




**Verification and certification report form for
CDM programme of activities
(Version 04.0)**

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

BASIC INFORMATION

Title and UNFCCC reference number of the programme of activities (PoA)	Title: PoA for Promotion of the Improved Water Mills (IWM) in Nepal UNFCCC ref: 9889		
Version number(s) of the PoA-DD(s) to which this report applies	10		
Version number of the verification and certification report	1.2		
Completion date of the verification and certification report	28/06/2021		
Monitoring period number and duration of this monitoring period	Monitoring period number: 04 Duration: 01/01/2020 to 31/12/2020		
Number and version number of the monitoring report to which this report applies	Number is 1 of 1. Version 3.0 of 28/06/2021		
Coordinating/managing entity (CME)	Alternative Energy Promotion Centre (AEPIC)		
Host Parties	Host Parties of the PoA	Is this a host Party to a CPA covered in this report? (yes/no)	
	Nepal	Yes	
Applied methodologies and standardized baselines	AMS-I.B. ver. 12 - Mechanical energy for the user with or without electrical energy		
Mandatory sectoral scopes	1: Energy industries (renewable/non-renewable sources)		
Conditional sectoral scopes, if applicable	N/A		
Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report	22,295 tCO ₂ e		
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	Amount before 1 January 2013	Amount from 1 January 2013 until 31 December 2020	Amount from 1 January 2021
	-	11,233 tCO ₂ e	-
Name and UNFCCC reference number of the DOE	E-0052: Carbon Check (India) Private Ltd.		
Name, position and signature of the approver of the verification and certification report	Vikash Kumar Singh, Compliance Officer		

	
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SECTION A. Executive summary

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Purpose and general description and location:

Alternative Energy Promotion Centre (AEPC), the coordinating and managing entity of the PoA (hereafter referred as CME) has appointed the DOE, Carbon Check (India) Private Ltd. to perform an independent fourth (04th) periodic verification of the CDM Programme of Activity "PoA for Promotion of the Improved Water Mills (IWM) in Nepal" (UNFCCC ref. no.: 9889) for the following CPAs:

1. PoA for Promotion of the Improved Water Mills (IWM) in Nepal (9889-P1-0001-CP1)
2. CPA 9889-0002: PoA for Promotion of the Improved Water Mills (IWM) in Nepal (9889-P1-0002-CP1)

The PoA involves the Promotion of the Improved Water Mills (IWM) in Nepal. The main objective of the IWM Programme of Alternative Energy Promotion Centre in Nepal is to promote dissemination of IWM replacing existing low powered, less efficient Traditional Water Mills (TWMs) to the existing owners or new installers (potential diesel mill owners) in Nepal and to avoid possible switchover/installation to diesel-based mills by new installer (potential diesel mill owners) to meet high powered milling requirements. The IWMs with increased efficiency and cost-effective services to the users will help avoid installation of diesel-based mills in the hilly areas. The IWM is a modified version of the TWM which translates into a higher processing capacity and possibility of providing a diverse range of services like hulling, oil expelling, saw milling, etc. Thus, IWM increases energy output helping both hullers and millers.

Under IWM Programme, standard low capacity TWMs of capacity 0.35 kW are replaced by energy efficient IWMs (short shaft and long shaft) of installed capacity ranging from 1.39 kW (minimum value, more than 97% of Short Shaft IWMs will be above this value) to 2.83 kW (on minimum value, more than 97% of Long Shaft IWMs will be above this value). CPAs include installation of high capacity IWMs replacing traditional low powered, less efficient water mills which avoid installation of diesel mills to meet increasing high power requirements. The proposed IWM does the same job of the TWM by improving the flat paddled wooden runner. The increased power output result in faster milling and shorter waiting times for users. The metallic shaft and pulley for power take off allow the usage of a range of other appliances including electrification in addition to traditional grinding. In case of long shaft IWMs electrical energy could also be generated as one of the end uses; however, the electricity and mechanical energy are not generated simultaneously. Normally, mechanical energy is used during the daytime for agro-processing and electricity is generated during evening for lighting. The turbine that generates mechanical and electrical energy is the same. Though there is possibility for the generation of electrical energy, only mechanical energy generated by IWMs is counted towards emission reductions. This verification covers CPA-1 and CPA-2.

Objective & Verification scope:

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

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

The objective of this verification was to verify and certify emission reductions reported for the "PoA for Promotion of the Improved Water Mills (IWM) in Nepal" in the host country Nepal for the period 01/01/2020 to 31/12/2020 (inclusive of both the dates).

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

In particular, the monitoring plan, monitoring report and the project's compliance with relevant UNFCCC and host Party criteria are verified to confirm that the component projects have been implemented in accordance with the previously registered/included component project design and conservative assumptions, as documented. It is also confirmed if the monitoring plan complies with the approved revised CPA-DD(s) and approved monitoring methodology.

The verification scope is:

- To verify the project implementation and operation with respect to the approved revised CPA-DD(s)
- To verify the implemented monitoring plan with the registered/included CPA-DD(s) and the applied baseline and monitoring methodology.
- To verify that the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

Verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable UNFCCC criteria for CDM in order to be certified.

Verification process:

The verification comprises a review of the monitoring report /01/ over the monitoring period from 01/01/2020 to 31/12/2020 and based on the approved revised PoA-DD/CPA-DDs /03/, /04/ in part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet /02/, monitoring methodology and all related evidence provided by the CME.

Remote interviews and stakeholders' interviews are also performed as part of the verification process.

Conclusion:

The verification team assigned by the DOE concludes that the approved revised PoA-DD (Version 10, dated: 22/04/2019) /03/, CPA-DDs for CPAs 9889-P1-0001-CP1 (Version 10.0, dated: 22/04/2019) /04/ and 9889-P1-0002-CP1 (Version 04, dated: 22/04/2019), and the Monitoring report (Version 3.0; Dated 28/06/2021) /01/, meets all relevant requirements of the UNFCCC for CDM project activities/ programme of activities including article 12 of the Kyoto Protocol and §62 of CDM M& P, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the requirements of CDM VVS for PoA (version 02.0) /11/.

During the verification, two (02) Clarification Requests (CLs) and two (02) Corrective Action Requests (CARs) were raised by the VT.

The PoA was correctly implemented according to selected monitoring methodology, monitoring plan and the approved revised PoA-DD /03/. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and remote interviews, the verification team confirms that the project activity has resulted in the 11,233 tCO₂e emission reductions during the fourth (04th) monitoring period.

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, verifier & Technical expert	EI	Buragohain	Champok	CC IPL	X		X	X
2.	Local Expert	EI	Ghimire	Narendra	CC IPL	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	Anand	Amit	CC IPL
2.	Approver	IR	Singh	Vikash Kumar	CC IPL

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.	Human error in the quantification of emissions (which may be more likely to occur if personnel are unfamiliar with, or not well trained regarding, emissions processes or data recording).	Low	Being 4 th verification, the project proponent is familiar with monitoring procedures and data reporting in line with the registered CPA DDs and previous verification and certification reports. Hence, the risk level is low.	During the remote assessment, the verification team will interview the staffs of the CDM team and check all records to confirm whether the monitoring plan have been well implemented. The team will review the survey records and interview end users.
2.	Undue reliance on a poorly designed information system, which may have few effective quality controls	Low	Being 4 th verification, the project proponent has already established a well-organized monitoring team, monitoring plan, including data collection procedure and QA/QC procedure consistent with registered monitoring plan. Third party survey was done as per defined frequency. Hence, the risk level is low.	The verification team will check the relevant records to confirm whether the data collection procedure and QA/QC procedure have been well implemented.
3.	Manual adjustment of otherwise automatically recorded activity levels	Low	No manual adjustment is required to be done. Monitoring results are	The verification team will interview the survey team for assessment of competency,

			based on third party survey. Hence, the risk is low.	survey method and survey records to cross check input results in emission reduction worksheet.
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C.2. Consideration of materiality in conducting the verification

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The threshold of materiality was evaluated based on §13 of “Guideline: Application of materiality in verifications” (version 02.0) /13/ and §308 of CDM VVS for PoAs (version 02.0) /11/. It was concluded that the materiality threshold applicable to the project activity based on actual emission reductions achieved is 5% of 11,233 tCO₂e which is equal to 562 tCO₂e.

In planning the verification, verification team took cognizance of §11 and 12 of the “Guideline: Application of materiality in verifications” (version 02.0) /13/. A materiality threshold of 562 tCO₂e is determined in line with §308 (d) of CDM VVS for PoAs (version 02.0) /11/.

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

- Monitoring system including IWMs surveys.
- Calculation spreadsheets.
- Quality of raw data and procedures for its collection.
- Data flow.
- Data control procedures.

The risks identified were mitigated through the review of whole databases /16/ and calculation spreadsheets and cross-check against monitoring survey records /17/.

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

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

SECTION D. Means of verification

D.1. Desk/document review

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The monitoring report (version 01 of 21/04/2021, version 2.0 of 08/06/2021 and version 3.0 of 28/06/2021) /01/, the emission reduction calculations provided in the form of a spreadsheet (9889_Emission Reduction Calculation spreadsheet_MP-4_v.1) /02/ were assessed as part of the verification. In addition, the approved revised PoA-DD (version 10 of 22/04/2019) /03/, approved revised CPA-DD (version 10 dated 22/04/2019) for CPA 01 and approved revised CPA-DD (version 04 of 22/04/2019) for CPA 02 /04/, in particular the baseline estimations and the monitoring plan and the corresponding validation report /05/ and previous verification reports /20/ for the project were reviewed.

The monitoring report (version 01 of 21/04/2021) /01/ was made publicly available on the CDM UNFCCC website on 29/04/2021. Appendix 3 lists the documentation that was reviewed during the verification.

D.2. On-site inspection

Duration of on-site inspection: DD/MM/YYYY to DD/MM/YYYY				
No.	Activity performed on-site	Site location	Date	Team member
1.				

Site visit for the subject project activity was avoided due to travel restrictions imposed in the host country due to COVID-19 impact. DOE also noted CDM Executive Board's notice to relax mandatory site visits by DOEs until 31 December 2021 because of COVID-19 /15/. DOE could not further postpone the site visit due to commitments by DOE in its proposal to complete the assignment within stipulated timeframe.

The alternative means used for the purpose of verification are demonstrated as follow:

The verification team has carried out remote interviews (by telephone and video call) in order to assess the information included in the monitoring report and monitoring measurement procedures adopted during the monitoring period. During the desk review, the relevant monitoring records in consistent with the registered CPA-DDs and corresponding validation reports were checked. Third party survey report, sample IWM photographs were used to cross check the consistency of information.

CC IPL confirms that the project is implemented in line with the registered CPA-DD during the monitoring period and the monitoring system is in line with the CPA-DDs and latest MR. There is no change of the project design, construction, operation. The monitoring plan is as per the CPA-DD.

Telephonic interview was performed by verification team as given in below table.

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Pokhrel	Prem Kumar	Climate and Carbon Expert, AEPC	30/05/2021	Project activity, ER calculations, Roles and responsibilities, Monitoring activities, QA/QC procedures, Documentation, Record keeping.	Champak Buragohain
2.	Thapa	Rana Bahadur	Section head, APEC	30/05/2021		
3.	Sapkota	Surya Kumar	Director, AEPC	30/05/2021		
4.	Bhattarai	Nawraj	Team Leader, Nepal Energy and Environment Development Services Pvt. Ltd.	30/05/2021		
5.	Das	Bhupendra	Team member, Nepal Energy and Environment Development Services Pvt. Ltd.	30/05/2021		
6	End users of IWMS			30/05/2021 & 31/05/2021	IWMS operation & its type, operating hours, O&M, Non-working hours (if any, and reasons), water availability, etc	

D.4. Sampling approach

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The total population size of the Improved Water Mills (IWMs) of type long shaft and short shaft distributed under the two (02) CPAs and covered under monitoring period is provided below:

Sl. No.	CPA Name	CPA ref. number	Long shaft IWMs	Short shaft IWMs	Total number of IWMs
1.	PoA for Promotion of the Improved Water Mills (IWM) in Nepal	9889-P1-0001-CP1	160	2039	2,199
2.	CPA 9889-0002: PoA for Promotion of the Improved Water Mills (IWM) in Nepal	9889-P1-0002-CP1	45	1093	1,138

The monitoring parameters monitored through the sampling plan are:

- 1) Number (quantity) of IWMs of type i operating under the project activity ($Q_{OP,i}$);
- 2) Operating hours of IWM for mechanical power generation ($OH_{i,y}$) (calculated using operating hours per day and operating days per year).

Stratified sampling at CPA level was applied by the CME for the selection of the monitoring samples with 90/10 confidence/precision which is deemed acceptable as per the approved and revised PoA-DD /03/, CPA-DDs /04/ which applies Standard for Sampling and Surveys for CDM project activities and programmes of activities (Version 04.0; Annex 5 of EB 74) /19/.

The sampling was conducted for IWMs, which are divided in two strata i.e., Long Shaft IWMs (strata I) and Short Shaft IWMs (strata II). A common questionnaire was used by CME to conduct monitoring survey for determination of all the three parameters. The total number of IWMs sampled for each CPA and under each stratum for determination of both the parameters are as:

Parameter	Type of IWMs	CPA 1	CPA 2
Total number of IWMs	LS	160	45
	SS	2039	1093
Sample calculated for parameter $Q_{OP,i}$	LS	2	1
	SS	15	18
Sample calculated for parameter Operational hours per day	LS	1	1
	SS	4	13
Sample calculated for parameter operational days/year	LS	1	1
	SS	10	18
Adjusted Sample Size	LS	4	4
	SS	36	36

Verification team reviewed the sampling size and the strata as selected for the survey and the details as available from the survey report /17/ and confirms that the sampling has been done in accordance with the requirements of sampling standard /15/, approved revised PoA-DD /03/ and approved revised CPA-DDs /04/ and the applied methodology, AMS-I.B (version 12.0) /12/.

As per §25 of the Standard: Sampling and surveys for CDM project activities and programmes of activities (version 09.0) /15/, the verification team has to verify whether the project participants or the coordinating/managing entity have implemented the sampling and surveys according to the sampling plan in the registered monitoring plan. The verification includes determining:

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

In line with §26 of the Sampling Standard (version 09.0) /15/, the verification team has applied a sampling approach for remote surveys as part of verification. Now as the CME had applied

sampling approach, the verification team has chosen acceptance sampling for monitoring parameters in accordance with §28 of the sampling standard (version 09.0) /15/.

The following table illustrates the agenda covered during the acceptance sampling by the DOE in accordance with Table 1, § 37 of "Standard: Sampling and surveys for CDM project activities and programmes of activities (version 09.0) /15/;

Parameter	How the CME conducted sampling surveys (to obtain the project participants' or the coordinating/managing entities' records)	How the DOE could obtain records for verification	Criteria for deciding what ultimately constitutes a discrepancy
Number (quantity) of IWMs of type i operating under the project activity ($Q_{OP,i}$)	Sampling based survey (questionnaire survey/interviews)	Cross-check of a sample of CME's samples (Questionnaire, operation surveys/interviews) including but not limited to following: <ul style="list-style-type: none"> • Consistency between the information as contained in Survey sheet and revealed from the on-site inspection interviews • Baseline scenario • Enquire/observe whether IWM is in use or not? 	DOE results, accounting for duly justified differences.
Operating hours of per day	Sampling based survey (questionnaire survey/interviews)	Cross-check of a sample of CME's samples (Questionnaire, operation surveys/interviews) including but not limited to following: <ul style="list-style-type: none"> • Consistency between the information as contained in Survey sheet and revealed from the on-site inspection interviews • Enquire about the hours of operation per day of IWMs during the project scenario. 	DOE results, accounting for duly justified differences.
Operational days/year	Sampling based survey (questionnaire survey/interviews)	Cross-check of a sample of CME's samples (Questionnaire, operation surveys/interviews) including but not limited to following: <ul style="list-style-type: none"> • Consistency between the information as contained in Survey sheet and revealed from the on-site inspection interviews • Enquire about the days of operation/year of IWMs during the project scenario. 	DOE results, accounting for duly justified differences.

The verification team of the DOE has applied a sampling approach as part of verification in accordance with the §26 of the Standard: Sampling and surveys for CDM project activities and programmes of activities (version 09.0) /15/. In accordance with the §28 of the sampling standard, acceptance sampling has been chosen by the verification team and accordingly steps listed in §29 of the sampling standard have been followed. Considering that Nepal is a Least Developed

Country (LDC), applying §39 (c)¹ of the sampling standard (version 09.0) /15/, a sample size for 8 IWMs was chosen (with no non-responses). A sample size of 8 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 10 % and consumer risk used was 20 %. Acceptance number (c) thus determined for the sample is 0.

Accordingly, a sample size of 10 IWMs per CPA across strata (i.e., long shaft and short shaft IWMs) i.e., in total 20 samples from the 2 CPAs from the CME's sample size for the CPAs for the monitoring period were randomly selected by VT for acceptance sampling. Accordingly, the verification team verified a total of 20 samples i.e., 10 sample IWMs per CPA across strata (i.e., long shaft and short shaft IWMs) and observed that the sampling survey results of the CME for all the IWMs surveyed were found to be consistent with DOE's remote survey results. Thus, no discrepant records were observed with the MR /1/ and ER sheet /2/ and thus c=0. Hence, CME's set of records has been accepted in line with §33 of the sampling standard (version 09.0) /15/.

The necessary confidence / precision of 90/10 each of the parameters are met. This has been cross verified by the verification team.

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
General	--	--	--
Compliance of the monitoring report with the monitoring report form	--	--	--
Remaining forward action requests from validation and/or previous verifications	--	--	--
CPAs considered for verification and covered in this report	--	--	--
Programme of activities	--	--	--
Compliance of the programme implementation with the registered PoA-DD	--	--	--
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 ²	--	--	--
• Changes to the programme design	--	--	--
• Addition of CPA inclusion template	--	--	--
• Change of coordinating/managing entity	--	--	--
• Changes specific to afforestation and reforestation activities	--	--	--
Component project activities	--	--	--
Compliance of the CPA implementation with the included CPA design document	--	--	--
Post-registration changes	--	1	--
• Temporary deviations from registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents	--	--	--
• Corrections	--	--	--
• Changes to the start date-of the crediting period	--	--	--
• Inclusion of a monitoring plan	--	--	--

¹ At the end of the monitoring period there were only 06 projects and 04 PoAs registered in Nepal i.e., a total of 10 project activities. Hence provision under §39 (c) of sampling standard has been applied for selection of sample size for Doe's acceptance sampling.

² 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).

• Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents	--	--	--
• Changes to the project design	--	--	--
• Changes specific to afforestation and reforestation activities	--	--	--
Compliance of the registered monitoring plan with applied methodologies and standardized baselines	--	--	--
Compliance of monitoring activities with the registered monitoring plan	1	--	--
• Data and parameters fixed ex ante or at renewal of crediting period	--	1	--
• Data and parameters monitored	--	--	--
• Implementation of sampling plan	--	--	--
Compliance with the calibration frequency requirements for measuring instruments	--	--	--
Assessment of data and calculation of emission reductions or net removals	1	--	--
• Calculation of baseline GHG emissions or baseline net GHG removals by sinks	--	--	--
• Calculation of project GHG emissions or actual net GHG removals by sinks	--	--	--
• Calculation of leakage GHG emissions	--	--	--
• Summary of calculation of GHG emission reductions or net GHG removals by sinks	--	--	--
• Comparison of actual GHG emission reductions or net GHG removals by sinks with estimates in included CPA	--	--	--
• Remarks on difference from estimated value in included CPA	--	--	--
Assessment of reported sustainable development co-benefits	--	--	--
Global stakeholder consultation	--	--	--
Others (please specify)	--	--	--
Total	2	2	0

SECTION E. Verification findings

E.1. General

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

Means of verification	DR
Findings	N/A
Conclusion	<p>CME has used the Monitoring report form for CDM programme of activities (version 04.0) /08/. Verification team confirms that the latest available version of monitoring report form /08/ has been used by the CME and the MR /01/ is in accordance with the monitoring report form with the relevant form and instructions therein /08/.</p> <p>CCIPL had made the version 01 dated 21/04/2021 of the monitoring report /01/, covering the monitoring period from 01/01/2020 to 31/12/2020 (both days inclusive) publicly available on 29/04/2021.</p> <p>This confirms compliance with the §338 and §339 of CDM VVS for PoA (version 02.0) /11/.</p>

E.1.2. Remaining forward action requests from validation and/or previous verifications

>> No FAR remaining from validation and or previous verification to be addressed during this 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)
PoA for Promotion of the Improved Water Mills (IWM) in Nepal (9889-P1-0001-CP1)	Yes	09/09/2015	10	Yes
CPA 9889-0002: PoA for Promotion of the Improved Water Mills (IWM) in Nepal (9889-P1-0002-CP1)	Yes	01/02/2017	10	Yes

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

Means of verification	DR, I
Findings	N/A
Conclusion	<p>CC IPL by means of a remote assessment, interview and document review, assessed that all physical features (technology, project equipment, and monitoring and measuring equipment) of the included CPA in the approved revised PoA-DD /03/ or approved revised CPA-DDs /04/ are in place and that the coordinating/managing entity has operated the PoA and the CPA as per the approved revised PoA-DD /03/ and CPA-DDs /04/.</p> <p>As part of the remote assessment, the verification team was able to confirm that the implementation of Programme of Activity (PoA) and the Component Project Activity (CPA) is in accordance with the project description contained in the approved CPA-DDs /04/. The verification took cognizance of \$253 of the CDM PS for PoA (version 02.) /10/ and \$340 (a) and \$341 of CDM VVS for PoA (version 02.0) /11/.</p>

E.2.2. Implementation and operation of the management system

Means of verification	DR, I
Findings	N/A
Conclusion	<p>The PoA management system including the record-keeping system has been explained in the approved revised PoA-DD /03/. During remote assessment, the verification team, based on review of provided documents and interview/observation, has assessed the management system. This included the organisational structure, roles and responsibilities, data collection, transfer and aggregation procedures, training of personnel, data storage and archiving and emergency procedures for the monitoring system.</p> <p>On the basis of remote interviews with the personnel of CME involved in the project monitoring and data collection, inspection of monitoring database and document review, VT can confirm that the responsibilities and authorities for monitoring and reporting are appropriate and effective for the project type and hence in accordance with the monitoring plan of the approved revised PoA-DD /03/ and the CPA-DDs /04/ and the applied monitoring methodology /12/.</p> <p>The verification team confirms that the monitoring and management system of the CDM PoA is in place; with the responsibilities properly identified. This confirms the</p>

E.2.3. Post-registration changes**E.2.3.1. Corrections**

>>N/A

E.2.3.2. Inclusion of a monitoring plan

>>N/A

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

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Reference No: PRC-9889-004

Date of approval: 23/10/2019

E.2.3.4. Changes to the programme design

>>N/A

E.2.3.5. Addition of CPA inclusion template

>>N/A

E.2.3.6. Change of coordination/managing entity

>>N/A

E.2.3.7. Changes specific to afforestation and reforestation activities

>>N/A

E.3. Component project activities**E.3.1. Compliance of the CPA implementation with the included CPA design document**

Means of verification	DR, I		
Findings	N/A		
Conclusion	The implementation status of the four CPAs claiming emission reductions during this monitoring period are as:		
	CPA Ref. No.	9889-P1-0001-CP1	9889-P1-0002-CP1
	CPA Implementer	Alternative Energy Promotion Centre (AEPC)	Alternative Energy Promotion Centre (AEPC)
	Location	Nepal	Nepal
	Scale	Small	Small
	Crediting Period Type	Renewable	Renewable
	Crediting period duration	09/09/2015 to 08/09/2022	01/02/2017 to 31/01/2024
	No. of IWMs to be installed as per CPA-DD	2200	2250
	Ex-ante estimated ERs in CPA-DD (tCO₂)	11,022	11,273
	Per unit ERs (ex-ante)	5.01 tCO ₂ /unit	5.01 tCO ₂ /unit
	No. of IWMs distributed in current MP	2,199	1,138
	Actual ERs achieved during the current monitoring	8,215	3,018

period (tCO₂)		
Per unit ERs (actual) achieved during the current monitoring period	3.73 tCO ₂ /unit	2.65 tCO ₂ /unit
SSC threshold limit (max. installed capacity)	15 MW	15 MW
Total installed capacity during this MP	3.29 MW	1.65 MW

The programme involves the promotion of the Improved Water Mills (IWM) in Nepal. The main objective of the IWM Programme of Alternative Energy Promotion Centre in Nepal is to promote dissemination of IWM replacing existing low powered, less efficient Traditional Water Mills (TWMs) to the existing owners or new installers (potential diesel mill owners) in Nepal and to avoid possible switchover/installation to diesel-based mills by new installer (potential diesel mill owners) to meet high powered milling requirements. The IWMS with increased efficiency and cost-effective services to the users will help avoid installation of diesel-based mills in the hilly areas. The IWM is a modified version of the TWM which translates into a higher processing capacity and possibility of providing a diverse range of services like hulling, oil expelling, saw milling, etc. Thus, IWM increases energy output helping both hullers and millers.

Under IWM Programme, standard low capacity TWMs of capacity 0.35 kW are replaced by energy efficient IWMS (short shaft and long shaft) of installed capacity ranging from 1.39 kW (minimum value, more than 97% of Short Shaft IWMS will be above this value) to 2.83 kW (on minimum value, more than 97% of Long Shaft IWMS will be above this value). CPAs include installation of high capacity IWMS replacing traditional low powered, less efficient water mills which avoid installation of diesel mills to meet increasing high power requirements. The proposed IWM does the same job of the TWM by improving the flat paddled wooden runner. The increased power output result in faster milling and shorter waiting times for users. The metallic shaft and pulley for power take off allow the usage of a range of other appliances including electrification in addition to traditional grinding. In case of long shaft IWMS electrical energy could also be generated as one of the end uses; however, the electricity and mechanical energy are not generated simultaneously. Normally, mechanical energy is used during the daytime for agro-processing and electricity is generated during evening for lighting. The turbine that generates mechanical and electrical energy is the same. Though there is possibility for the generation of electrical energy, only mechanical energy generated by IWMS is counted towards emission reductions.

The exact location of each IWM commissioned and implemented under the CPAs can be verified from the IWM CPA database /16/ and end-user agreements which also acts as sales receipts /21/.

The verification team has confirmed that the number of IWMS deployed under each CPA is under the small-scale threshold limit of 15MW of installed capacity as defined in accordance with the applied methodology AMS I.B (version 12.0) /12/. As can be seen in the table above, each CPA remains within the small-scale limit /B02/. The installed capacity calculation was checked in the ER spread sheets /02/ submitted for the CPAs and found to be appropriate.

Verification team noted that the actual number of IWMS distributed under both the CPAs are smaller than the number indicated in the registered CPA-DDs /04/.

The monitoring report /01/, reports for the fourth monitoring period (01/01/2020 - 31/12/2020) for all the two (02) included CPAs (9889-P1-0001-CP1 and 9889-P1-0002-CP1) in the PoA and thus is the only batch applicable for the monitoring period. The reported monitoring report is a consecutive batch to be reported after the third monitoring period /20/ and is after the end date of the third monitoring period (01/01/2019 – 31/12/2019).

Based on above assessment, verification team confirms that the component project

	<p>activities were implemented, and equipment installed as described in the approved revised CPA-DDs /04/. Furthermore, CCIPL's verification team considers the project description of the project contained in the approved revised PoA-DD /03/ and the CPA-DDs /04/ to be complete and accurate.</p> <p>The CME has got the recipient user's consent for the exclusive rights of the CERs for CME during the distribution of the IWMs through signing of end-user agreement /21/. Operation of the devices is confirmed during the remote assessment by the verification team. Followings were verified during the remote assessment:</p> <ul style="list-style-type: none"> • IWM unique numbering system • Electronic monitoring system including input procedure • Actual distribution / implementation of the IWMs • Owners were interviewed regarding the usage of IWMs • Whether or not TWMs were still in use • Agreements between owners and the CPA implementer / CME <p>Verification team has assessed the project to check any proposed or actual changes to the project design in accordance with §269 of VVS for PoAs (version 02.0) /11/. In the opinion of CCIPL, there is no change to the project design. CCIPL's verification team confirms that the CPAs are implemented within the boundary of the PoA as described in the approved revised PoA-DD /03/ and the implementation and operation of the project activity has been conducted in accordance with the description contained in the approved revised PoA-DD /03/ and approved revised CPA-DDs /04/.</p> <p>The verification team took cognizance of §340, 341 and 342 of the CDM VVS for PoA (version 02.0) /11/ to conduct the verification and conducted a site visit in accordance with the §321 and 322 of the CDM VVS for PoA (version 02.0) /11/.</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

>>N/A

E.3.2.2. Corrections

>>N/A

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

>>N/A

E.3.2.4. Inclusion of a monitoring plan

>>N/A

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

>>

Reference No: PRC-9889-004

Date of approval: 23/10/2019

E.3.2.6. Changes to the project design

>>N/A

E.3.2.7. Changes specific to afforestation and reforestation activities

>>N/A

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

Means of verification	I, DR
Findings	N/A
Conclusion	<p>The monitoring plan as contained in respective approved revised CPA-DDs /04/ were reviewed against the monitoring requirements of the applied methodology AMS-I.B (version 12.0) /12/ as well as approved revised PoA-DD /03/. Based on this review the VT concludes that the monitoring plan contained in the approved revised CPA-DDs /04/ includes all the parameters which are required to be monitored in the context of the CPA design and description and allows proper determination of emission reductions in accordance with approved revised PoA-DD /03/ and applied methodology AMS-I.B (version 12.0) /12/.</p> <p>The monitoring plan is in accordance with the approved methodology, AMS-I.B (version 12.0) /12/, that is included in each approved revised CPA-DD /04/.</p> <p>The verification took cognizance of §343 to §345 of CDM VVS for PoA (version 02.0) /11/.</p>

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**

Means of verification	DR, I				
Findings	CAR 2 was raised as sample size of monitoring survey fixed ex-ante found inconsistent in the MR which PP has corrected in section E.1 of the updated MR and hence CAR is closed.				
Conclusion	The following parameters have been fixed ex-ante for all the CPAs considered under this monitoring period:				
	Parameter	Description of the parameter	Value	Source	Assessment by VT
	IC _{TWM} (kW)	Traditional Water Mill (TWM) installed capacity	0.35	Study report Determining the capacity of Long Shaft and Short Shaft Improved Water Mill (IWM), Final Report, Energy Development Services Pvt. Ltd. May 2012. registered PoA-DD.	The value is consistent with approved revised CPA-DDs /04/ and fixed ex-ante for the duration of the crediting period.
	IC _{IWM} (kW)	Improved Water Mill (TWM) installed capacity	SS: 1.39 LS 2.83	Mill specifications form manufacturer.	The value is consistent with approved revised CPA-DDs /04/ and fixed ex-ante for the duration of the crediting period.
	EF _{Diesel} (kgCO ₂ /kWh)	Emission Factor of diesel-based power generators. For diesel based	1.2	As per AMS-I.F (version 03) with 100% load emission factor is 1.2 kgCO ₂ /kWh, with 50% load 1.4	The value is consistent with approved revised CPA-DDs /04/ and fixed ex-ante for the duration of

		Mills		kgCO ₂ /kWh and with 25% load 2.4 kgCO ₂ /kWh. Hence, conservatively 1.2 kgCO ₂ /kWh is used.	the crediting period.
	N	Sample size of Monitoring Survey	33	Approved revised CPA-DDs /04/	The value is consistent with approved revised CPA-DDs /04/ and fixed ex-ante for the duration of the crediting period.
<p>Verification team confirms that the Data and parameters fixed ex-ante are in accordance with the revised and approved PoA-DD and registered/ included CPA-DDs /B04/ and the monitoring plan.</p> <p>The verification took cognizance of §346 of CDM VVS for PoA (version 02.0) /B01-1/.</p>					

E.3.4.2. Data and parameters monitored

Means of verification	DR, I
Findings	CL 01 was raised to provide the third-party survey report and clarify if the annual monitoring frequency has been maintained to which PP has provided the survey report and monitoring results found consistent in the survey report. Hence, CL is closed.
Conclusion	<p>The Verification team is able to confirm that the data and parameters monitored are in accordance with the approved revised CPA-DDs /04/ and the monitoring plan /B04/. A complete assessment of each of the monitored parameters has been provided in Appendix 5 of the verification report.</p> <p>The verification took cognizance of §262, 263 and 264 of the CDM PS for PoA (version 02.0) /10/ and §358, 359 and 360 of the CDM VVS for PoA (version 02.0) /11/.</p>

E.3.4.3. Implementation of sampling plan

Means of verification	DR, I																							
Findings	N/A																							
Conclusion	The total population size of the Improved Water Mills (IWMs) of type long shaft and short shaft distributed under the two (02) CPAs and covered under monitoring period is provided below:																							
	<table><tr><th>Sl. No.</th><th>CPA Name</th><th>CPA ref. number</th><th>Long shaft IWMs</th><th>Short shaft IWMs</th><th>Total number of IWMs</th></tr><tr><td>1.</td><td>PoA for Promotion of the Improved Water Mills (IWM) in Nepal</td><td>9889-P1-0001-CP1</td><td>160</td><td>2039</td><td>2,199</td></tr><tr><td>2.</td><td>CPA 9889-0002: PoA for Promotion of the Improved Water Mills (IWM) in Nepal</td><td>9889-P1-0002-CP1</td><td>45</td><td>1093</td><td>1,138</td></tr></table>						Sl. No.	CPA Name	CPA ref. number	Long shaft IWMs	Short shaft IWMs	Total number of IWMs	1.	PoA for Promotion of the Improved Water Mills (IWM) in Nepal	9889-P1-0001-CP1	160	2039	2,199	2.	CPA 9889-0002: PoA for Promotion of the Improved Water Mills (IWM) in Nepal	9889-P1-0002-CP1	45	1093	1,138
	Sl. No.	CPA Name	CPA ref. number	Long shaft IWMs	Short shaft IWMs	Total number of IWMs																		
	1.	PoA for Promotion of the Improved Water Mills (IWM) in Nepal	9889-P1-0001-CP1	160	2039	2,199																		
	2.	CPA 9889-0002: PoA for Promotion of the Improved Water Mills (IWM) in Nepal	9889-P1-0002-CP1	45	1093	1,138																		
The monitoring parameters monitored through the sampling plan are:																								
1) Number (quantity) of IWMs of type i operating under the project activity ($Q_{OP,i}$);																								
2) Operating hours of IWM for mechanical power generation ($OH_{i,y}$) (calculated using operating hours per day and operating days per year)																								

Stratified sampling at CPA level was applied by the CME for the selection of the monitoring samples with 90/10 confidence/precision which is deemed acceptable as per the approved and revised PoA-DD /03/, CPA-DDs /04/ which applies Standard for Sampling and Surveys for CDM project activities and programmes of activities (Version 04.0; Annex 5 of EB 74) /19/.

In line with §26 of the Sampling Standard (version 09.0) /15/, the verification team has applied a sampling approach for remote surveys as part of verification. Now as the CME had applied sampling approach, the verification team has chosen acceptance sampling for monitoring parameters in accordance with §28 of the sampling standard (version 09.0) /15/.

The verification team of the DOE has applied a sampling approach as part of verification in accordance with the §26 of the Standard: Sampling and surveys for CDM project activities and programmes of activities (version 09.0) /15/. In accordance with the §28 of the sampling standard, acceptance sampling has been chosen by the verification team and accordingly steps listed in §29 of the sampling standard have been followed. Considering that Nepal is a Least Developed Country (LDC), applying §39 (c) of the sampling standard (version 09.0) /15/, a sample size for 8 IWMs was chosen (with no non-responses). A sample size of 8 was required, based on an AQL of 0.5 % and UQL of 20 %, the producer risk used is 10 % and consumer risk used was 20 %. Acceptance number (c) thus determined for the sample is 0.

Accordingly, a sample size of 10 (considering non-responses) IWMs per CPA across strata (i.e., long shaft and short shaft IWMs) i.e., in total 20 samples from the 2 CPAs from the CME's sample size for the CPAs for the monitoring period were randomly selected by VT for acceptance sampling. Accordingly, the verification team verified a total of 20 samples i.e., 10 sample IWMs per CPA across strata (i.e., long shaft and short shaft IWMs) and observed that the sampling survey results of the CME for all the IWMs surveyed were found to be consistent with DOE's remote survey results. Thus, no discrepant records were observed with the MR /1/ and ER sheet /2/ and thus $c=0$. Hence, CME's set of records has been accepted in line with §33 of the sampling standard (version 09.0) /15/. For determination of the parameter in question a common interview questionnaire /17/ was prepared and was used during the survey by the CME. Verification team has cross verified these sample documents during the remote audit.

Assessment of sampling for CPA 1 (9889-P1-0001-CP1) and CPA 2 (9889-P1-0002-CP1):

Stratified sampling at CPA level was applied by the CME for the selection of the monitoring samples with 90/10 confidence/precision, which is deemed acceptable as per the approved revised PoA-DD /03/and CPA-DDs /04/.

The sampling was conducted for IWMs, which are divided in two strata i.e., Long Shaft IWMs (strata I) and Short Shaft IWMs (strata II). A common questionnaire was used by CME to conduct monitoring survey for determination of both the parameters The total number of IWMs sampled for each CPA and under each stratum for determination of both the parameters are as:

Parameter	Type of IWMs	CPA 1	CPA 2
Total number of IWMs	LS	160	45
	SS	2039	1093
Sample calculated for parameter $Q_{OP,i}$	LS	2	1
	SS	15	18
Sample calculated for parameter Operational hours per day	LS	1	1
	SS	4	13
Sample calculated for parameter operational	LS	1	1
	SS	10	18

days/year			
Adjusted Sample Size	LS	4	4
	SS	36	36

As can be seen from above, the sample size for parameter $Q_{OP,i}$ (proportional parameter) was sixteen (16) for CPA 01 and eighteen (18) for CPA 02, which was less than 30 as required by §14 of Sampling Standard (version 09.0) /15/. So, CME has considered 40 IWMs in each CPA for sampling and proportionally allocated them to each stratum i.e., long shaft and short shaft according to the formula provided in the approved revised CPA-DDs /04/. The same is acceptable to VT as the revised and approved PoA-DD /03/ and CPA-DDs /04/ provide a minimum sample size of 33.

Furthermore, the calculated sample size for '**Operational hours per day**' (numerical mean parameter) was four (04) for CPA 01 and thirteen (13) for CPA 02, which was less than 30 as required by §14 of Sampling Standard (version 09.0) /15/. So, a student's t-distribution was applied by the CME to determine the sample size for the parameter. The calculated sample size after applying student's t-distribution is 6 for CPA 01 and 15 for CPA 02. So, CME has considered 40 IWMs in each CPA for sampling and proportionally allocated them to each stratum i.e., long shaft and short shaft according to the formula provided in the approved revised CPA-DDs /04/. The same is acceptable to VT as the revised and approved PoA-DD /03/ and CPA-DDs /04/ provide a minimum sample size of 33.

Furthermore, the calculated sample size for operational days (numerical mean parameter) was ten (10) for CPA 01 and eighteen (18) for CPA 02, which was less than 30 as required by §14 of Sampling Standard (version 09.0) /15/. So, a student's t-distribution was applied by the CME to determine the sample size for the parameter. The calculated sample size after applying student's t-distribution is 12 for CPA 01 and 20 for CPA 02. So, CME has considered 40 IWMs in each CPA for sampling and proportionally allocated them to each stratum i.e., long shaft and short shaft according to the formula provided in the approved revised CPA-DDs /04/. The same is acceptable to VT as the revised and approved PoA-DD /03/ and CPA-DDs /04/ provide a minimum sample size of 33.

The overall actual reliability achieved for the monitoring parameters are within the 10% level. Hence it is deemed that the samples selected are representative of the population.

Parameters	9889-P1-0001-CP1	9889-P1-0002-CP1	Remarks
$Q_{OP,i}$	8.20%	9.83%	< 10%
$OH_{i,y}$	6.03%	9.18%	< 10%
Operation days/year	2.88%	6.73%	< 10%

The necessary confidence / precision of 90/10 for the parameter in question (for sampling at CPA level) is met. This has been cross verified by the verification team from the supporting documents submitted /17/.

Verification team confirms that the sampling approach applied by the CME is in accordance with the approved revised PoA-DD /03/ and the CPA-DDs /04/ including the Guidelines: Sampling and surveys for CDM project activities and programmes of activities (version 04.0) /18/ and Standard: Standard for sampling and surveys for CDM project activities and Programme of Activities (version 09.0) /15/.

The verification took cognizance of §348 of CDM VVS for PoAs (version 02.0) /11/.

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

Means of verification	DR, I
Findings	N/A
Conclusion	The project activity does not involve any monitoring instruments that require

	calibration; hence no further assessment is done.
	The monitoring is in accordance with the approved revised PoA-DD /03/ and CPA-DDs /04/.
	The verification took cognizance of §346 and §351 of CDM VVS for PoAs (version 02.0) /11/.

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

Means of verification	DR, I
Findings	N/A
Conclusion	<p>Emission reductions have been calculated in line to the applied methodology. According to §16(a) of applied methodology AMS.I.B (Version 12.0) /12/, the baseline emissions (BE_y) are calculated using either of the two approaches below:</p> <ol style="list-style-type: none"> The power requirements times hours of operation per year times the emission factor for diesel generator systems, determined according to procedures specified in "AMS: Electricity generation by the user" The fossil fuel consumption per hour, conservatively converted to diesel fuel hourly consumption rate, times hours of operation per year times the default value for the emission coefficient for diesel fuel i.e., 0.0032 t CO₂ per kg of diesel fuel. <p>For the purpose of calculation of the emission displacement, option (i) has been chosen. Since the TWM itself has certain power output required for milling purpose and IWM provides the additional power required for high-capacity milling, the emission reduction is calculated only for the additional capacity. The additional capacity of the IWMs installed is calculated as given in the equation below:</p> $IC_{add} = IC_{IWM} - IC_{TWM}$ <p>where:</p> <p>IC_{IWM} = IWM installed capacity, kW (for long shaft: 2.83 kW and for short shaft: 1.39 kW)</p> <p>IC_{TWM} = TWM installed capacity, kW (0.35 kW)</p> <p>IC_{add} = Additional Installed Capacity, kW</p> <p>As per option (i) §16(a) AMS.I.B (version 12), the baseline emission is calculated as the product of power requirement, operation hours of IWM for mechanical power generation and emission factor of diesel. Following formula was used to calculate the baseline emission.</p> $ER_y = \sum_{i=1}^n \frac{Q_{OP,i} * IC_{add,i} * OH_i * EF_{Diesel}}{1000}$ $Q_{OP,i} = Q_{T,i} - Q_{NW,i}$ <p>Where:</p> <p>ER_y ≡ Emission Reductions in year y (tCO₂e)</p> <p>$Q_{OP,i}$ ≡ Number (quantity) of IWMs of type i operating under the project activity /units (can be taken up as directly monitored value OR can be calculated as above, if monitored value of $Q_{NW,i}$ is available). Once all of the project IWMs are installed, $Q_{OP,i}$ is a constant value independent from y.</p> <p>i ≡ Counter for equipment type</p> <p>n ≡ 2 (for long shaft and short shaft)</p> <p>$Q_{T,i}$ ≡ Number (quantity) of IWMs of type i installed under the project activity (units).</p>

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$Q_{NW,i,y}$	\equiv	<u>Number (quantity) of IWMS of type inot working under the project activity (units).</u>
$OH_{i,y}$	\equiv	<u>Operating hours of IWMfor mechanical power generation</u>
EF_{Diesel}	\equiv	<u>Emission Factor of diesel based power generators, as per table I.F,1 of AMS-I.F as guided by the para 9 of AMS.I.A as referred in AMS I.B. (kg CO₂/kWh)</u>

From the above equation and the parameter values, emission reductions are calculated as:

CPA Ref. No.	Achieved ERs (tCO ₂ e) /06/
9889-P1-0001-CP1	8,215
9889-P1-0002-CP1	3,018
Total	11,233

The verification team confirms that the calculation of baseline emission and emission reductions is in accordance with the applied methodological equation and the revised and approved CPA-DDs /04/. Calculations have been checked and confirmed from the ER spread sheet /03/.

The verification took cognizance of \$358 of CDM VVS for PoAs. (version 02.0) /11/.

E.3.6.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	DR, I
Findings	N/A
Conclusion	There are no project emissions identified in the monitoring methodology /B02/ and the approved revised CPA-DDs /04/.

E.3.6.3. Calculation of leakage GHG emissions

Means of verification	DR, I
Findings	N/A
Conclusion	<p>The approved revised PoA-DD /03/, CPA-DDs /04/ and applied monitoring methodology /12/ does not prescribe any leakage emissions to be considered. The remote audit and project design also did not reveal any potential source to be considered in this regard.</p> <p>No leakage emissions were required to be calculated as per the approved revised PoA-DD /03/ and CPA-DDs /04/.</p>

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

Means of verification	DR, I
Findings	N/A
Conclusion	<p>The verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from approved revised PoA-DD /03/ and CPA-DDs /04/. The total number of ERs achieved during the monitoring period is 11,233 tCO₂e.</p> <p>In summary, verification team confirms that actual emission reduction is lower than the estimate of the ERs provided in the revised and approved CPA-DDs /B04/ for the current monitoring period.</p> <p>The verification took cognizance of \$358 of CDM VVS PoA (version 02.0) /B01-1/.</p>

Title and UNFCCC reference number of the CPA	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	GHG emission reductions or net GHG removals by sinks (tCO ₂ e)		
				Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	Amount achieved in the entire monitoring period
9889-P1-0001-CP1	8,215	-	-	-	8,215	8,215
9889-P1-0002-CP1	3,018	-	-	-	3,018	3,018
Total	11,233	-	-	-	11,233	11,233

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

Means of verification	DR, I
Findings	N/A
Conclusion	Comparison of the actual GHG emission reductions with the estimates in the included specific CPAs is given in the below table. The verification team took cognizance of §358 of CDM VVS for PoAs (version 02.0) /11/.

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)
PoA for Promotion of the Improved Water Mills (IWM) in Nepal (9889-P1-0001-CP1)	8,215 tCO ₂ e	11,022 tCO ₂ e
PoA for Promotion of the Improved Water Mills (IWM) in Nepal (9889-P1-0002-CP1)	3,018 tCO ₂ e	11,273 tCO ₂ e
Total	11,233 tCO ₂ e	22,295 tCO ₂ e

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

Means of verification	DR, I
Findings	N/A
Conclusion	Verification team confirms that actual emission reduction is lower than the estimate of the approved revised CPA-DDs /04/ for the current monitoring period.

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

Means of verification	N/A
Findings	N/A
Conclusion	N/A

E.3.8. Global stakeholder consultation

Means of verification	N/A
Findings	N/A
Conclusion	N/A

SECTION F. Internal quality control

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

SECTION G. Verification opinion

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Carbon Check (India) Private Ltd. (CC IPL) has been appointed to perform the fourth (04th) periodic verification of the registered CDM CDM Programme of Activities “PoA for Promotion of the Improved Water Mills (IWM) in Nepal” (UNFCCC Ref. No.: 9889) for the following CPAs:

Sl. No.	CPA Reference Number	Title of the CPA
1	9889-P1-0001-CP1	PoA for Promotion of the Improved Water Mills (IWM) in Nepal
2	9889-P1-0002-CP1	CPA 9889-0002: PoA for Promotion of the Improved Water Mills (IWM) in Nepal

Verification methodology and process:

The Verification team confirms the contractual relationship signed on 04/03/2021 between Carbon Check (India) Private Ltd., (DOE) and the CME (Alternative Energy Promotion Centre). The team assigned to the verification meets the CC IPL’s internal procedures including the UNFCCC requirements for the team composition and competence. The verification team has conducted a thorough contract review as per UNFCCC and CC IPL procedures and requirements.

The verification has been performed as per the requirements described in the VVS, PS and PCP for PoAs (version 02.0) and constitutes the review and completion of the following steps:

- Reviewing the approved revised PoA-DD (version 10.0, dated 22/04/2019) /03/, approved revised CPA-DDs (CPA 1 version 10 of 22/04/2019, CPA 2 version 04 of 22/04/2019) /04/ including the monitoring plan and the corresponding validation reports /05/, /06/.
- Publication of the MR (version 1.0; Dated: 21/04/2021) /01/ on the UNFCCC website on 29/04/2021
- Desk review of the validation report, MR and other relevant documents including documents related to the emission reductions from the CPAs
- Review of the applied monitoring methodology (AMS-I.B version 12.0) /12/;
- Review of any CMP and EB decisions, clarifications, and guidance.
- Remote audit and interviews: 30/05/2021 & 31/05/2021
- Resolution of CARs and CLs raised during verification.
- Issuance of Verification Report.

The component project activities were correctly implemented according to selected monitoring methodology /12/, monitoring plan and the approved revised CPA-DDs /04/. The monitoring system is in place and collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and off-site assessment, the verification team confirms that the PoA has resulted in the 11,233 tCO₂e emission reductions during this fourth (04th) monitoring period.

CPA Ref. No.	Achieved ERs (tCO ₂ e) /06/
9889-P1-0001-CP1	8,215
9889-P1-0002-CP1	3,018
Total	11,233

The break-up of emission reduction up to 31/12/2012, from 01/01/2013 until 31/12/2020 and from 01/01/2021 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards until 31/12/2020	From 1 January 2021 onwards
Emission reductions (tCO ₂ e)	0	11,233	0

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

SECTION H. Certification statement

Carbon Check (India) Private Ltd. (CC IPL) has been appointed to perform the fourth (04th) periodic verification of the registered CDM CDM Programme of Activities “PoA for Promotion of the Improved Water Mills (IWM) in Nepal” (UNFCCC Ref. No.: 9889) for the following CPAs:

Sl. No.	CPA Reference Number	Title of the CPA
1	9889-P1-0001-CP1	PoA for Promotion of the Improved Water Mills (IWM) in Nepal
2	9889-P1-0002-CP1	CPA 9889-0002: PoA for Promotion of the Improved Water Mills (IWM) in Nepal

The component project activities are designed to generate emission reductions by replacing existing low powered Traditional Water Mills (TWM) with Improved Water Mills (IWM). Under the Programme, standard low capacity TWMs of capacity 0.35 kW would be replaced by energy efficient IWMs (short shaft and long shaft) of installed capacity ranging from 1.39 kW (minimum value, more than 97% of Short Shaft IWMs will be above this value) to 2.83 kW (on minimum value, more than 97% of Long Shaft IWMs).

The CME who is also the CPA implementer is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the component project activities. It is DOE's responsibility to express an independent verification statement on the reported GHG emission reductions from the component project/s. The DOE does not express any opinion on the selected baseline scenario or on the approved revised PoA-DD/03/ CPA-DDs /04/. The verification is carried out in-line with the requirements of CDM VVS for PoAs (version 02.0) /11/.

The verification was performed to identify the compliance of the component project activities with implementation and monitoring requirements, and to verify the actual amount of achieved emission reductions, through obtaining evidence and information through remote interviews that included:

- Checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied; and
- Collection of evidence supporting the reported data.

The verification is based on:

- Approved revised PoA-DD (version 10.0, dated 22/04/2019) /03/
- Approved revised CPA-DDs (CPA 1 version 10 of 22/04/2019, CPA 2 version 04 of 22/04/2019) /04/, included in the registered PoA and its monitoring plan
- Previous verification and certification reports /20/
- Approved monitoring methodology AMS-I.B (version 12) /12/;
- Validation report for the PoA and CPA/s /05/, /06/
- Monitoring report(s) (versions: 1.0; Dated: 21/04/2021; Version 2.0; Dated 08/06/2021 and version 3 of 28/06/2021)

This statement covers verification period from 01/01/2020 to 31/12/2020 (including both the days).

The DOE had raised two (02) clarification requests (CLs) and two (02) corrective action requests (CARs), all of which have been closed. There are no Forward Action Requests (FARs) raised during the previous or current verification.

The break-up of emission reduction up to 31/12/2012, from 01/01/2013 until 31/12/2020 and from 01/01/2021 onwards as verified during the course of verification are as below:


Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards until 31/12/2020	From 1 January 2021 onwards
Emission reductions	0	11,233	0

(tCO ₂ e)			
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Appendix 1. Abbreviations

Abbreviations	Full texts
AEPC	Alternative Energy Promotion Centre
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CDM-PCP	Clean Development Mechanism Project Cycle Procedure
CDM-PS	Clean Development Mechanism Project Standard
CDM-VVS	Clean Development Mechanism Validation and Verification Standard
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CC IPL	Carbon Check India Pvt. Ltd.
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ER	Emission Reductions
ERPA	Emission Reductions Purchase Agreement
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IWM	Improved Water Mill
LoA	Letter of Approval
MoV	Means of Verification
MR	Monitoring Report
N/A	Not Applicable
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PP(s)	Project Participant(s)
Ref.	Document Reference
SS(s)	Sectoral Scope(s)
TA(s)	Technical Area(s)
TWM	Traditional Water Mill
UNFCCC	United Nations Framework Convention on Climate Change

Appendix 2. Competence of team members and technical reviewers


Carbon
CHECK

Carbon Check (India) Private Ltd.

Champok Buragohain

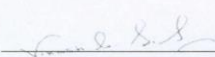
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

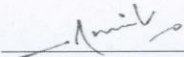
For following functions:

Validator	<input checked="" type="checkbox"/>	Team Leader	<input checked="" type="checkbox"/>	Technical reviewer	<input type="checkbox"/>
Verifier	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>	Local Assessor ¹	<input checked="" type="checkbox"/>

In the following Technical Areas:

TA 1.1	<input checked="" type="checkbox"/>	TA 3.1	<input checked="" type="checkbox"/>	TA 5.2	<input type="checkbox"/>	TA 9.2	<input type="checkbox"/>	TA 13.2	<input checked="" type="checkbox"/>
TA 1.2	<input checked="" type="checkbox"/>	TA 4.1	<input type="checkbox"/>	TA 8.1	<input type="checkbox"/>	TA 10.1	<input type="checkbox"/>	TA 14.1	<input type="checkbox"/>
TA 2.1	<input type="checkbox"/>	TA 5.1	<input type="checkbox"/>	TA 9.1	<input type="checkbox"/>	TA 13.1	<input checked="" type="checkbox"/>		


 Mr. Vikash Kumar Singh
Compliance Officer


 Mr. Amit Anand
CEO

Date of Approval
24/12/2020

Valid Till
24/12/2021

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision
01/03/2020	Interim Revision for office address change
01/09/2020	Interim Revision for CCIPL logo change
24/12/2020	Annual Revision

¹ Please state the name of countries for which the candidate is qualified as local assessor.
 CARBON CHECK (INDIA) PRIVATE LIMITED
 CIN: U74930DL2012PTC232495
 Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
 Corporate off: Unit No. 1701, Logix City Centre Office Tower, Plot No. BW-58, Sector-32 Noida, Uttar Pradesh
 Tel: +91 120 4373114 | URL: www.carboncheck.co.in | e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Amit Anand

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

For following functions:

Validator	<input checked="" type="checkbox"/>	Team Leader	<input checked="" type="checkbox"/>	Technical reviewer	<input checked="" type="checkbox"/>
Verifier	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>	Local Assessor ¹	<input checked="" type="checkbox"/>

In the following Technical Areas:

TA 1.1	<input checked="" type="checkbox"/>	TA 3.1	<input checked="" type="checkbox"/>	TA 5.2	<input type="checkbox"/>	TA 9.2	<input type="checkbox"/>	TA 13.2	<input type="checkbox"/>
TA 1.2	<input checked="" type="checkbox"/>	TA 4.1	<input type="checkbox"/>	TA 8.1	<input checked="" type="checkbox"/>	TA 10.1	<input type="checkbox"/>	TA 14.1	<input checked="" type="checkbox"/>
TA 2.1	<input type="checkbox"/>	TA 5.1	<input type="checkbox"/>	TA 9.1	<input type="checkbox"/>	TA 13.1	<input checked="" type="checkbox"/>		

Mr. Vikash Kumar Singh
Compliance Officer

Date of Approval
24/12/2020

Valid Till
24/12/2021

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision
01/03/2020	Interim Revision for office address change
01/09/2020	Interim Revision for CCIPL logo change
24/12/2020	Annual Revision

¹ India and South Africa

CARBON CHECK (INDIA) PRIVATE LIMITED
CIN: U74930DL2012PTC232495

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Corporate off: Unit No. 1701, Logix City Centre Office Tower, Plot No. BW-58, Sector-32 Noida, Uttar Pradesh
Tel: +91 120 4373114 | URL: www.carboncheck.co.in | e-mail: info@carboncheck.co.in

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
01	AEPC	Monitoring report for the PoA 9889: PoA for Promotion of the Improved Water Mills (IWM) in Nepal	Version 1.0 of 21/04/2021, version 2.0 of 08/06/2021, version 3.0 of 28/06/2021	CME
02	AEPC	Emission reduction calculation spreadsheet (9889_Emission Reduction Calculation spreadsheet_MP-4_v.1'	Version 1.0 of 21/04/2021	CME
03	AEPC	Approved revised PoA-DD for the PoA 9889: PoA for Promotion of the Improved Water Mills (IWM) in Nepal	Version 10.0 of 22/04/2019	CME
04	AEPC	Approved revised CPA-DDs for the PoA 9889: PoA for Promotion of the Improved Water Mills (IWM) in Nepal- CPA 1 & CPA 2	CPA 1: version 10; Dated: 22/04/2019, CPA2: version 04; Dated: 22/04/2019	CME
05	TUV Sud	CDM validation report for the PoA 9889: PoA for Promotion of the Improved Water Mills (IWM) in Nepal	Validation report N° 00027PT issued on 31/08/2015	Others
06	EPIC	PRC Validation report of the PoA 9889: PoA for Promotion of the Improved Water Mills (IWM) in Nepal	Version 1.4 of 19/05/2019	Others
07	UNFCCC	PoA 9889: PoA for Promotion of the Improved Water Mills (IWM) in Nepal	https://cdm.unfccc.int/	Others
08	CDM Executive Board	Monitoring report form (CDM-PoA-MR-FORM) for CDM PoA and filling instruction provided therein.	version 04.0 of 06/04/2021	Others
09	CDM Executive Board	CDM project cycle procedure for PoA	version 02.0 of 29/11/2018	Others
10	CDM Executive Board	CDM Project Standard for PoA	version 02.0 of 29/11/2018	Others
11	CDM Executive Board	CDM Validation and Verification Standard for PoA	version 02.0 of 29/11/2018	Others
12	CDM Executive Board	AMS-I.B – Mechanical energy for the user with or without electrical energy	Version 12	Others
13	UNFCCC	Guideline: Application of materiality in verifications	Version 02, Annex 11, EB 82 dated 20/02/2015	Others
14	UNFCCC	CDM Executive Board agrees to relax mandatory site visits by DOEs until 31 December 2021 because of COVID-19	https://cdm.unfccc.int/newsroom/latestnews/releases/2020/0104_1_index.html	Others
15	UNFCCC	Standard: Sampling and surveys for CDM project activities and programmes of activities	Version 09	Others
16	AEPC	IWM CPA database	IMW installation database	CME
17	Nepal Energy and Environment Development Services Pvt.	Final Report on Emission Reduction Monitoring (User Survey) of Improved Water Mill (IWM) Clean Development Mechanisms (CDM) Programme of Activity (PoA) 2020	April 2021	CME

CDM-PoA-VCR-FORM

	Ltd.	CPA-1 & CPA 2		
18	UNFCCC	Guidelines for sampling and surveys for CDM project activities and programmes of activities	Version 04	Others
19.	UNFCCC	Standard for Sampling and Surveys for CDM project activities and programme of activities, (EB 74 annex 05)	version 04	Others
20.	UNFCCC	Monitoring report and corresponding verification reports for PoA 9889 for three (03) previous verifications	--	Others
21	AEPC	Sample end user agreement copies/commissioning reports	--	CME
22	AEPC	Sample calculation worksheet with t-distribution worksheet	--	CME
23	AEPC	Per CPA wise installed capacity calculation worksheet	--	CME
24	AEPC	Sample number generator screen shots for both the CPAs	--	CME
25	Nepal Energy and Environment Development Services Pvt. Ltd.	Filled in sample survey forms	--	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
Description of FAR				
<i>No FAR raised</i>				
CME response				Date: DD/MM/YYYY
Documentation provided by the CME				
DOE assessment				Date: DD/MM/YYYY

Table 2. CLs from this verification

CL ID	01	Section no.		Date: 03/06/2021
Description of CL				
<ol style="list-style-type: none"> 1. CME is requested to provide the third party survey report applicable for the monitoring period. 2. CME is requested to clarify and provide details whether annual monitoring frequency has been maintained? 3. Number (quantity) of IWMs of type i installed under the project activity ($Q_{T,i}$) to be monitored annually. Although there is no change in IWMs in each CPA during this monitoring period, how CME ensure the consistency of the number annually? 				
CME response				Date: 08/06/2021
<ol style="list-style-type: none"> 1. Third party survey report for the applicable monitoring period is provided for two CPAs with this response. 2. The annual monitoring frequency has been maintained for this monitoring as well. For the first monitoring, the survey was conducted in February-April 2018 which was applicable to first verification. Similarly, second monitoring was conducted in February-March 2019 that was applicable for 2nd verification. Third monitoring was conducted in March-June 2020 (most of data collection were covered in March by physical visits and remaining were covered through telephonic conversation in May/June 2019 due to COVID 19). For this MP Survey is conducted in February/March 2021. The dates for 1st, 2nd and 3rd monitoring can be evidenced from the approved monitoring report (under section E.3) verified before by DOE in UNFCCC website. For this monitoring, please see section 2.3.4 of the third party survey provided with this response. 3. The threshold number of IWMs for each CPA is 3000. Once the IWMs are installed, this will be confirmed through database verifying the commissioning reports according to registered CPA-DD. Since the first verification, no IWMs were added in the CPAs, so the number of IWMs in CPA-1 is 2199 and for CPA-2 is 1138 only since the first verification. So, the number of IWMs in the CPAs are not changed since first verification. Please see attached database for CPA-1 and CPA-2. 				
Documentation provided by the CME				
<ol style="list-style-type: none"> 1. Third Party Reports SD#1.1_Final Report_IWM Survey 2020_CPA-1 SD#1.2_Final Report_IWM Survey 2020_CPA-2 2. For 1st, 2nd and 3rd monitoring reports https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/93J80QPO5I7HEA2S4KUZ1DWMCNBXL6/view <p>For this MP: SD#1.1_Final Report_IWM Survey 2020_CPA-1 SD#1.2_Final Report_IWM Survey 2020_CPA-2</p> <ol style="list-style-type: none"> 3. SD#3-IWM CPA Database 				
DOE assessment				Date: 10/06/2021
<p>The third-party survey report is submitted. The previous monitoring survey was conducted in March-June 2020 and current monitoring survey conducted in March 2021. Hence, annual frequency is maintained. Since, the number of IWM included in CPA is not changed since its inclusion and same number is maintained as per commissioning database. Hence, CME's response is accepted, and CL is closed.</p>				

CL ID	02	Section no.		Date: 03/06/2021
Description of CL				
<i>Clarify why the "Amount achieved during this monitoring period (tCO₂e)" is almost less by 50% when compared to the "Amount estimated ex-ante for this monitoring period in the CPA-DD (t CO₂e)"</i>				
CME response				Date: 08/06/2021
<p>The main reason for reduction of the ER is the number of IWMs installed in CPA. Total number of IWMs in the CPA-1 was considered as 2,200 and for CPA-2 it was considered as 2250 for the ex-ante emission reduction calculation where the maximum threshold number of IWMs that can be instated is 3000. Whereas the actual number of IWMs in CPA-1 is 2199 and for CPA-2 is 1138. Also, the types of IWMs installed in the CPAs also varies than in ex-ante estimates. The capacity of long shaft IWMs is higher than short shaft. Emission reduction for each long shaft is estimated as 9.36 tCO₂eq in ex-ante whereas it is 3.92 tCO₂eq for short shaft. While estimating the ER in ex-ante, it was considered that proportion of long shaft IWMs in the CPA is 20% however in actual installation, it is only 7.28% for CPA-1 and 3.95% for CPA-2. This has largely affected the actual emission reduction calculation. Also, the amount of the emission reduction depends on the operational status of the IWM for the monitoring period and the operational hours in a year. So, the calculation of emission reduction may go up and down as the parameter varies during the monitoring period. Considering all these parameters, the amount of emission reduction achieved during the monitoring period is almost 50% less than the ex-ante estimated value. See ex-ante calculation sheet in UNFCCC website under CPA webpage for ex-ante calculation and ER calculation sheet for this MP detail.</p>				
Documentation provided by the CME				
<p>For Ex-ante calculation sheets:</p> <p>https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/GV582UOEBK1C7JQZNPYHD0RMI4F6AW/view</p> <p>https://cdm.unfccc.int/ProgrammeOfActivities/cpa_db/4QM9J3L0W7GE2B5YA06KD1HCV8ZIPT/view</p> <p>For ER calculation for this MP:</p> <p>9889_Emission Reduction Calculation spreadsheet_MP-4_v.1</p>				
DOE assessment				Date: 10/06/2021
<p>In actual implementation, CPA 1 included 2,199 IWMs as against ex-ante estimation of 2,200 and in CPA 2 included 1,138 as against 2,250 IWM. This was verified from actual implementation database and previous verifications. The capacity of long shaft IWMs is higher than short shaft. Emission reduction for each long shaft is estimated as 9.36 tCO₂eq in ex-ante whereas it is 3.92 tCO₂eq for short shaft. While estimating the ER in ex-ante, it was considered that proportion of long shaft IWMs in the CPA is 20% however in actual installation, it is only 7.28% for CPA-1 and 3.95% for CPA-2. This has largely affected the actual emission reduction calculation. Therefore, it is realistic to achieve less emission reductions compared to ex-ante estimation. CME's response is accepted and hence CL is closed.</p>				

Table 3. CARs from this verification

CAR ID	01	Section no.		Date: 03/06/2021
Description of CAR				
<i>The PRC approval date mentioned in section B.2.3 of the MR is not consistent with the details available in UNFCCC project view page.</i>				
CME response				Date: 08/06/2021
<i>The PRC approval date is corrected appropriately in section B.2.3 of the revised MR in-line with the detail available in UNFCCC PoA page</i>				
Documentation provided by the CME				
<p>9889_MR_IWM PoA_MP-4_V02_Trackchange</p> <p>9889_MR_IWM PoA_MP-4_V02_Clean</p>				
DOE assessment				Date: 10/06/2021
<p>The PRC approval date and reference number is corrected in the updated MR and found to be consistent with UNFCCC details. Hence, CAR is closed.</p>				

CAR ID	02	Section no.	E.3.4.1	Date: 03/06/2021
Description of CAR				
<i>The ex-ante parameter (Sample size of Monitoring Survey) provided in the MR is not consistent with registered CPA-DDs.</i>				
CME response				Date: 08/06/2021
<i>The sample size estimated ex-ante is corrected in section E.1 of revised MR in-line with the registered PoA-DD and CPA-DD.</i>				
Documentation provided by the CME				

9889_MR_IWM PoA_MP-4_V02_Trackchange	
9889_MR_IWM PoA_MP-4_V02_Clean	
DOE assessment	Date: 10/06/2021
The corrections found done in updated MR which is consisted with registered CPA-DDs. Hence, CAR is closed.	

Table 4. FARs from this verification

FAR ID	xx	Section No.		Date: DD/MM/YYYY
Description of FAR				
No FAR raised.				
CME response				Date: DD/MM/YYYY
Documentation provided by the CME				
DOE assessment				Date: DD/MM/YYYY

Appendix 5. Data and parameters monitored

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	$Q_{op,i}$
Description of parameter	Number (quantity) of IWMs of type i operating under the project activity.
Data Unit	Number
Reported Value	CPA 01 (9889-P1-0001-CP1): <ul style="list-style-type: none"> Long Shaft: 120 (operational rate: 75%) Short Shaft: 1869 (operational rate: 91.67%) CPA 02 (9889-P1-0002-CP1): <ul style="list-style-type: none"> Long Shaft: 11.25 (operational rate: 25 %) Short Shaft: 941.20 (operational rate: 86.11 %)
Measuring/reading/recording frequency	Annually
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine this parameter. Annual surveys conducted through use of survey forms and questionnaires.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	No equipment used hence the calibration requirement not applicable.
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.
If applicable, has the reported data been cross-checked with other available data?	Yes. The information provided in the IWM CPA Database /16/ were verified randomly during the remote audit with the survey forms /25/, survey reports /17/ and through interview of the household representatives.
How were the values in the monitoring report verified?	The values reported in the final MR /01/ (and corresponding ER sheet /03/) were verified from the annual survey forms /25/, survey reports /17/. The IWM owners were remotely interviewed to record if the IWMs is operating and hours and days of operation in a year. The uniqueness of the IWMs is maintained unique identification number allotted to them in IWM CPA database /16/. During the monitoring survey exercise, name of the owner, address, capacity of the IWMs and date of installation are recorded in the survey form. The information from the survey forms /25/ is then translated in the excel for calculation of the operation hours and

	<p>operational rate.</p> <p>Number of IWMs implemented before the start of current monitoring period and are transparently indicated in the emission reduction calculations /03/, MR /01/. Consequently, the number of SWH sold under each CPA is also consistent with revised and approved CPA-DD /B04/,</p> <p>The calculations were verified, and the source survey forms /25/ were also verified by the assessment team.</p>
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>The necessary QA/QC for this parameter is in place. The verification team has cross checked the audit trail of the data management for this parameter (IWM CPA database /16/, sales agreements /21/, monitoring survey reports /17/).</p> <p>Furthermore, the verification team confirmed the competence of the team involved in monitoring and recording during the remote interviews and by reviewing the training documents /17/.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	<p>Not applicable.</p> <p>Full data is available for the monitoring period.</p>

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	OH_{i,y}
Description of parameter	Operating hours of IWM for mechanical power generation
Data Unit	Hrs
Reported Value	<p>CPA 01 (9889-P1-0001-CP1):</p> <ul style="list-style-type: none"> Long Shaft: 11.33 hrs/day (298.33 operational days/year) Short Shaft: 10.73 hrs/day (280.00 operational days/year) <p>CPA 02 (9889-P1-0002-CP1):</p> <ul style="list-style-type: none"> Long Shaft: 9 hrs/day (200 operational days/year) Short Shaft: 9.59 hrs/day (262.59 operational days/year)
Measuring/reading/recording frequency	Annually
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine this parameter. Annual surveys conducted through use of survey forms and questionnaires.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD	No equipment used hence the calibration requirement not applicable.

does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.
If applicable, has the reported data been cross-checked with other available data?	Yes. The information provided in the CPA Database /05/ were verified randomly during the remote audit with the survey forms/records /06/ and through interview of the household representatives.
How were the values in the monitoring report verified?	<p>The values reported in the final MR /01/ (and corresponding ER sheet /03/) were verified from the annual survey forms /25/, survey reports /17/. The IWM owners were remotely interviewed to record if the IWMs is operating and hours and days of operation in a year. The uniqueness of the IWMs is maintained unique identification number allotted to them in IWM CPA database /16/. During the monitoring survey exercise, name of the owner, address, capacity of the IWMs and date of installation are recorded in the survey form. The information from the survey form /25/ is then translated in the excel for calculation of the operation hours and operational rate.</p> <p>Number of IWMs implemented before the start of current monitoring period and are transparently indicated in the emission reduction calculations /03/, MR /01/. Consequently, the number of SWH sold under each CPA is also consistent with revised and approved CPA-DD /B04/.</p> <p>The calculations were verified, and the source survey forms /25/ were also verified by the assessment team.</p>
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>The necessary QA/QC for this parameter is in place. The verification team has cross checked the audit trail of the data management for this parameter (IWM CPA database /16/, sales agreements /21/, monitoring survey reports /17/).</p> <p>Furthermore, the verification team confirmed the competence of the team involved in monitoring and recording during the remote interviews and by reviewing the training documents /17/.</p>
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	<p>Not applicable.</p> <p>Full data is available for the monitoring period.</p>

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	$Q_{T,y}$
Description of parameter	Number (quantity) of IWMs of type i installed under the project activity
Data Unit	Number
Reported Value	CPA 01 (9889-P1-0001-CP1): <ul style="list-style-type: none"> Long Shaft: 160

	<ul style="list-style-type: none"> • Short Shaft: 2039 • CPA 02 (9889-P1-0002-CP1): <ul style="list-style-type: none"> • Long Shaft: 45 • Short Shaft: 1093
Measuring/reading/recording frequency	Annually
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	No monitoring equipment used to determine this parameter. Annual surveys conducted through use of survey forms and questionnaires.
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable since no equipment is used to determine the parameter.
Calibration frequency /interval: Is it monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	No equipment used hence the calibration requirement not applicable.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	No equipment used hence the calibration requirement not applicable.
Company performing the calibration (internal or external calibration):	No equipment used hence the calibration requirement not applicable.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	No equipment used hence the calibration requirement not applicable.
Is (are) calibration(s) valid for the whole reporting period?	No equipment used hence the calibration requirement not applicable.
If applicable, has the reported data been cross-checked with other available data?	Yes. The information provided in the CPA Database /05/ were verified randomly during the remote audit with the survey forms/records /06/ and through interview of the household representatives.
How were the values in the monitoring report verified?	<p>The values reported in the final MR /01/ (and corresponding ER sheet /03/) were verified from the annual survey forms /25/, survey reports /17/. The IWM owners were remotely interviewed to record if the IWMs is operating and hours and days of operation in a year. The uniqueness of the IWMs is maintained unique identification number allotted to them in IWM CPA database /16/. During the monitoring survey exercise, name of the owner, address, capacity of the IWMs and date of installation are recorded in the survey form. The information from the survey form /25/ is then translated in the excel for calculation of the operation hours and operational rate.</p> <p>Number of IWMs implemented before the start of current monitoring period and are transparently indicated in the emission reduction calculations /03/, MR /01/. Consequently, the number of SWH sold under each CPA is also consistent with revised and approved CPA-DD /B04/.</p> <p>The calculations were verified, and the source survey forms /25/ were also verified by the assessment team.</p>
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of	The necessary QA/QC for this parameter is in place. The verification team has cross checked the audit trail of the data management for this parameter (IWM CPA database

<p>data and reporting of emission reductions and are necessary QA/QC processes in place?</p>	<p>/16/, sales agreements /21/, monitoring survey reports /17/).</p> <p>Furthermore, the verification team confirmed the competence of the team involved in monitoring and recording during the remote interviews and by reviewing the training documents /17/.</p>
<p>In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?</p>	<p>Not applicable.</p> <p>Full data is available for the monitoring period.</p>

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

Sl. No.	Checklist Questions	Assessment												
1.	Does the Monitoring Report apply sampling for determination of ex-post monitoring parameters?	Yes, there are ex-post monitoring parameters determined through the sampling effort.												
2.	Is the applied sampling plan in accordance with the sampling plan proposed in the registered PoA-DD/ PDD?	Yes, the applied sampling plan is in accordance with the sampling plan proposed in the approved revised PoA-DD /03/ and approved revised CPA-DDs /04/.												
3.	<p>List the parameters determined through sampling and respective parameters of interest.</p> <p>[In situations where monitoring is based on data recording once at the time of implementation particularly for distribution projects, where there are large/dispersed number of project technology, the VV team shall make the confirmation to assess its accuracy during the onsite verification through document review and where applicable through acceptance sampling.]</p> <p>[The assessment of implementation status of distribution projects or projects having dispersed and large number of components, it is pertinent that the VV Team shall assess that all physical features (technology, project equipment, and monitoring and metering equipment) of the included CPAs/projects as specified in the included CPA-DDs/PDD in cases where the households/users dropped out or voluntarily leave the project. In this particular case, it is important to assess CME/PP's QA/QC procedures with regards to handling of its database and where applicable consider those dropped out technology as a part of assessment of sampling requirements, including acceptance sampling by DOE.]</p>	<p>Parameters determined through sampling and respective parameters of interest are:</p> <table border="1"> <thead> <tr> <th>Parameter</th><th>Description of Parameter</th><th>Parameter of Interest</th></tr> </thead> <tbody> <tr> <td>$Q_{OP,i}$</td><td>Number (quantity) of IWMs of type i operating under the project activity</td><td>Proportion</td></tr> <tr> <td>$OH_{i,y}$</td><td>Operating hours of IWM for mechanical power generation</td><td>Mean</td></tr> <tr> <td>Operational days/year</td><td>Operational days/year</td><td>Mean</td></tr> </tbody> </table> <p>There are no instances of households/end-users dropping out of technology and no situations where the households/users dropped out or voluntarily leave the project.</p> <p>Furthermore, there are no parameters whose monitoring is based on data recording once at the time of implementation.</p>	Parameter	Description of Parameter	Parameter of Interest	$Q_{OP,i}$	Number (quantity) of IWMs of type i operating under the project activity	Proportion	$OH_{i,y}$	Operating hours of IWM for mechanical power generation	Mean	Operational days/year	Operational days/year	Mean
Parameter	Description of Parameter	Parameter of Interest												
$Q_{OP,i}$	Number (quantity) of IWMs of type i operating under the project activity	Proportion												
$OH_{i,y}$	Operating hours of IWM for mechanical power generation	Mean												
Operational days/year	Operational days/year	Mean												
4.	Is the sample size calculated in accordance with the formula presented in the registered PoA-DD/PDD?	Yes, the sample size calculated is in accordance with the formula presented in the approved revised PoA-DD /03/ CPA-DDs /04/.												
5.	<p>Are the assumptions used for calculation of sample size appropriate, and correct?</p> <p>P.S.: Provide assessment on appropriateness of value of proportion (p), standard deviation (STDEV) or variance (v) used for calculation of sample size.</p>	<p>Yes, the assumptions used for calculation of sample size is appropriate and correct.</p> <p>The value of proportion, standard deviation (STDEV) and mean used for calculation of sample size are taken from the monitoring results of previous MP. The same is in accordance with §13 (c) of the Standard: Sampling and surveys for CDM project activities and programmes of activities (version 09.0) /15/ and acceptable to VT.</p>												

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6.	<p>What are the sample sizes obtained for the parameters being monitored? Is the determined sample size deemed adequate for the parameter of interest being monitored?</p> <p>P.S.: If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion. If the parameter of interest is a numeric mean value (i.e., not a proportion or percentage) the Student's t-distribution shall be used if the resulting sample size is less than 30.</p> <p>While assessing the sampling effort by the PP/CME particularly the sample size, the VV Team shall make sure the reliability criteria (confidence level and precision) should be as per the requirement of the applied methodology. Only when there is no specific guidance in the applied methodology for the sampling requirements, the confidence/precision as stated in the sampling standards should be considered. As a rule of thumb it is to be always kept in mind that the sampling requirements in the applied methodology shall take precedence.]</p>	<p>The sample size for parameters as mentioned in the table below have been calculated using 90/10 confidence and precision level. The same is acceptable as stratified sampling for individual CPA has been applied and the same is in accordance with the approved revised PoA-DD /03/ and CPA-DDs /04/ and also in accordance with §11 of Standard: Sampling and surveys for CDM project activities and programme of activities (version 09.0) /15/.</p> <p>The number of samples for each of the parameters covered during the monitoring activity is as given below:</p> <p><u>CPA 1 (9889-P1-0001-CP1) & CPA 2 (9889-P1-0002-CP1):</u></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #d3d3d3;"> <th>Parameter</th> <th>Type of IWMS</th> <th>9889-P1-0002-CP1</th> <th>9889-P1-0002-CP1</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Total number of IWMS</td> <td>LS</td> <td>160</td> <td>45</td> </tr> <tr> <td>SS</td> <td>2039</td> <td>1093</td> </tr> <tr> <td rowspan="2">Sample calculated for parameter Q_{OP,i}</td> <td>LS</td> <td>2</td> <td>1</td> </tr> <tr> <td>SS</td> <td>15</td> <td>18</td> </tr> <tr> <td rowspan="2">Sample calculated for parameter Operational hours per day</td> <td>LS</td> <td>1</td> <td>1</td> </tr> <tr> <td>SS</td> <td>4</td> <td>13</td> </tr> <tr> <td rowspan="2">Sample calculated for parameter operational days/year</td> <td>LS</td> <td>1</td> <td>1</td> </tr> <tr> <td>SS</td> <td>10</td> <td>18</td> </tr> <tr> <td rowspan="2">Sample Size covered during monitoring survey</td> <td>LS</td> <td>4</td> <td>4</td> </tr> <tr> <td>SS</td> <td>36</td> <td>36</td> </tr> </tbody> </table> <p>As can be seen from above, the sample size for parameter Q_{OP,i} (proportional parameter) was sixteen (16) for CPA 01 and eighteen (18) for CPA 02, which was less than 30 as required by §14 of Sampling Standard (version 09.0) /15/. So, CME has considered 40 IWMS in each CPA for sampling and proportionally allocated them to each stratum i.e., long shaft and short shaft according to the formula provided in the approved revised CPA-DDs /04/. The same is acceptable to VT as the revised and approved PoA-DD /03/ and CPA-DDs /04/ provide a minimum sample size of 33.</p> <p>Furthermore, the calculated sample size for 'Operational hours per day' (numerical mean parameter) was four (04) for CPA 01 and thirteen (13) for CPA 02, which was less than 30 as required by §14 of Sampling Standard</p>	Parameter	Type of IWMS	9889-P1-0002-CP1	9889-P1-0002-CP1	Total number of IWMS	LS	160	45	SS	2039	1093	Sample calculated for parameter Q_{OP,i}	LS	2	1	SS	15	18	Sample calculated for parameter Operational hours per day	LS	1	1	SS	4	13	Sample calculated for parameter operational days/year	LS	1	1	SS	10	18	Sample Size covered during monitoring survey	LS	4	4	SS	36	36
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		<p>(version 09.0) /15/. So, a student's t-distribution was applied by the CME to determine the sample size for the parameter. The calculated sample size after applying student's t-distribution is 6 for CPA 01 and 15 for CPA 02. So, CME has considered 40 IWMs in each CPA for sampling and proportionally allocated them to each stratum i.e., long shaft and short shaft according to the formula provided in the approved revised CPA-DDs /04/. The same is acceptable to VT as the revised and approved PoA-DD /03/ and CPA-DDs /04/ provide a minimum sample size of 33.</p> <p>Furthermore, the calculated sample size for operational days (numerical mean parameter) was ten (10) for CPA 01 and eighteen (18) for CPA 02, which was less than 30 as required by §14 of Sampling Standard (version 09.0) /15/. So, a student's t-distribution was applied by the CME to determine the sample size for the parameter. The calculated sample size after applying student's t-distribution is 12 for CPA 01 and 20 for CPA 02. So, CME has considered 40 IWMs in each CPA for sampling and proportionally allocated them to each stratum i.e., long shaft and short shaft according to the formula provided in the approved revised CPA-DDs /04/. The same is acceptable to VT as the revised and approved PoA-DD /03/ and CPA-DDs /04/ provide a minimum sample size of 33.</p> <p>Moreover, upon review of the student's t-distribution it was observed that the student t-distribution test has been performed using 90/10 confidence and precision level and the same is in line with the requirements of §11 of Standard: Sampling and surveys for CDM project activities and programmes of activities (version 09.0) /15/.</p>								
7.	<p>Has reliability specification been applied to determine the sampling requirements for each individual parameter value determined through a sampling effort?</p> <p>P.S.: If there is more than one parameter to be estimated in a CDM project activity, then a sample size calculation should be done for each of them. Then either the largest number for the sample size is chosen for the sampling effort with one common survey, or the sampling effort and survey is repeated for each of the parameters. A random sub-sample within the common survey is allowed as long as: (i) the reliability specification (e.g., 90/10 confidence/precision for small-scale CDM project activities and 95/10 for large scale CDM project activities) is achieved for each individual parameter; and (ii) the random sub-sample is consistent with the design of the survey and the corresponding sample size calculation.</p>	<p>Yes, reliability specification of 90/10 confidence/precision have been applied to determine the sample size for parameters as mentioned in the table below. The same is acceptable as stratified sampling for individual CPA has been applied and the same is in accordance with the approved revised PoA-DD /03/ and CPA-DDs /04/ and also in accordance with §11 of Standard: Sampling and surveys for CDM project activities and programme of activities (version 09.0) /15/.</p> <p>The number of samples for each of the parameters covered during the monitoring activity is as given below:</p> <p><u>CPA 1 (9889-P1-0001-CP1) & CPA 2 (9889-P1-0002-CP1):</u></p> <table><tr><th>Parameter</th><th>Type of IWMs</th><th>9889-P1-0002-CP1</th><th>9889-P1-0002-CP1</th></tr><tr><td></td><td></td><td></td><td></td></tr></table>	Parameter	Type of IWMs	9889-P1-0002-CP1	9889-P1-0002-CP1				
Parameter	Type of IWMs	9889-P1-0002-CP1	9889-P1-0002-CP1							

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Total number of IWMs	LS	160	45
	SS	2039	1093
Sample calculated for parameter $Q_{OP,i}$	LS	2	1
	SS	15	18
Sample calculated for parameter Operational hours per day	LS	1	1
	SS	4	13
Sample calculated for parameter operational days/year	LS	1	1
	SS	10	18
Sample Size covered during monitoring survey	LS	4	4
	SS	36	36

As can be seen from above, the sample size for parameter $Q_{OP,i}$ (proportional parameter) was sixteen (16) for CPA 01 and eighteen (18) for CPA 02, which was less than 30 as required by §14 of Sampling Standard (version 09.0) /15/. So, CME has considered 40 IWMs in each CPA for sampling and proportionally allocated them to each stratum i.e., long shaft and short shaft according to the formula provided in the approved revised CPA-DDs /04/. The same is acceptable to VT as the revised and approved PoA-DD /03/ and CPA-DDs /04/ provide a minimum sample size of 33.

Furthermore, the calculated sample size for **Operational hours per day** (numerical mean parameter) was four (04) for CPA 01 and thirteen (13) for CPA 02, which was less than 30 as required by §14 of Sampling Standard (version 09.0) /15/. So, a student's t-distribution was applied by the CME to determine the sample size for the parameter. The calculated sample size after applying student's t-distribution is 6 for CPA 01 and 16 for CPA 02. So, CME has considered 40 IWMs in each CPA for sampling and proportionally allocated them to each stratum i.e., long shaft and short shaft according to the formula provided in the approved revised CPA-DDs /04/. The same is acceptable to VT as the revised and approved PoA-DD /03/ and CPA-DDs /04/ provide a minimum sample size of 33.

Furthermore, the calculated sample size for operational days (numerical mean parameter) was ten (10) for CPA 01 and eighteen (18) for CPA 02, which was less than 30 as required by §14 of Sampling Standard (version 09.0) /15/. So, a student's t-distribution was applied by the CME to determine the sample size for the parameter. The calculated sample size

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		<p>after applying student's t-distribution is 12 for CPA 01 and 20 for CPA 02. So, CME has considered 40 IWMs in each CPA for sampling and proportionally allocated them to each stratum i.e., long shaft and short shaft according to the formula provided in the approved revised CPA-DDs /04/. The same is acceptable to VT as the revised and approved PoA-DD /03/ and CPA-DDs /04/ provide a minimum sample size of 33.</p> <p>Moreover, upon review of the student's t-distribution it was observed that the student t-distribution test has been performed using 90/10 confidence and precision level and the same is in line with the requirements of §11 of Standard: Sampling and surveys for CDM project activities and programmes of activities (version 09.0) /15/.</p>																
8.	Is the assumed response rate reasonable (appropriate and correct) for the determination of samples to be surveyed?	Yes, the assumed response rate is deemed reasonable (appropriate and correct) for the determination of samples to be surveyed for each of the parameter of interest.																
9.	Is the sample selected by PP for determination of the monitored parameters unbiased (random) and representative?	Yes, the verification team, based on evidence for random number generator /24/ as provided by the CME, confirms that sample selected by the CME for determination of the monitored parameters are random. It can be considered as representative of the population.																
10.	Has minimum target level of precision been achieved based on estimates from the actual samples?	<p>The target level of precision been achieved based on estimates from the actual samples for CPAs are as:</p> <p><u>CPA 1 (9889-P1-0001-CP1) & CPA 2 (9889-P1-0002-CP1):</u></p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="text-align: left;">Parameters</th><th style="text-align: center;">9889-P1-0001-CP1</th><th style="text-align: center;">9889-P1-0002-CP1</th><th style="text-align: left;">Remarks</th></tr> </thead> <tbody> <tr> <td>Q_{OP,i}</td><td style="text-align: center;">8.20%</td><td style="text-align: center;">9.83%</td><td>< 10%</td></tr> <tr> <td>OH_{i,y}</td><td style="text-align: center;">6.03%</td><td style="text-align: center;">9.18%</td><td>< 10%</td></tr> <tr> <td>Operation days/year</td><td style="text-align: center;">2.88%</td><td style="text-align: center;">6.73%</td><td>< 10%</td></tr> </tbody> </table> <p>Yes, the minimum target level of precision been achieved based on estimates from the actual samples. The same was verified through review of survey reports /17/ and analysis sheet /22/.</p>	Parameters	9889-P1-0001-CP1	9889-P1-0002-CP1	Remarks	Q_{OP,i}	8.20%	9.83%	< 10%	OH_{i,y}	6.03%	9.18%	< 10%	Operation days/year	2.88%	6.73%	< 10%
Parameters	9889-P1-0001-CP1	9889-P1-0002-CP1	Remarks															
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Operation days/year	2.88%	6.73%	< 10%															
11.	In case the minimum target level of precision has not been achieved based on estimates from the actual samples, please specify the approach adopted by PP to reach the required precision and also justify the appropriateness of the adopted approach in accordance with the applied methodology or §18 of Sampling and surveys for CDM project activities and programmes of activities (Version 09.0).	Not Applicable.																
12.	Has VT applied acceptance sampling to verify that the results of sampling efforts undertaken by PP for determination of ex-post parameters? If yes, please provide a detailed justification of the approach adopted including	In accordance with the §28 of the sampling standard (version 09.0) /15/, acceptance sampling has been chosen by the verification team and accordingly steps listed in §29 of the sampling standard (version 09.0) /15/																

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	<p>information on (but not limited to):</p> <ul style="list-style-type: none"> (a) Selected AQL Level (b) Selected UQL Level (c) Selected Consumer Risk Level (d) Selected Producer Risk Level (e) Sample Size chosen for acceptance sampling (f) Acceptance number (c) <p>Approach adopted by VT to in case value of greater than c discrepant records were observed in the sample</p>	<p>have been followed.</p> <p>AQL: 0.5% UQL: 20% Consumer risk: 20% Producer risk: 10% Sample Size: 11 Acceptance number (c): 0</p> <p><u>CPA 1 (9889-P1-0001-CP1) & CPA 2 (9889-P1-0002-CP1):</u></p> <p>No discrepant records were observed with the MR /01/, ER sheet /02/ and duly filled monitoring survey questionnaires /25/. Thus, CME's set of records has been accepted in line with §33 of the Standard: Sampling and surveys for CDM project activities and programmes of activities (version 09.0) /15/.</p>
13.	Are the procedures for the selected survey and data collection method unambiguously defined and do they adequately provide for minimizing non-sampling errors?	Verification team based on remote interviews and review of documented procedure confirms that the selected survey and data collection method is unambiguously defined. This also adequately ensure minimizing non-sampling errors.
14.	Have potential sources of bias inherent in the selected data collection method, such as self-selection and under-coverage, been anticipated? Have mechanisms for mitigating these been considered?	Review of sampling records, documented procedure and remote interviews with the survey team, did not reveal any sources of bias inherent in the selected data collection.
15.	Is the quality control and assurance strategy adequate?	Verification team based on review of provided supporting documents and remote interviews confirms that the quality control and assurance strategy is adequate.
16.	Are the proposed skill sets, qualifications and experience of the personnel/institutions engaged to conduct the standardized tests/data collection exercise adequate?	<p>No standardized test has been applied for monitoring of any parameters for the CPAs under verification. This is in accordance with the approved and revised PoA-DD /03/ and CPA-DDs /04/.</p> <p>Through the remote interview of personnel responsible for carrying out the monitoring survey it was ascertained that the personnel are competent to conduct the survey and follow the instructions and requirements of CME management manual. Furthermore, the VT also reviewed the training certificates /17/ of the personnel and ascertained that they are trained every year before undertaking the monitoring survey to refresh their skills. The same is found acceptable by VT.</p>
17.	<p>Does the PP have a process in place to ensure data quality is maintained to a high standard? This should include:</p> <ul style="list-style-type: none"> a) Are the personnel trained and experienced? b) What is the level of supervision and guidance provided to staff? c) Is there a standardized system for data entry and analysis to 	<p>Verification team based on review of provided supporting documents and remote interviews confirms the following:</p> <ul style="list-style-type: none"> • The personnel involved in the surveys are trained and experienced. • There exists a standardized system for data entry and analysis to

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

<i>Version</i>	<i>Date</i>	<i>Description</i>
04.0	6 April 2021	Revision to: <ul style="list-style-type: none"> • Reflect the “Clarification: Regulatory requirements under temporary measures for post-2020 cases” (CDM-EB109-A01-CLAR).
03.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM validation and verification standard for programmes of activities” (CDM-EB93-A08-STAN); • Make structural and editorial improvements.
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.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: programme of activities, verifying and certifying		