESCO mini-grid ( $EG_{BL,y}$ )	Quantity of electricity supplied to the mini-grid operated by Andoya Hydro Electric Power Co. Ltd ( $EG_{BL,y}$ )
CPA 9904-0003 (Mbinga)	2,626.414 MWh	59.547 MWh

For CPA 9904-0007 (Ngombeni), the CME had indicated that the CPA was not operational during the entire monitoring period and no emission reductions were being claimed. The DOE, therefore, did not carry out any further verification of the parameters required for monitoring by the CPA. The parameter have been reported as 0, as in the following table:

Parameter	Description	Value
$EG_{BL,y}$	Quantity of net electricity displaced in year y	0
<b>Biomass Consumption</b>	Quantity of biomass consumed in year y	0
$MC_{Biomass}$	Moisture content of the biomass (wet basis)	0
$NCV_{Biomass}$	Net calorific value of biomass type k)	0

#### **Category 3 CPAs:**

Three CPAs (9904-0004, 9904-0005 and 9904-0008) fall in this category. The monitored parameters have been verified as follows:

**Parameter 1:  $EG_{actual,y}/EG_{BL,y}$**  (Quantity of net electricity supplied to the national grid in year y)

**MoV:** Verification involved review of monthly energy reports for the entire monitoring period for the three CPAs and onsite review of records (i.e. plant logs for 9904-0004

and 9904-0005). The DOE also crosschecked the data against invoices to TANESCO for electricity supplied. During this monitoring period the CPA 9905-0005 did not supply electricity to the national grid since the national grid had not reached the location of the CPA, thus the amount of electricity to the national grid is reported as zero. The table below shows the amount of electricity supplied to the national grid by each CPA for the monitoring period:

CPA	Electricity supplied to the grid (MWh/year)
9904-0004 (Yovi)	4,859
9904-0005 (Tulila)	0
9904-0008 (Ikondo)	305

**Parameter 2:  $EG_{BL,y}$**  (Quantity of net electricity supplied to the mini-grid in year y)

**MoV:** The same means of verification as indicated above (i.e. category 3 CPAs Parameter 1) were employed. During this monitoring period the CPA 9905-0004 did not supply electricity to a mini-grid since the planned mini-grid had not yet been constructed, thus the amount of electricity to a mini-grid for the CPA is reported as zero.

The table below shows the amount of electricity supplied to the mini-grids by each CPA for the monitoring period:

CPA	Quantity of net electricity displaced in TANESCO mini-grid ( $EG_{BL,y}$ )	Quantity of electricity supplied to the mini-grid operated by Matembwe Village Company ( $EG_{BL,y}$ )
9904-0004 (Yovi)	0	N/A
9904-0005 (Tulila)	18,384	N/A
9904-0008 (Ikondo)	N/A	330

<b>Findings</b>	A corrective action request was raised from the review (refer to CAR 5 in Appendix 4)
<b>Conclusion</b>	<p>Corresponding to the paragraph 349 of CDM VVS version 02.0, Bureau Veritas India Pvt Ltd confirms that:</p> <ul style="list-style-type: none"> <li>- Monitoring has been carried out in accordance with the monitoring plan contained in the respective CPA DDs and where applicable, the revised approved CPA-PDDs; with the exception of CPA 9904-0009, for which an alternative has been proposed and a request for temporary deviation made.</li> <li>- Parameters required by the monitoring plan have been sufficiently monitored and correctly listed as indicated above; also, with the exception of CPA 9904-0009, for which an alternative has been proposed and a request for temporary deviation made. The monitored data for required parameters have been verified by checking the whole information flow as indicated above.</li> </ul> <p>In line with paragraph 350 of CDM VVS version 02.0, the parameters are listed and the means of verification indicated in this table in the first row above.</p>

#### E.3.4.3. Implementation of sampling plan

<b>Means of verification</b>	N/A
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

#### E.3.5. Compliance with the calibration frequency requirements for measuring instruments

<b>Means of verification</b>	Verification was done through review of documents (CPA DDs), including onsite review of additional records (including calibration records), to determine whether the CME had ensured that calibration of the monitoring equipment was done at the required frequency.
<b>Findings</b>	Compliant
<b>Conclusion</b>	Bureau Veritas India Pvt Ltd confirms that calibration has been conducted. Calibration of measuring equipment for the CPAs, was done by the Authorized entity (TANESCO). This was further confirmed through interviews with the CPA

implementers during onsite assessment. The entity authorized to perform the calibration (TANESCO) provided a letter dated 03/03/2017 indicating the results of the calibration exercise but did not indicate the exact date each meter was calibrated.

The CME opted to apply the date on the letter as the calibration date; and based on this date the CME has applied the maximum permissible error where the situation indicates delayed calibration in the monitoring period 01/01/2017 to 31/12/2017, as provided for, in paragraph 352 a) and the Appendix to the CDM validation and verification standard for programmes of activities Version 02.0. Bureau Veritas India Pvt has assessed this approach and considered it to be a conservative approach and in line with the provisions of the standard.

The calibration for the monitoring equipment for the respective CPAs is as follows:

CPA	Main meter SN	Re-calibration date	Delayed?	Calibration results	Error applied for the period (01/01/2017-03/03/2017) for which calibration was due
9904-0003 (Mbinga)	211108423	03/03/2017	Yes	0.79%	0.79%
9904-0004	208304008	03/03/2017	Yes	0.01%	0.5%
9904-0005 (Tulila)	211112553	03/03/2017	Yes	0.37%	0.5%
9904-0007 (Ngombeni)	211108280	03/03/2017	Yes	0.109%	N/A*
9904-0008 (Ikondo)	212556508	03/03/2017	No/Yes**	-0.62%	0.5%
9904-0009 (Darakuta)	215281802	03/03/2017 (initial calibration)	No	-0.5%	N/A

\* The CPA is not claiming emission reduction, thus, application of the error is not relevant

\*\* For the meter connected to TANESCO grid, previous calibration done on 11/11/2016 was valid until 10/11/2017; recalibration was still done on 03/03/2017, hence no delay in calibration and no error discounting was applied for the portion of electricity supplied to the grid. However, for the portion supplying the mini-grid, the end consumers in the mini-grid were provided with the energy meters during commissioning of the plant starting from 26/01/2016. They had calibration validity until 25/01/2017. The meters were recalibrated in 03/03/2017. Therefore, the delayed calibration only affected the month of February for which error discounting of 0.5% has been applied, since the meters were found to be within the permissible error margin. Also, noteworthy is that the CPA implementer reconfigured monitoring by installing meters at distribution points. The meters were calibrated in 12/01/2017 and have been operational since April 2017.

### E.3.6. Assessment of data and calculation of emission reductions or net removals

#### E.3.6.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

<b>Means of verification</b>	<b>Document review:</b> Verification was done by crosschecking information in the CPA DDs and where applicable, revised approved CPA-DDs, with the values reported in the monitoring report as indicated in section E.3.4 above; and following up the CME's calculations in the ER calculation spread sheets.
<b>Findings</b>	A corrective action request was raised from the review (refer to CAR 6 in Appendix 4)
<b>Conclusion</b>	<b>Category 1 CPAs:</b>

Only one CPA (9904-0009) falls in this category. The baseline emission for the electricity displaced from the grid by the CPA is calculated as:

$$BE_{add,CO_2,y} = (EG_{PJ,add,y,grid} - EG_{BL,existing,y,grid}) \times EF_{CO_2,grid,y}$$

Where

$EG_{PJ,add,y,grid}$	Total net electrical energy supplied to a grid in year y by all units, existing and new project units
$EG_{BL,existing,y,grid}$	Quantity of net electricity supplied to the national grid by the existing units in year y
$EF_{CO_2,grid,y}$	Grid emission factor in year y

Following the formula above baseline emission is calculated as follows:

$$BE_{add,CO_2,y} = (106.62 - 36) \text{ MWh} \times 0.530 \text{ tCO}_2/\text{MWh} \\ = 37 \text{ tCO}_2$$

### Category 2 CPAs:

Two CPAs (9904-0003 and 9904-0007) fall in this category. The baseline emission for the electricity displaced from the mini-grids is calculated as:

**Baseline emissions = Net electricity supplied to the mini-grid x a default emission factor for a mini-grid**

For CPA 9904-0003 the baseline emission is calculated as:

$$BE_{CO_2,y} = 2,678 \text{ MWh} \times 0.8 \text{ tCO}_2/\text{MWh} \\ = 2,142 \text{ tCO}_2$$

For CPA 9904-0007 the baseline emission is reported as zero (0)

### Category 3 CPAs:

Three CPAs (9904-0004, 9904-0005 and 9904-0008) fall in this category. Baseline emission is calculated as the sum of baseline emission for the component of electricity displaced from the national grid and the baseline emission for the component of electricity displaced from the mini-grid. Baseline emission for the two components is determined as follows:

#### Grid component

**Baseline Emissions = Net electricity supplied to the grid x grid emission factor**

#### Mini-grid component

**Baseline emissions = Net electricity supplied to the mini-grid x a default emission factor for a mini-grid**

The table below shows the values determined using the above formulae

Description	CPA 9904-0004	CPA 9904-0005	CPA 9904-0008
Net electricity supplied to the grid in MWh	4,856	0	305
Grid emission factor in tCO <sub>2</sub> /MWh	0.530	0.530	0.530
<b>Baseline emission (grid) in tCO<sub>2</sub></b>	<b>2,573</b>	<b>0</b>	<b>161</b>
Net electricity supplied to the mini-grid in MWh	0	18,368	330
Emission factor for a mini-grid in tCO <sub>2</sub> /MWh	0.8	0.8	0.8
<b>Baseline emission (min-grid) in tCO<sub>2</sub></b>	<b>0</b>	<b>14,694</b>	<b>264</b>
<b>Baseline emissions tCO<sub>2</sub></b>	<b>2,573</b>	<b>14,694</b>	<b>425</b>

Bureau Veritas India Pvt Ltd hereby confirms that a complete set of verifiable data

	was available and the CME has applied the appropriate methods and formulae for calculating baseline GHG emissions.
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### E.3.6.2. Calculation of project GHG emissions or actual net GHG removals by sinks

<b>Means of verification</b>	<p><b>Document review:</b></p> <p>Verification was done by crosschecking information in the CPA DDs and where applicable, revised approved CPA-DDs; with the values reported in the monitoring report as indicated in section E.3.4 above and following up the CME's calculations in the ER calculation spread sheets.</p> <p>Also, during site visit, assessment had been done to determine whether or not, there were any possible sources of project emissions</p>
<b>Findings</b>	Compliant
<b>Conclusion</b>	<p>The CPAs, as designed and operated do not have any project emissions. Project emissions in the respective CPA DD and revised approved CPA-DDs are reported as zero (0). During onsite assessment, the DOE did not come across any indication that deviates from the conclusions in the validation report for the CPAs, that is, no project emissions were identified.</p> <p>Bureau Veritas India Pvt Ltd hereby confirms that the conclusion on project GHG emissions has been applied correctly.</p>

### E.3.6.3. Calculation of leakage GHG emissions

<b>Means of verification</b>	<p><b>Document review:</b></p> <p>Verification was done by crosschecking information in the CPA DDs and where applicable, revised approved CPA-DDs, with the values reported in the monitoring report as indicated in section E.3.4 above and following up the CME's calculations in the ER calculation spread sheets.</p> <p>An onsite assessment had been done, to determine whether or not, there are any possible sources of leakage emissions</p>
<b>Findings</b>	Compliant
<b>Conclusion</b>	<p>The CPAs, as designed and operated do not have any leakage emissions. Leakage emissions in the respective CPA DD and revised approved CPA-DDs are reported as zero (0). During onsite assessment, the DOE did not come across any indication that deviates from the conclusions in the validation report for the CPAs, that is, no leakage emissions were identified.</p> <p>Bureau Veritas India Pvt Ltd hereby confirms that the conclusion on leakage GHG emissions has been applied correctly.</p>

### E.3.6.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

<b>Means of verification</b>	Verification was done by crosschecking information in the CPA DDs and where applicable, revised approved CPA-DDs, with the values reported in the monitoring report as indicated in section E.3.4 above and following up the CME's application of the values in the formulae for calculating emission reductions.
<b>Findings</b>	Compliant
<b>Conclusion</b>	<p>The emission reductions have been calculated as follows for each of CPAs as</p> <p><b>Emission reduction = baseline emissions – project emissions – leakage</b></p> <p>A summary of the calculations is provided in the succeeding table below.</p> <p>Bureau Veritas India Pvt Ltd hereby confirms that :</p> <ul style="list-style-type: none"> <li>(a) All data for the CPAs was available for this monitoring period</li> <li>(b) Crosschecks have been done on the values used in ER calculation with the respective sources of the data (refer to section E.3.4 above).</li> <li>(c) Appropriate methods and formulae for calculating GHG emission reductions have been followed;</li> <li>(d) Assumptions, emission factors and default values that have been applied in the calculations have been justified;</li> <li>(e) No pro-rata approach was necessary in calculations of GHG emission reductions;</li> </ul>

(f) The first day and last day, for the CPAs, in which CERs are being claimed has been correctly specified.

Title and UNFCCC reference number of the CPA	Baseline emissions or baseline net GHG removals by sinks (tCO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (tCO <sub>2</sub> e)	Leakage (tCO <sub>2</sub> e)	GHG emission reductions or net GHG removals by sinks (tCO <sub>2</sub> e)		
				Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	Amount achieved in the entire monitoring period
9904-0003	2,142	0	0	N/A	2,142	2,142
9904-0004	2,573	0	0	N/A	2,573	2,573
9904-0005	14,694	0	0	N/A	14,694	14,694
9904-0007	0	0	0	N/A	0	0
9904-0008	425	0	0	N/A	425	425
9904-0009	37	0	0	N/A	37	37
<b>Total</b>	<b>19,871</b>	<b>0</b>	<b>0</b>	<b>N/A</b>	<b>19,871</b>	<b>19,871</b>

#### E.3.6.5. Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA

<b>Means of verification</b>	<b>Document review</b> Comparison of emission reductions in the CPA DDs and where applicable, revised approved CPA-DDs, for the monitoring period, against the actual emission reductions realised and reported in the monitoring period.
<b>Findings</b>	Compliant
<b>Conclusion</b>	The combined estimated ex ante emission reductions for this monitoring period, for the CPAs according to the respective CPA-DDs and revised approved CPA DDs is 49,698 tCO <sub>2</sub> e. The corresponding actual emission reduction in the monitoring period as reported in the monitoring report and verified by the DOE is 19,871 tCO <sub>2</sub> e. This is represent 60% less emission reductions than projected in the included CPA-DDs. None of the CPAs generated more emission reductions than projected in their respective CPA DDs. A comparison of the estimated emission reductions and actual emission reduction for each CPA is summarized in the succeeding table below.

Title and UNFCCC reference number of the CPA	Actual values achieved by the CPAs during this monitoring period	Value estimated in ex ante calculation in the included CPA-DD(s)
9904-0003	4,982	2,142
9904-0004	4,959	2,573
9904-0005	26,280	14,694
9904-0007	12,019	0
9904-0008	1,416	425
9904-0009	42	37
<b>Total</b>	<b>49,698</b>	<b>19,871</b>

#### E.3.6.6. Remarks on difference from estimated value in included CPA

<b>Means of verification</b>	Document review Review of the monitoring report and interview with CPA Implementers.
<b>Findings</b>	Compliant
<b>Conclusion</b>	Bureau Veritas India Pvt Ltd considers the lowers emissions reductions realised by the CPAs would have been expected given that most of the CPAs have not been

	implemented as planned. The table below shows the causes for the reduced emission reduction compared to the estimates in the CPA-DDs:	
	CPA	Reason
	9904-0003 (Mbiga)	Mbinga CPA consisted of two phases of 520 kW each. Currently only one phase of 520 kW is installed. Phase 2 was expected to be installed in Jan 2016. But the implementation is delayed.
	9904-0004 (Yovi)	Yovi CPA was to be implemented in two phases. Phase 1 consisting of 1 MW is implemented, while phase 2 consisting of 1.3 MW has not been implemented.
	9904-0005 (Tulila)	In Tulila CPA the CPA implementer indicated that they faced technical challenges in synchronization between the mini-grid and the power plant. The plant was not running at the full capacity, as a result. Also, Phase 2 consisting of an additional 2.5 MW has not been implemented.
	9904-0007 (Ngombeni)	In Ngombeni CPA, the CPA was not operational during the monitoring period. No emission reductions were realised.
	9904-0008 (Ikondo)	The DOE did not interview the CPA implementer, hence no reasons are provided.
	9904-0008 (Darakura)	For Darakuta CPA, the existing unit has not been connected to the grid hence a conservative estimate approach was used leading to lower emission reduction.

### E.3.7. Assessment of reported sustainable development co-benefits

<b>Means of verification</b>	N/A
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

### E.3.8. Global stakeholder consultation

<b>Means of verification</b>	No comments were submitted to the DOE for review
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

## SECTION F. Internal quality control

The verification report underwent an Internal Technical Review (ITR) before requesting issuance of CERs for the CPAs.

The ITR is an independent process performed to examine thoroughly that the process of verification has been carried out in conformance with the requirements of the verification scheme as well as internal Bureau Veritas India Pvt Ltd procedures.

The Lead Verifier provides a copy of the verification report to the reviewer, including any necessary verification documentation. The reviewer reviews the submitted documentation for conformance with the verification scheme. This will be a comprehensive review of all documentation generated during the verification process.

When performing an Internal Technical Review, the reviewer ensures that: The verification activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM rules and requirements.

The review encompasses all aspects related to the program which includes program design, baseline, additionality, monitoring plans and emission reduction calculations, internal quality assurance systems of the CME as well as the component project activities, review of the stakeholder comments and responses, closure of CARs, CLs and FARs during the verification exercise, review of sample documents.

The reviewer compiles clarification questions for the Lead Verifier; and Verification Team and discusses these matters with Lead Verifier.

After the agreement of the responses on the 'Clarification Request' from the Lead Verifier as well as the CME/PP(s) the finalized verification report is accepted for further processing such as uploading on the UNFCCC webpage.

## **SECTION G. Verification opinion**

Bureau Veritas India Pvt Ltd has conducted the second periodic verification of the PoA "Tanzania Renewable Energy Programme"; UNFCCC reference number 9904. The PoA is coordinated and managed by the Rural Energy Agency (REA) and is located in the United Republic of Tanzania. The PoA's goal is to increase access to modern energy services in Tanzania by promoting both the off-grid (isolated mini-grid) and national grid connected renewable energy projects, within the country. The technologies promoted by the PoA include: photovoltaic, wind, hydro and biomass technologies for electricity generation. The PoA applies the following two methodologies: AMS.I-D "Grid connected renewable electricity generation", Version 17 and AMS.I-F "Renewable electricity generation for captive use and mini-grid", Version 02. CPAs can be included into the PoA in any one of the following three categories of generic CPAs, by fulfilling the requirements therein:

- a) CPA Category 1: comprises installation of one or more renewable energy technologies (hydro, wind, biomass or PV) not exceeding 15 MW, and supply the generated electricity to the main national grid. The CPAs are required to comply with the requirements of methodology AMS-I.D version 17.
- b) CPA Category 2: comprises installation of one or more renewable energy technologies (hydro, wind, biomass or PV) not exceeding 15 MW, and supply the generated electricity to an existing mini-grids being operated by the national utility (TANESCO), or to new isolated mini-grids to serve new areas. The CPAs are required to comply with the requirements of methodology AMS-I.F version 02.
- c) CPA Category 3: comprises installation of one or more renewable energy technologies (hydro, wind, biomass or PV) not exceeding 15 MW, and supply the generated electricity both to the main national grid and existing mini-grids being operated by the national utility (TANESCO), and/or to new isolated mini-grids to serve new areas. The CPAs are required to comply with the requirements of both methodology AMS-I.D version 17 and AMS-I.F version 02.

Monitoring activities for the PoA in this second period have been reported in a single monitoring report. This verification and certification report covers activities as reported in the monitoring report number 01, version 03 dated 07/06/2019. The monitoring report covers the following six CPAs, included in the PoA, in their respective categories:

- a) Mbinga hydroelectric project, UNFCCC reference number 9904-0003; a CPA in category 2
- b) Yovi Small Hydro Power Project, UNFCCC reference number 9904-0004; a CPA in category 3
- c) Tulila hydroelectric plant, UNFCCC reference number 9904-0005; a CPA in category 3
- d) Ngombeni biomass power plant project, UNFCCC reference number 9904-0007; a CPA in category 2
- e) Ikondo micro hydro power plant, UNFCCC reference number 9904-0008, a CPA in category 3
- f) Darakuta Mini Hydro Project, UNFCCC reference number 9904-0009, a CPA in category 1

The verification consists of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

The Rural Energy Agency (the CME) is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions of the CPA in the PoA; on the basis set out within the PoA and the CPAs' Monitoring Plan as indicated in the CPA DDs and revised approved CPA-DDs. The development and maintenance of records and reporting procedures are in accordance with that plan, including the calculation and determination of GHG emission reductions from the CPAs, and is the responsibility of the management of the programme.

Bureau Veritas India Pvt Ltd confirms that the programme is implemented as described in validated and registered PoA design document and with the CPA DDs, and revised approved CPA-DDs where applicable. Installed equipment being essential for generating emission reduction run reliably, with the exception of Ngombeni biomass power plant project (CPA 9904-0007) which was not operational in the monitoring period. The monitoring system is in place and the CPAs are generating GHG emission reductions.

Bureau Veritas India Pvt Ltd confirms that, in this PoA there was a post registration change to the CPA 9904-0006 (Darakuta Mini Hydro Project). The post registration change has been proposed as a temporary deviation from the monitoring plan. Bureau Veritas India Pvt Ltd, has reviewed the change and proposed alternative; and considers it to be in line with CDM project standard for programmes of activities version 02.

It is Bureau Veritas India Pvt Ltd opinion that the GHG emission reductions are calculated without material misstatements, applying most conservative approach. The emission reductions verified totalize **19,871 tCO<sub>2</sub>e**. Our opinion here relates to the PoA's resulting GHG emission reductions for the six CPAs mentioned above (as reported in monitoring report number 01, version 03 dated 07/06/2019); and related to the valid and registered baseline, registered monitoring plan and associated documents for the CPAs.

## **SECTION H. Certification statement**

Bureau Veritas India Pvt Ltd has conducted the second periodic verification of the PoA "Tanzania Renewable Energy Programme"; UNFCCC reference number 9904. The PoA is coordinated and managed by the Rural Energy Agency (REA) and is located in United Republic of Tanzania. The PoA aims to increase access to modern energy services in Tanzania by promoting both the off-grid (isolated mini-grid) and national grid renewable energy projects within the country using photovoltaic, wind, hydro and biomass technologies for electricity generation. The PoA applies the following two methodologies: AMS.I-D "Grid connected renewable electricity generation", Version 17 and AMS.I-F "Renewable electricity generation for captive use and mini-grid", Version 02.

This verification and certification report covers the monitoring period 01/01/2017 to 31/12/2017 for the following six CPAs:

- a) Mbinga hydroelectric project, UNFCCC reference number 9904-0003; a CPA in category 2
- b) Yovi Small Hydro Power Project, UNFCCC reference number 9904-0004; a CPA in category 3
- c) Tulila hydroelectric plant, UNFCCC reference number 9904-0005; a CPA in category 3
- d) Ngombeni biomass power plant project, UNFCCC reference number 9904-0007; a CPA in category 2
- e) Ikondo micro hydro power plant, UNFCCC reference number 9904-0008, a CPA in category 3
- f) Darakuta Mini Hydro Project, UNFCCC reference number 9904-0009, a CPA in category 1

**CDM-PoA-VCR-FORM**

Bureau Veritas India Pvt Ltd confirms that the GHG emission reductions are calculated without material misstatements, applying most conservative approach. The emission reductions verified totalize **19,871 tCO<sub>2</sub>e** for the six CPAs.

Based on the evidence and information that is considered necessary to guarantee that GHG emission reductions are appropriately calculated, Bureau Veritas India Pvt Ltd confirms the following:

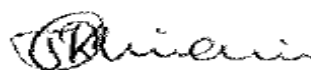
CPA no.	Reporting period	Baseline emissions (tCO <sub>2</sub> e)	Project emissions (tCO <sub>2</sub> e)	Leakage emissions (tCO <sub>2</sub> e)	Emission Reductions (tCO <sub>2</sub> e)
9904-0003	01/01/2017 – 31/12/2017	2,142	0	0	2,142
9904-0004	01/01/2017 – 31/12/2017	2,573	0	0	2,573
9904-0005	01/01/2017 – 31/12/2017	14,694	0	0	14,694
9904-0007	01/01/2017 – 31/12/2017	0	0	0	0
9904-0008	01/01/2017 – 31/12/2017	425	0	0	425
9904-0009	12/12/2017 – 31/12/2017	37	0	0	37
<b>Total</b>	<b>01/01/2017 – 31/12/2017</b>	<b>19,871</b>	<b>0</b>	<b>0</b>	<b>19,871</b>



Mr. Samuel Mayieko

Team Leader

07/06/2019



Mr. James Chirchir

Internal Technical Reviewer

07/06/2019

## Appendix 1. Abbreviations

Abbreviations	Full texts
BVI	Bureau Veritas India Pvt Ltd
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CL	Clarification Request
CME	Coordinating / Managing Entity
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
DOC/doc	Document
DOE	Designated Operational Entity
ERs	Emission Reductions
FAR	Forward Action Request
GHG	Green House Gas(es)
MoV	Means of Verification
MR	Monitoring report
PCP	CDM project cycle procedure for programmes of activities
PDD	Project design document
PP	Project Participant
PRC	Post-Registration Change
PS	CDM project standard for programmes of activities
REA	Rural Energy Agency
SSC	Small Scale
TANESCO	Tanzania Electric Supply Company Limited
UNFCCC	United Nations Framework Convention on Climate Change
VVS	CDM validation and verification standard for programmes of activities

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

Mr. Samuel Onsongo	Bureau Veritas Certification, Kenya	<b>Team Leader</b>  He has a degree in Physics with over 10 years' experience in renewable energy and climate change out of which 7 years have been in CDM. He has been trained on CDM verification, QMS (ISO 9001) and EMS (ISO 14001), as Lead auditor. He has been involved in validation and verification of CDM and Gold Standard projects covering sectoral scope 1 and 3.
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Mr. Chirchir	James	Bureau Veritas Certification, Kenya	<b>Technical Reviewer</b> James Chirchir – holds a Bachelor's degree in Chemical and Process Engineering and had 4 years' experience in manufacturing before joining Bureau Veritas. He is an ISO 9001 and ISO 14000 Lead Auditor and a trained CDM Verifier. He has been involved in validation and verification of over 5 projects.
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Mr. Patankar	Sanjay	Bureau Veritas Certification, India	<b>Technical Specialist supporting Technical Reviewer</b> Educational qualifications: B.E. (Mech.) M.E. (Mech.) He has over 20 years of experience in engineering manufacturing industry covering various functions like enterprise management, product design, engineering, tool & die design, improvements in the production shop, quality assurance & control and systems planning and implementation, including ISO 9001 based quality management systems. Working for the last 10 years in Bureau Veritas Certification (India) Pvt. Ltd. As Lead Auditor for ISO 9001, 14001 and OHSAS 18001 standards/specifications. Has undergone training related to Clean Development Mechanism and is currently involved in validation and verification of CDM project activities.
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### Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	REA	Monitoring report version 01	20/02/2018	CME
2	REA	Emission reduction calculation spreadsheet version 01	20/2/2018	CME
3	BVI	Verification certification report-v2.2	22/11/2018	UNFCCC
4	BVI	Verification certification report-1.3	08/02/2019	UNFCCC
5	REA	Tanzania PoA MR - I 01Nov2018	01/11/2018	UNFCCC
6	REA	2_Monitoring report version 02	07/02/2019	UNFCCC
7	REA	Tanzania Renewable Energy Programme Version 08	23/04/2014	UNFCCC
8	EB 61	AMS I.D. Grid connected renewable electricity generation, Version 17	03/06/2011	UNFCCC
9	EB 61	AMS I.F. Renewable electricity generation for captive use and mini-grid, Version 02	03/06/2011	UNFCCC
10	REA	CPA-DD: Mbinga Hydroelectric Project version 03	25/10/2015	UNFCCC
11	REA	Yovi Small Hydro Power Project version 05	31/01/2018	UNFCCC
12	REA	CPA-DD: Tulila Hydro-electric Plant version 02	26/10/2015	UNFCCC
13	REA	CPA-DD: Ikondo Micro Hydro Power Plant version 05	08/09/2016	UNFCCC
14	REA	CPA-DD: Ngombeni Biomass Power	14/07/2018	UNFCCC

		Plant Project version 06		
15	REA	CPA-DD: Darakuta Mini Hydro Project version 09	13/11/2017	UNFCCC
16	AENOR	Validation report MBINGA version 02	26/10/2015	UNFCCC
17	AENOR	Validation report-Tulila version 02	27/10/2015	UNFCCC
18	AENOR	Validation report – Yovi version 02	26/10/2015	UNFCCC
19	BVI	Yovi PRC- Assessment Opinion version 1.1	14/01/2019	UNFCCC
20	AENOR	Ngombeni Validation report version 02	10/08/2016	UNFCCC
21	BVI	PRC-Ngombeni validation report version 02	14/07/2018	UNFCCC
22	AENOR	Ikondo Validation report version 02	12/10/2016	UNFCCC
23	AENOR	Validation report – Darakuta version 05	13/12/2017	
24	REA	Emission reduction calculation spreadsheet version 02	13/06/2018	CME
25	REA	Monitoring report version 03	07/06/2019	CME

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

**Table 1. Remaining FARs from validation and/or previous verification**

FAR ID	xx	Section no.	Date: DD/MM/YYYY
<b>Description of FAR</b>			
NONE			
<b>CME response</b>			<b>Date: DD/MM/YYYY</b>
<b>Documentation provided by the CME</b>			
<b>DOE assessment</b>			<b>Date: DD/MM/YYYY</b>

**Table 2. CLs from this verifications**

CL ID	CL 1	Section no.	Cover page,	Date: 17/05/2018
<b>Description of CL</b>				
<i>How has the CME determined that the ex-anted ERs estimate is 49,698 tCO<sub>2</sub>e?</i>				
<b>CME response</b>				<b>Date: 03/04/2019</b>
<p>The ex-ante ERs estimate from the reported six CPAs is already provided under title “Ex-ante CER Summary and comparison” in worksheet “CER summary” in the ER calculation excel sheet. The values are taken directly from the included CPA DDs of Mbinga, Yovi, Tulila, Ngombeni and Ikondo for the year 2017.</p> <p>Regarding Darakuta CPA, it was included into PoA only on 12/12/2017 and the ex-ante ER estimate for Dec 2017 was 65 tCO<sub>2</sub>. It had only 20 days of monitoring period during Dec 2017. Therefore, ex-ante ER estimate for 20 days in year 2017 = ((65/31)*20) = 42 tCO<sub>2</sub>. A footnote (no.20) is now added in section F.5 in the MR to be provide better clarity on this.</p> <p>The sum of ex-ante emission reduction from all six CPAs during the second verification period is 49,698 tCO<sub>2</sub>.</p>				
<b>Documentation provided by the CME</b>				
Revised MR version 02 dated 03/04/2019				

<b>DOE assessment</b>	<b>Date:</b> 20/04/2019
The Response has been reviewed and found acceptable. CL 1 is closed.	

<b>CL ID</b>	CL 2	<b>Section no.</b>	A.1.2	<b>Date:</b> 17/05/2018
<b>Description of CL</b>				
<p>1. The CME is requested to clarify why CPAs 9904-0001, 9904-0002, and 9904-0006 are not covered in this monitoring period, yet each of the CPAs is eligible, based on the start of the crediting period for the respective CPAs.</p> <p>2. This being the second monitoring period, the CME is requested to clarify whether or not it has submitted a request for issuance for the three CPAs in the first monitoring period.</p> <p>(refer to paragraph 256 of the CDM project standard for programmes of activities Version 01.0, and section A1.2 paragraph 5 of the instructions for completing a Monitoring report form)</p>				
<b>CME response</b>				<b>Date:</b> 03/04/2019
<p>1. The CPAs Mapembasi (9904-0001), NextGen (9904-0002) and Maguta (9904-0006) are not commissioned yet. Once commissioned, these CPAs will be reported in separate monitoring report number 02 for this monitoring period as per para 255 (b) of the CDM project standard for programmes of activities Version 02.0.</p> <p>2. As stated above, these three CPAs are not yet commissioned. Once commissioned these CPAs will be reported in separate monitoring report number 03 for first monitoring period as per para 255 (b) of the CDM project standard for programmes of activities Version 02.0.</p> <p>In cover page, it is now mentioned that this is the monitoring report number 01 for 6 CPAs in the PoA. Same note is added in page 7 of the MR. For the CPAs mentioned above, it will be monitoring report number 02 that will be prepared later.</p>				
<b>Documentation provided by the CME</b>				
Revised MR version 02 dated 03/04/2019				
<b>DOE assessment</b>				<b>Date:</b> 20/04/2019
The response has been reviewed together with the revised monitoring report and is accepted. CL 2 is closed.				

Table 3. CARs from this verification

<b>CAR ID</b>	CAR 1	<b>Section no.</b>	Cover page	<b>Date:</b> 17/05/2018
<b>Description of CAR</b>				
<p>While preparing the monitoring report, the CME has made editorial errors e.g. on the cover page the name of the CME is not correct and on page 17, the CME has made reference to a draft version of a revised CPA DD (that is revised Yovi CPA DD version 05 dated 06/10/2017) instead of a validated version.</p>				
<b>CME response</b>				<b>Date:</b> 03/04/2019

<ul style="list-style-type: none"> <li>The name of the CME was incorrectly mentioned as Renewable Energy Agency instead of Rural Energy Agency (REA). It is now corrected in the latest MR cover page.</li> <li>The version of the revised CPA DD of Yovi is now corrected as version 05 dated 31/01/2018 as per the latest approved PRC CPA DD under section C.3.6 of the latest MR.</li> </ul>	
<b>Documentation provided by the CME</b>	
Revised MR version 02 dated 03/04/2019	
<b>DOE assessment</b>	<b>Date:</b> 20/04/2019
The corrective action has been reviewed and is accepted. CAR 1 is closed.	

<b>CAR ID</b>	CAR 2	<b>Section no.</b>	A.1	<b>Date:</b> 17/05/2018
<b>Description of CAR</b>				
<p><i>While providing the description in section A.1, the CME has not included information on how the measures proposed/implemented, reduces GHG emissions</i></p> <p><i>(refer to the instruction for completing Monitoring report form section A.1</i></p>				
<b>CME response</b>				<b>Date:</b> 03/04/2019
<p>As per instruction for completing monitoring report form section A.1, the statement "The generated electricity from these renewable energy sources under the component project activities (CPAs) will replace equivalent electricity, which would be otherwise generated using fossil fuels either in the national grid and/or in the mini-grid, resulting in an emission reductions." is now added in paragraph three in page 2 of section A.1 of the revised MR version 02.</p>				
<b>Documentation provided by the CME</b>				
Revised MR version 02 dated 03/04/2019				
<b>DOE assessment</b>				<b>Date:</b> 20/04/2019
The corrective action has been reviewed and is accepted. CAR 2 is closed.				

<b>CAR ID</b>	CAR 3	<b>Section no.</b>	PART II	<b>Date:</b> 17/05/2018
<b>Description of CAR</b>				
<p><i>Part II is prepared as one group of CPAs. However the PP has not included rationale for the grouping.</i></p> <p><i>(refer to the instruction for completing Monitoring report form section Part II)</i></p>				
<b>CME response</b>				<b>Date:</b> 03/04/2019
<p>As per the instructions for completing monitoring report form section Part II, the following statement is added for rationale of grouping all CPAs and reporting as one group under Part II of the MR.</p> <p>"Though the CPAs are categorized as I, II and III based on the type of power export (grid or mini-grid or both), there is not much difference in their operation, monitoring, reporting and estimation of CERs. So all CPAs reported in this MR is clubbed under one group and reported in Part II of this MR."</p>				
<b>Documentation provided by the CME</b>				

Revised MR version 02 dated 03/04/2019	
<b>DOE assessment</b>	<b>Date:</b> 20/04/2019
The corrective action has been reviewed and is accepted. CAR 3 is closed.	

<b>CAR ID</b>	CAR 4	<b>Section no.</b>	C.3	<b>Date:</b> 17/05/2018
<b>Description of CAR</b>				
<p><i>While indicating the post registration changes in section C.3 of the monitoring report, the CME has not indicated the category (2a or 2b) under which the correction and change in project design falls.</i></p> <p><i>(please refer to the instruction for completing the monitoring form section C.3.2 and C.3.6 paragraph 2 and 3, and paragraph 262 of the CDM project standard for programmes of activities Version 01.0)</i></p>				
<b>CME response</b>				<b>Date:</b> 03/04/2019
<p>As per the instructions for completing monitoring report form, the changes made to the CPA DDs (reported under section C.3.2 <i>Corrections</i> for Ngombeni CPA and section C.3.6 <i>Changes to project design</i> for Yovi CPA) come under option 2 (a) corrections or changes that have been notified to the secretariat as applicable from the period prior to this monitoring period.</p> <p>The same has been now added in the MR document in section C.3.2 and C.3.6.</p>				
<b>Documentation provided by the CME</b>				
Revised MR version 02 dated 03/04/2019				
<b>DOE assessment</b>				<b>Date:</b> 20/04/2019
The corrective action has been reviewed and is accepted. CAR 4 is closed.				

<b>CAR ID</b>	CAR 5	<b>Section no.</b>	E	<b>Date:</b> 17/05/2018
<b>Description of CAR</b>				
<p><i>The CME has not reported all parameters required to be monitored for CPA 9904-0009. According to the monitoring plan for the included CPA 9904-0009 (Darakuta), the following parameters are to be monitored:</i></p> <p><i>Total net electrical energy supplied to a grid in year y by all units, existing and new project units ( <math>EG_{PJ,ADD,y, grid}</math> ) and Quantity of net electricity supplied to the national grid by the existing units in year y ( <math>EG_{actual,y} / EG_{BL,Existing,y, grid}</math> )</i></p> <p><i>However for the CPA the CME has only reported Quantity of net electricity supplied to the national grid in year y ( <math>EG_{actual,y} / EG_{BL,y (category)}</math> )</i></p> <p><i>(please refer to the instruction for completing the monitoring form section E paragraph 1, and paragraph 263 and 264 of the CDM project standard for programmes of activities Version 01.0)</i></p>				
<b>CME response</b>				<b>Date:</b> 03/04/2019

The monitoring parameters for the Darakuta CPA are reported correctly now. Both parameters (i) Total net electrical energy supplied to a grid in year y by all units, existing and new project units ( $EG_{PJ,ADD,y,grid}$ ) and (ii) Quantity of net electricity supplied to the national grid by the existing units in year y ( $EG_{actual,y} / EG_{BL,Existing,y,grid}$ ) are reported in tables in section "E.2. Data and parameters monitored" of the revised MR. Relevant changes are also made in the ER sheet.

As per the registered CPA DD, the existing 75 kW power plant at project site will be connecting to the TANESCO grid along with the proposed 320 kW project power plant. The monitoring plan required a separate energy meter to be installed on the existing 75 kW power plant to monitor its power generation and deduct it from the total power exported to the grid from the project site.

But during whole reported monitoring period (01/01/2017 to 31/12/2017), the existing 75 kW unit was used for internal consumption of the ranch and was not yet connected to the grid. Therefore, the project developer did not install a separate meter for this existing power plant. Only the project power plant of 320 kW supplied power to the grid. This is a temporary deviation from the registered monitoring plan.

For the ER calculation, the maximum power from the existing 75 kW unit ( $EG_{actual,y} / EG_{BL,Existing,y,grid}$ ) will be estimated and deducted from the power supplied to grid by 320 kW project power plant. This is conservative on following basis:

- Existing 75 kW unit is not yet connected to grid, but still expected maximum power is deducted from total power exported to grid from site, assuming that it would have contributed to grid export in case it was connected the grid.
- Maximum power export from the existing 75 kW unit is calculated as plant capacity (kW) times the total annual hours (365 x 24 hours). This is conservative as the plant capacity factor (around 45% for small hydro plants) is not taken into consideration at all.
- Even in case it was connected to grid, some portion of power from 75 kW unit would have been used for internal purpose (which is its main purpose). But for the ER calculation, all of these maximum power is deducted from total power export to the grid from the site.

The details are updated now in section C.3.1 of the MR. The ER sheet is also revised for the changes.

#### Documentation provided by the CME

- Revised MR version 02 dated 03/04/2019
- Revised ER sheet version 02 dated 03/04/2019

#### DOE assessment

Date: 20/04/2019

The corrective action has been reviewed and is accepted. CAR 5 is closed.

CAR ID	CAR 6	Section no.	F.1	Date: 17/05/2018
<b>Description of CAR</b>				
<p>For the CPA 9904-0009 (Darakuta) Baseline emissions are calculated as :</p> $BE_{Add,CO2,y,grid} = (EG_{PJ,add,y,grid} - EG_{BL,existing,y,grid}) * EF_{CO2}$ <p>However in the ER calculation spreadsheet version 01 dated 2/20/2018, the CME has not applied the formular. The CME has only considered the value for <math>EG_{PJ,ADD,y,grid}</math> and not <math>EG_{BL,Existing,y,grid}</math>.</p> <p>(please refer to the instruction for completing the monitoring form section F.1, paragraph 269 of the CDM project standard for programmes of activities Version 01.0, and page 17 of Darakuta Mini Hydro Project CPA-DD version 09 dated 13/11/2017)</p>				

<b>CME response</b>	<b>Date:</b> 03/04/2019
<p>The ER sheet is now revised to consider both the parameters <math>EG_{PJ,ADD,y,grid}</math> and <math>EG_{BL,Existing,y,grid}</math>. Refer revised ER sheet version 02, worksheet "Power import &amp; export" under Darakuta CPA.</p> <p>Similarly, the section "F.1.Calculation of baseline emissions or baseline net removals" of the MR is revised. The ER calculation is revised considering both the values of <math>EG_{PJ,ADD,y,grid}</math> and <math>EG_{BL,Existing,y,grid}</math>. The CER generated from the CPA during the monitoring period is 37 tCO<sub>2</sub>.</p>	
<b>Documentation provided by the CME</b>	
<ul style="list-style-type: none"> <li>Revised MR version 02 dated 03/04/2019</li> <li>Revised ER sheet version 02 dated 03/04/2019</li> </ul>	
<b>DOE assessment</b>	<b>Date:</b> 20/04/2019
The corrective action has been reviewed and is accepted. CAR 6 is closed.	

Table 4. FARs from this verification

<b>FAR ID</b>	xx	<b>Section No.</b>		<b>Date:</b> DD/MM/YYYY
<b>Description of FAR</b>				
NONE				
<b>CME response</b>				<b>Date:</b> DD/MM/YYYY
<b>Documentation provided by the CME</b>				
<b>DOE assessment</b>				
<b>Date:</b> DD/MM/YYYY				

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## Document information

Version	Date	Description
03.0	31 May 2019	Revision to: <ul style="list-style-type: none"> <li>Ensure consistency with version 02.0 of the "CDM validation and verification standard for programmes of activities" (CDM-EB93-A08-STAN);</li> <li>Make structural and editorial improvements.</li> </ul>
02.0	29 December 2017	Revision to align with the requirements of the "CDM validation and verification standard for programme of activities" (version 01.0).
01.0	5 June 2015	Initial publication.

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