Verification and certification report form for CDM programme of activities

(version 03.0)

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

BASIC INFORMATION		
Title and UNFCCC reference number of the programme of activities (PoA)	PoA for Promotion of the Improved Water Mills (IWM) in Nepal (UNFCCC no:9889)	
Version number(s) of the PoA-DD(s) to which this report applies	10.0	
Version number of the verification and certification report	1.4	
Completion date of the verification and certification report	20/06/2019	
Monitoring period number and duration of this monitoring period	Monitoring period number: 01 Duration of the MR period: 09/09/2015 to 31/12/2017	
Number and version number of the monitoring report to which this report applies	Monitoring period number: 01 Version number of the MR: 04.0	
Coordinating/managing entity (CME)	Alternative Energy Promotion Centre (AEPC)	
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	Energy industries (renewable/non-renewable sources)	
Conditional sectoral scopes, if applicable	NA	
Estimated amount of GHG emission reductions or GHG removals for this monitoring period in the included CPAs covered in this report	**CPA-1: 25,517 tCO_2 e** **CPA-2: 10,315 tCO_2 e** **Total: 35,832 tCO_2 e**	
Certified amount of GHG emission reductions or GHG removals for this monitoring period for the included CPAs covered in this report	**CPA-1: 15,191 tCO_2 e** **CPA-2: 3,804 tCO_2 e** **Total: 18,995 tCO_2 e**	
Name and UNFCCC reference number of the DOE	EPIC Sustainability Services Private Limited (E-0062)	
Name, position and signature of the approver of the verification and	Mr. Krishnachar Sudheendra	

certification report	 (Head - Operations)

SECTION A. Executive summary

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EPIC Sustainability Services Private Limited (EPIC) has been contracted by Alternative Energy Promotion Centre (AEPC) to undertake the initial periodic independent verification of the registered CDM programme of activity titled "PoA for Promotion of the Improved Water Mills (IWM) in Nepal" (UNFCCC reference number: 9889). The objectives of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 09/09/2015 to 31/12/2017 (first and last day included); and to verify that the data reported are complete and transparent.

This report summarizes the findings of the verification of the project, performed on the basis of UNFCCC criteria for CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to the Kyoto Protocol, the CDM rules and modalities as agreed in the Bonn Agreement, the Marrakech Accords and the CDM Executive Board's decisions.

The verification team has, based on the recommendations in the Validation and Verification Standard for Programme of activities, Version 2.0/4/, employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generations of CERs. The verification is not meant to provide any consulting towards the client. However, stated request for clarifications and/or corrective actions may provide input for improvement of the project design.

The scope of the verification is the independent and objective review and ex-post determination of the monitored reductions in GHG emission by the project activity. The verification is based on the registered project design document (PoA-DD)/1/ version 8.0 dated 03rd August 2015 and validated and approved project design document (PoA-DD)/1/ version 10.0 dated 22nd April 2019, corresponding validation reports/2/, registered CPA-DD's (CPA 1 to CPA 2)/2/, validated and approved CPA-DD's (CPA 1 version 10.0, dated 22nd April 2019 and CPA 2, version 4.0, dated 22nd April 2019), corresponding validation reports. These documents were reviewed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

The PoA involves the Promotion of the Improved Water Mills (IWM) in Nepal. The main objective of the IWM Project of AEPC 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 increase 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) SSC-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 takeoff 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 day time 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

With financial assistance from Government of Nepal (GoN) and donor agencies, Regional Service Centres (RSCs) are assisting AEPC as a service centre to implement the IWM Programme AEPC is a public entity that executes all renewable/alternative energy programmes in Nepal including this POA.

The verification team determines the conformity of the actual project activity and its operation with the registered and approved PoA-DD and CPA-DDs/1/. The verification team has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM programme of activity are in place, and that the project participants have operated the CDM project activity as per the PoA-DD/1/ and the CPA-DD/1/. Thus the verification team has concluded that the project activity was implemented and operated as per PoA-DD/1/, and that all physical features of the project are in place and comply with para 340 to 342 of VVS-PoA/4/.

The start date of this monitoring period is 09/09/2015 which is in line with the UNFCCC project webpage/1/ considering that this is the initial monitoring period.

The monitoring report/17/ for this monitoring period is in compliance with the monitoring plan of the PoA-DD/1/ and the CPA-DDs/1/. However, for this MR period temporary deviation is observed with respect to carrying out of annual ex-post survey monitoring for CPA 01, and this is reported as Post Registration Changes with respect to temporary deviation from registered monitoring plan without requiring prior approval, and it is assessed as per para 228 (b) of PS PoA Ver 2.0 and a PRC report is submitted along with this issuance request. Also permanent changes to the registered monitoring plan in the PoA-DD, CPA01 and 02, with respect to sampling approach was observed and was reported as Post Registration Changes and it was approved on 10th June 2019. The project activity was registered by applying the small scale methodology/3/ AMS.I.B version 12.0 and the verification was carried out in accordance with the applied methodology. It was confirmed during the site visit that the project activity during the current periodic verification is in accordance with the applicability criteria of the methodology.

It is the responsibility of EPIC to express an independent GHG verification opinion on the GHG emissions reductions and on the calculation of GHG emission reductions from the project for this monitoring period based on the reported emission reduction in the monitoring Report.

EPIC's verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive board. EPIC's approach was risk-based, drawing on an understanding of the risks associated with reported GHG emissions data and the controls in place to mitigate these. The examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for this monitoring period.

The verification team has planned and performed the work to obtain the information and explanations that is considered necessary to provide sufficient evidence for it to give reasonable assurance that the amount of calculated GHG emission reductions for this monitoring period were fairly stated.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team members

No.	Role	⊢ ≻	Last name	First name	Affiliation	Involvement in

					(e.g. name of central or other office of DOE or outsourced entity)	Desk/document review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader	IR	Anbazhagan	Prabu Das	EPIC, Central office, Bangalore	√	√	√	√
2.	Host Country Expert	ER	Narendra	Ghimire	EPIC, Central office, Bangalore	√	√	√	√

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	G	Vishnu	EPIC, Central office, Bangalore
2.	Technical Expert assisting TR also Approver-Head Operations	IR	Krishnachar	Sudheendra	EPIC, Central office, Bangalore

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.	Errors in manual transfer of records.	Low	Likely human error during transfer of data to ER spread sheets and MR	Complete review of data transfer to the ER spreadsheet and in the MR.
2.	Wrong data collection / misinterpretation of IWM installation	Low	Monitoring process is not complicated. Pre- requisite trainings are conducted for the monitoring personnel.	By means of site visit check of actual situation to sample number of IWMs.

C.2. Consideration of materiality in conducting the verification

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In line with Guidelines for Application of materiality in verification, a reasonable level of assurance is defined for the verification of the project by complete verification of all the values indicated in the emission reduction spreadsheet and the referred documents, at the document review stage and onsite visit. There are no material errors, omissions or misstatements, except for the one observation as explained below.

Parameter	Verification approach	Error identified	Correction	Extrapolated error for population size (Qty and %)
$OH_{i,y}$ Operating hours of IWM for mechanical power generation	Acceptance sampling	No error identified	NA	No Impact

$Q_{OP,I}$ Number (quantity) of IWMs of type i operating under the project activity	Acceptance sampling	One IWM which was registered as long shaft is now operating in short shaft mode due to damage in earthquake	Updated in the database and ER is now correctly calculated for short shaft mode of operation	Not required to be extrapolated, since it was not wrong capture of information (type) in the database, but damage caused due to the earthquake, during the MR period, resulted in change in operation type.
$Q_{T,I}$ Number (quantity) of IWMs of type i installed under the project activity	Complete data check	One IWM which was registered as long shaft is now operating in short shaft mode due to damage in earthquake	Since it was clarified by the IWM owner that the change in operation was temporary in nature, and that it would be set right in future, a FAR is raised to verify the operational type in the next verification	

The identified/selected materiality threshold for the PoA under current monitoring period is 5% as PoA is small scale in accordance with para 308 of CDM VVS for PoA, Version 2.0.

SECTION D. Means of verification

D.1. Desk/document review

>> The verification was performed primarily based on the review of the monitoring report, validated and approved PoA-DD, CPA-DDs, its corresponding validation reports and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, and the QA/QC procedures, and an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of emission reduction.

The monitoring report version 01/17/ (hereinafter referred to as initial MR) submitted by the project participant and additional background documents related to the emission reductions are reviewed as an initial step of the verification process. The subsequent step involved the identification of corrective action requests and clarification requests (CAR and CL) which are presented in Appendix 4 of this report. As a result of these findings, the MR is revised to MR version 04.0/17/. A complete list of all documents and records reviewed is as attached in Appendix 3 of this report.

D.2. On-site inspection

Duration of on-site inspection: 03/09/2018 to 13/09/2018				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	The verification team conducted visits to the project site to confirm the information and to resolve issues identified in the document review. An on-site assessment was conducted as a part of verification activity and involved: 1. an assessment of the implementation and operation of the CDM programme of activity as per the PoA-DD and the CPA-DD's[1] 2. a review of information flows for generating, aggregating and reporting of the monitoring parameters 3. interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the Monitoring Plan 4. a cross-check between information provided in the MR and data from other sources 5. a check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the PoA-DD and the applied methodology 6. a review of calculations and assumptions made in determining the GHG data and ERs, and 7. an identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters	IWMs in following districts (Solukhumbu, Sindhuli, Gorkha, Dailekh, Kalikot, Okhaldhunga, Kaski, Salyan, Jajarkot, Makwanpur, Baitadi, Achham, Jumla, Bajura, Dolakha, Rasuwa) of Nepal	03/09/2018 to 13/09/2018	Mr A Prabu das Mr Narendra Ghimire

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	**First name**	**Affiliation**			
1.	Nawa Raj	Dhakal	Acting Executive Director, AEPC	03/09/2018	Performance of project activity - Project Implementation	Mr A Prabu das Mr Narendra Ghimire
2.	Rana	Thapa	AEPC	03/09/2018	Performance of project activity - Project Implementation, correctness of data captured in the PCC (Project Completion Certificate) Monitoring, Data management and reporting, QA/QC – Subsidy check list, interactions with RSCs and IWM owners	

3.	Pokhrel	Prem Kumar	Climate and Carbon Expert, AEPC	03/09/2018	MR, CER sheets, Sampling, Internal quality Documentation, Record keeping, Customer complaints	
4.	Rassu	Manandhar	Programme, Officer, AEPC	04/09/2018 to 13/09/2018	Status of IWM operation and its type, operating hours etc	
5.	Amit	Khadka	User survey team	03/09/2018	Modalities of user survey carried out, training to enumerators etc	
5.	IWM owners (33 nos)	Sampled and non-sampled IWMs	IWM owners	04/09/2018 to 13/09/2018	Status of IWM operation and its type, operating hours, operation and maintenance, and availability of trained personnel, down times, (if any), reasons for non-usage, water availability, spares availability etc	

D.4. Sampling approach

>> The PP had adopted stratified random sampling approach as detailed in the revised and approved PoA-DD/CPA-DD's for this monitoring period. PP has adopted stratified random sampling approach with 90% confidence level and 10% margin of error. As required in the PoA-DD/CPA-DD's, for CPA1 the PP has conducted the annual survey and the data from the survey conducted for the years 2016 and 2017 has been adopted for emission reduction calculations for this monitoring period and for CPA 2 the survey was conducted for the year 2017 as the Crediting period for CPA 2 starts from 01 Feb 2017. The verification team checked the calculations done to calculate the minimum sample size and confirms that the calculations are in order.

This is the first verification for both the CPA 1 and CPA 2. Even though the sample size calculated for each of the CPAs for the two ex-post parameters (a. Number of IWMs of type 'I' operating under the project activity, b. Operating hours of IWM for mechanical power generation) is in the range of 16 to 30, the PP to be conservative and to be more representative has considered a sample size of 45 (accounting for non responses also) for each CPA, for the verification period. Since the PP has adopted a sampling approach, the verification team had adopted an acceptance sampling approach to verify the data. The verification team considered an Acceptable Quality Level of 0.5% and Unacceptable quality level of 15% and verified that data for 30 samples required for the acceptable and unacceptable quality level as per table 1 (page 109) of the Guideline for Sampling and Surveys for CDM project activities and programmes of activities version 04.0[/6/]. As per this the acceptance number is 1 and the verification team found PPs survey records to be acceptable within the limits required. In view of this the verification team accepts the sampling done by the PP for the CPA and confirms that the same is complying with the EB guidance on sampling.

Based on the analysis of the CDM monitoring report[/17/], ER sheet[/18/] and user Survey reports[/5/], and by careful examination of the data provided in it, the verification team took the district level representative samples of the PP for the purpose of acceptance sampling. In all the districts, the Verification team has randomly picked the sampled IWMs by the PP as well as few non-sampled IWMs for the verification. In total 33 IWMs were visited during verification site visit.

The DOE has accepted the results as presented in the monitoring survey reports[/5/], and recorded in the monitoring report with a reasonable level of confidence.

Sample size calculation for the Proportional Parameter (Number of IWMs operating)

$$n \geq \frac{1.645^2 NV}{(N-1)\times 0.1^2 + 1.645^2 V}$$

n	Sample size
N	Total number of IWM users (For CPA-1: 2199; For CPA-2: 1138)
	$V = \frac{SD^2}{\bar{p}^2} = \frac{\text{overall variance}}{\bar{p}^2}$ and $\bar{p}$ is the overall proportion.
Confidence	The level of confidence (for this case 1.645 for 90% as per Guideline for Sampling and Surveys).
precision	Required precision (for this case 10% = 0.1 as per Guideline for Sampling and Surveys).

$$V = \frac{SD^2}{\bar{p}^2} = \frac{\text{overall variance}}{\bar{p}^2} \text{ and } \bar{p} \text{ is the overall proportion.}$$

The maximum sample size calculated for each of the CPAs adopting the above formula for CPA-1 and CPA-2 is 29.67 and 29.32 respectively which is rounded off to 30. However, the PP has considered a sample size of 45 for the survey of each CPA.

Sample Size for the Mean Value Parameter (Daily Operation Hours of IWM for mechanical power generation)

$$n \geq \frac{1.645^2\, NV}{(N-1)\times 0.1^2 + 1.645^2\, V}$$

n	sample size
V	(SD/Mean)
N	Total number of IWM users (For CPA-1: 2199; For CPA-2: 1138)
SD	Overall standard deviation = 2.25 hrs
Mean	Overall mean operational hours for agro processing = 9.52 hrs
Confidence	the level of confidence (for this case 1.645 for 90% as per Guideline for Sampling and Surveys).
precision	Required precision (for this case 10% = 0.1 as per Guideline for Sampling and Surveys).

The max sample size calculated for each of the CPAs adopting the above formula for CPA-1 and CPA-2 is 15.02 and 14.93 respectively which is rounded off to 16. However, the PP has considered a sample size of 45 for the survey of each CPA.

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	-	01	-
Remaining forward action requests from validation and/or previous verification	-	-	-
CPA(s) 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	01	02	-
Post-registration changes			
• Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline	-	-	-
• Corrections	-	-	-
• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools	-	-	-
• Changes to the programme design or project design	-	-	-
• 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	-	04	01
Post-registration changes			
• Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline	01	-	-
• Corrections	-	-	-
• Changes to the start date of the crediting period of component project activities	-	-	-
• Inclusion of a monitoring plan	-	-	-
• Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or other applied standards or tools	-	-	-
• Changes to the programme design of project design	-	-	-
• Changes specific to afforestation and reforestation component project activities	-	-	-
Compliance of the registered monitoring plan with the methodology including applicable tool(s) and standardized baseline	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	01	-
• Data and parameters fixed ex ante or at renewal of crediting period	-	-	-
• Data and parameters monitored	02	01	-
• Implementation of sampling plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	01	-	-
• 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	**05**	**09**	**01**

SECTION E. Verification findings

E.1. General

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

Means of verification	As per VVS version 2.0[/4/], the verification team has determined whether the monitoring report was completed using the valid version of the applicable monitoring report form. The verification team has checked whether all the sections of the monitoring report follows the guidelines provided in the template itself.
Findings	One CAR (CAR 09) is raised in this section.
Conclusion	PP has used the version 3.0 of the MR template[/17/] which is current and active one. The monitoring report has been prepared as per the instructions provided in the template. EPIC has made the version 01.0 of the monitoring report[/17/] covering the monitoring period from 09/09/2015 to 31/12/2017; publicly available on 06th June 2018 through its dedicated interface on the UNFCCC CDM website[/1/] before undertaking the site visit for the verification. The verification team has concluded that the monitoring report was completed using the valid version of the applicable monitoring report form and is followed the guidelines given in the template itself.

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

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This is the first verification and the verification team has reviewed the validation report and observed that there is no open issue i.e FARs was found from the validation. The verification team has raised a Forward Action Request (FAR) during this verification process.

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, CPA 1 (9889-0001)	Yes	09 Sep 2015	10.0	N (this is the first monitoring period)
PoA for Promotion of the Improved Water Mills (IWM) in Nepal, CPA 2 (9889-0002)	Yes	01 Feb 2017	10.0	N (this is the first monitoring period)

E.2. Programme of activities

E.2.1. Compliance of the programme implementation with the registered programme design document

<table>
<tr><td>Means of verification</td><td>As per VVS version 2.0[/4/], the verification team determined the conformity of the actual project activity and its operation with the registered project design document. The verification team has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the PoA-DD and CPA-DDs[/1/] are in place, and that the project participants have operated the CDM project activity as per the PDD[/1/].</td></tr>
<tr><td>Findings</td><td>One CL (CL01) is raised in this section.</td></tr>
<tr><td>Conclusion</td><td>The verification team determines the conformity of the actual project activity and its operation with the approved project design document. The verification team has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the PoA-DD and CPA-DDs[/1/] are in place, and that the project participants have operated the CDM project activity as per the PoA-DD and CPA-DDs[/1/].

Project location:-
<table>
<tr><td>Host Country</td><td>Nepal</td></tr>
<tr><td>Region:</td><td>Various locations across Nepal</td></tr>
<tr><td>Project location address:</td><td>Nepal</td></tr>
<tr><td>Latitude:</td><td>North 26.20 degree to North 30.45 degree</td></tr>
<tr><td>Longitude:</td><td>East 80.07 degree to East 88.20 degree</td></tr>
</table>
Technical details of IWMs:-
The IWMs included in these CPAs are the improved version of traditional water mills that transform the potential energy of water into mechanical energy. That mechanical energy can be used for the agro-processing in rural areas. The CPAs have the IWMs installed with long shaft and short shaft. The summery of the technical description of the IWMs is given below:-
<table>
<tr><th>Component & description</th><th>Material</th><th>Dimension</th></tr>
<tr><td>1. Fali – a device used to hold shaft through key to the upper grinding stone of Short Shaft IWM</td><td>Mild steel</td><td>L150 x W60 x D20 fabricated out of 20 x 20 section rods welded together;
Central rectangular hole size L38 x W20</td></tr>
<tr><td>2. Short Shaft – a device used to hold runner and transmit power to grinder at the top.</td><td>Mild steel</td><td>Dia. 38 x L1220 shaft; Key shape at top to tightly fit into the hole in Fali 38 x 20; 2 nos. Dia. 13.5 holes at right angle to hold runner hub; 1 no. Dia 20.5 hole from bottom to insert Takkar pin, with a lateral hole of Dia 10.5 for guide pin to fix the Takkar pin</td></tr>
<tr><td>3. Long Shaft – a device used to hold runner and transmit power to driver pulley at the top</td><td>Mild steel</td><td>Dia. 50 x L1800 shaft; 2 nos. Dia. 13.5 holes at right angle to hold runner hub; 1 no. Dia 20.5 tapered hole from bottom to insert Takkar pin, with a lateral hole of Dia 10.5 for guide pin to fix the Takkar pin</td></tr>
<tr><td>4. Runner (Nepal Yantra Shala Model)</td><td>Mild steel</td><td>Outer Dia. 600 runner; Dia. 240 bucket Dia. 115 x L165 x 4mm thick for runner</td></tr>
</table>
</td></tr>
</table>

	– a device with 14 buckets to convert hydraulic power to mechanical power		hub, 6mm thick side plate; Dia. 55 x L48 x 8mm thick for SS shaft hub; Dia. 68 x L48 x 8mm thick for LS shaft hub Dia. 10 rod for runner to hub connection; Thickness 3 x 20 strip for runner outer re-inforcing strip 2.5 sheet for bucket
	5. Runner (Bhagawati Metal Model) – a device with 17 buckets to convert hydraulic power to mechanical power	Mild steel	Outer dia. 702 runner Dia. 250 bucket Dia. 270 x L165 x 4mm thick for runner hub, 6mm thick side plate Dia. 55 x L48 x 8mm thick for SS shaft hub Dia. 68 x L48 x 8mm thick for LS shaft hub Dia. 10 rod for runner to hub connection Thickness 3 x 20 strip for runner outer re-inforcing strip 2.5 sheet for bucket
	6. Runner (Banepa Model) – a device with 15 buckets to convert hydraulic power to mechanical power	Mild steel	Outer dia. 686 runner Dia. 267 bucket Dia. 152 x L165 x 4mm thick for runner hub, 6mm thick side plate Dia. 55 x L48 x 8mm thick for SS shaft hub Dia. 68 x L48 x 8mm thick for LS shaft hub Dia. 10 rod for runner to hub connection Thickness 3 x 20 strip for runner outer re-inforcing strip 2.5 sheet for bucket
	7. Takkar (Pivot Model)-kind of bottom bearing of IWM in the form of a pivot rotating on a Chakati		<u>SS IWM Takkar:</u> Tapering out from top (Dia. 19) to bottom (Dia. 21) Bottom pin L20 x Dia. 23 co-axial with upper part <u>LS IWM Takkar:</u> Tapering out from top (Dia. 25) to bottom (Dia. 28) in LS IWM Takkar Bottom pin L28 x Dia. 28 co-axial with upper part Both type Takkar to be hardened by heating up to 500 deg cel and cooling in oil bath
	8. Chakati (Pivot Model) – kind of bottom bearing fixed base plate of IWM in the form of a Chakati on which pivot rotates		L130 x W40 x 5 thickness bottom plate with holes to screw it to wooden frame of the IWM structure L40 x W 40 x 10 thickness top plate concentric with the bottom plate, with middle conical hole for Takkar to rest & rotate Chakati to be hardened by heating up to 500 deg cel and cooking in a oil bath
	7. Takkar (Ball Model) – kind of bottom bearing of IWM in the form of a ball rotating on a Chakati		Tapering out from top (Dia. 18.6) to bottom (Dia. 21), welded to a forged hard metal plate 10 thickness with socket at bottom for metal ball of Dia. 16 Takkar to be hardened by heating up to 500 deg cel and cooling in oil bath
	8. Chakati (Ball Model) – kind of bottom bearing fixed		L130 x W40 x 5 thickness bottom plate with holes to screw it to wooden frame of the IWM structure

base plate of IWM in the form of a Chakati on which Takkar rotates with a Ball in between		L40 x W 40 x 10 thickness top plate concentric with the bottom plate, with spherical depression of 4mm depth at the center for holding the Ball on which Takkar rests & rotates Chakati to be hardened by heating up to 500 deg cel and cooking in oil bath

Each IWM included in the CPA have a unique identification numbers (AEPC-IWM-XXX-XXXX). These unique identification numbers will prevent double counting of IWM in the PoA as well as in other IWM projects.

In the registered and approved PoA-DD, the capacity of the short shaft and long shaft IWM is determined as 1.39kW and 2.83kW respectively, as a minimum to be included in the PoA (as per eligibility criteria no: 06 for inclusion in CPA) this determination is based on the capacity Determination Report, prepared by third party (Energy development services pvt ltd). Additionally, the IWMs included in the programme has to comply the technical specifications specified by AEPC (CME) for the level and types of services, whose information is also detailed in the PoA-DD. There is set of standards for the technologies and equipment for project IWM, and these standard ensure the capacity of the IWMs. Only those IWMs that meet the given standards qualify for the subsidy programme under Government of Nepal, and the subsidy is only released after the installation and quality check of IWM ensuring that the installed system meets the given standards. It is observed that only these qualified IWMs are included into the PoA. The IWMs are relatively small, considering that the IWMs are used only for mechanical power and that it has no provision of any metering equipment, the determination of the installed capacity of IWMs by relating it to meeting the requirement of the pre-defined standards is found acceptable by the validation team.
The IWMs technical specification including the capacity and unique identity is confirmed through the document review of project completion certificates (PCC) and subsidy checklist, physical inspections of the installed IWMs, interview with the IWM owners, the technology suppliers and AEPC team which is responsible for subsidy release to the qualified IWMs. Further, the owners name, type of the IWM (long or short shaft), installation date and its operational status, operating hours, purpose of usage and water availability were verified through interview and visual observation. This information is also verified to be in line with the user survey report[/5/].

Detail of CPAs implemented under the PoA covered in this MR period:-

Ref[/1/]	**CPA title**	**Number of IWMs**[/19/]
9889-0001	PoA for Promotion of the Improved Water Mills (IWM) in Nepal, CPA 1	Short shaft - 2039 Long shaft - 160
9889-0002	PoA for Promotion of the Improved Water Mills (IWM) in Nepal, CPA 2	Short shaft - 1092[1] Long shaft – 46[1]
Total		**3,337**

Contract signed between IWM owners and AEPC (as national service

[1] However, for calculation of CERs for this MR period one implemented long shaft IWM (AEPC/IWM/002/1010 – Name: Krishna Prasad Pakuwal) was verified to be operating in short shaft mode due to impact by earthquake. So in CER calculation, the total no of long shaft IWM is decreased by one (i.e 45) and total no of short shaft IWM is increased by one (i.e 1093)

	provider for installation of IWMs across Nepal), database[19] maintained by AEPC (individuals information, installation date, IWM type information), PCC[10] were reviewed for the implementation of the IWMs. Thus the verification team has concluded that the project activity was implemented and operated as per PoA-DD and CPA-DDs, and that all physical features of the project are in place.

E.2.2. Implementation and operation of the management system

Means of verification	The verification team carried out onsite visits for the CPAs and interviewed key personnel and several households (sampled and non-sampled). Interviewees included the CME, project developer and the company who takes care of maintenance activity. It was established that the programme management system has been implemented and operated as described in the registered PoA-DD and CPA-DDs[1].
Findings	Two CARs (CAR 07, 08) and CL03 are raised in this section.
Conclusion	Based on document review, interview of management personnel, stakeholder interview, on-site verification, the verification team confirms the implementation and operation of the management system included in the registered PoA-DD and CPA-DDs[1].

E.2.3. Post-registration changes

E.2.3.1. Corrections

>> There are no corrections in this monitoring period.

E.2.3.2. Inclusion of a monitoring plan

>> Not applicable

E.2.3.3. Permanent changes to the registered monitoring plan or permanent deviation of monitoring from the applied methodology, standardized baseline or methodological regulatory documents

>> Clarity with respect to the sampling approach applicable to the project activity is assessed and reported as permanent changes to the registered monitoring plan and it was approved on 10th June 2019.

E.2.3.4. Changes to the programme design

Not applicable

E.2.3.5. Addition of CPA inclusion template

>> Not applicable

E.2.3.6. Change of coordination/managing entity

>> Not applicable

E.2.3.7. Changes specific to afforestation and reforestation activities

>> Not applicable, as the project does not involve afforestation and reforestation activity

E.3. Component project activities

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

Means of verification	As per VVS version 2.0[/4/], the verification team determined the conformity of the actual project activity and its operation with the registered project design document. The verification team has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the PoA-DD and CPA-DDs[/1/] are in place, and that the project participants have operated the CDM project activity as per the PoA-DD[/1/].
Findings	CARs (CAR 01, 02, 03, 04, 06) are raised in this section.
Conclusion	The verification team determines the conformity of the actual project activity and its operation with the approved PoA-DD and CPA-DDs[/1/]. CPA-1 to CPA-2 were also confirmed to be fully operational in accordance with the registered CPA-DDs. The verification team has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the PoA-DD and CPA-DDs[/1/] are in place, and that the project participants have operated the CDM project activity as per the PoA-DD and CPA-DDs[/1/]. The number of IWMs installed under CPA01 are 2199 comprising of both small shaft and long shaft IWMs, and were installed between 09 October 2011 to 13 March 2014. Since they are installed before the start date of the current MR period entire IWMs in CPA01 are considered for ER computation. For CPA 02, only 1138 IWMs are installed between 14 March 2014 and 17 October 2015, and the CPA02 was included in the PoA on 01 Feb 2017, so 1138 IWMs of CPA02 starting from 01 Feb 2017 is considered in the MR period for ER computation. Since the implementation modality of IWMs by AEPC is demand driven approach, the installation of the IWM is a continuous process rather than the phase wise installation. Once the IWMs are implemented and subsidy delivered, it is added to the database and included in the CPA by the CME (AEPC). The inclusion of IWMs in the CPA is continued until the ceiling of the particular CPA is fulfilled, for CPA02 the ceiling is determined as 2200.

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

>> Temporary deviation with respect to conduct of annual survey for the year 2015 is applicable for this MR period, for CPA1 alone. Please refer to Validation report[/22/] on Post Registration Changes, Ver 2.2 dated 20/06/2019, submitted along with this issuance, for assessment of Temporary deviation of the registered monitoring plan.

E.3.2.2. Corrections

>> Not applicable

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

>>The start date of the crediting period of both the CPAs 1 and 2 were changed to their respective CPA inclusion date and this information is verified to be inline with the project webpage of the CPAs. CPA inclusion date and C.P start date for CPA2 is 01 Feb 2017 and for CPA1 the inclusion date and C.P start date is 09 Sep 2015, the request to change the start date of the C.P was made to CDM-EB directly by CME through e-mail dated 18th May 2018.

E.3.2.4. Inclusion of a monitoring plan

>> Not applicable

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

>> Clarity with respect to the sampling approach applicable to the component project activity is assessed and reported, as permanent changes to the registered monitoring plan and it was approved on 10th June 2019.

E.3.2.6. Changes to the project design

>> Not applicable

E.3.2.7. Changes specific to afforestation and reforestation activities

>> Not applicable, as the project does not involve afforestation and reforestation activity

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

Means of verification	As per VVS version 2.0/4/, the verification team determined whether the registered monitoring plan is in accordance with the applied methodologies/3/ including applicable tools.
Findings	There is no CAR/CL raised in this section.
Conclusion	The verification team was able to confirm that the monitoring plan contained in the validated PoA-DD is in accordance with the approved methodology applied by the project activity, i.e. AMS.I.B version 12.0/3/ and its applicable tools. The monitoring report for this monitoring period is in compliance with the monitoring plan of the CPA-DD/1/. The project activity was registered by applying the small scale methodology AMS.I.B version 12.0/3/ and the verification was carried out in accordance with the applied methodology. It was confirmed during the site visit that the project activity during the current periodic verification is in accordance with the applicability criteria of the methodology

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	As per VVS version 2.0/4/, the verification team has determined whether all ex-ante parameters used for emission reduction calculation stated in the monitoring report are used appropriately as per the PoA-DD and CPA-DD/1/.
Findings	There is no CAR/CL raised in this section.
Conclusion	The following data and parameters fixed ex ante were checked by the verification team to be in line with registered CPA-DD (for CPA-1 and CPA-2) /1/: • IC_{TWM} - Traditional Water Mill (TWM) installed capacity, kW • IC_{IWM} - Improved Water Mill (IWM) installed capacity • EF_{Diesel} - Emission Factor of diesel based power generators. For diesel based mills

E.3.4.2. Data and parameters monitored

Means of verification	As per VVS version 2.0/4/, the verification team has determined whether the

<table>
<tr><td></td><td>registered monitoring plan has been properly implemented and followed by the PP that the monitoring has been carried out in accordance with the registered monitoring plan.</td></tr>
<tr><td>Findings</td><td>Two CLs (CL 02 and 05) and a CAR (CAR 05) are raised in this section.</td></tr>
<tr><td>Conclusion</td><td>As per the registered monitoring plan, '$Q_{OP,i}$' Number (quantity) of IWMs of type i operating under the project activity, $OH_{i,y}$ - Operating hours of IWM for mechanical power generation and $Q_{T,i}$ - Number (quantity) of IWMs of type i installed under the project activity are the parameters that needs to be monitored.
This parameter is the weighted average calculated value across all ecological zones obtained from annual users survey. Survey procedures adopted in determining the monitored value is verified to be as per the applicable standards and relevant requirement. QA/QC procedures followed for the MR period is appropriate

$Q_{OP,i}$' Number (quantity) of IWMs of type 'I' operating under the project activity
CPA-1
<table>
<tr><th>CPA and its monitored value</th><th>Data source</th></tr>
<tr><td><u>For 2015</u>
Survey was not done, so conservatively the CERs are not claimed for this period</td><td>It is assessed as temporary deviation to registered monitoring plan and reported as PRC (pls refer to PRC report ver 2.2 dated 20/06/2019/22/ submitted along with this issuance)</td></tr>
<tr><td><u>For 2016</u>
Long Shaft: 100% (out of sampled IWM)
Short Shaft: 90.48% (out of sampled IWM)</td><td>User survey report 2016/5/</td></tr>
<tr><td><u>For 2017</u>
Long Shaft: 100% (out of sampled IWM)
Short Shaft: 90.48% (out of sampled IWM)</td><td>User survey Report 2017/5/</td></tr>
</table>
CPA-2
<table>
<tr><th>CPA and its monitored value</th><th>Data source</th></tr>
<tr><td><u>For 2017</u>
Long Shaft: 100% (out of sampled IWM)
Short Shaft: 83.72% (out of sampled IWM)</td><td>User survey Report 2017/5/</td></tr>
</table>
OHi,y - Operating hours of IWM for mechanical power generation
CPA-1
<table>
<tr><th>CPA and its monitored value</th><th>Data source/9/</th></tr>
<tr><td><u>For 2015</u>
Survey was not done, so conservatively the CERs are not claimed for this period</td><td>It is assessed as temporary deviation to registered monitoring plan and reported as PRC (pls refer to PRC report, ver 2.2 dated 20/06/2019/22/ submitted along with this issuance)</td></tr>
<tr><td><u>For 2016</u>
Long Shaft: 9.16 hours daily (192</td><td>User survey report 2016/5/</td></tr>
</table>
</td></tr>
</table>

operational days per year) Short Shaft: 10.78 hours daily (261 operational days per year)	
For 2017 Long Shaft: 12.7 hours daily (246.7 operational days per year) Short Shaft:11.5 hours daily (241 operational days per year)	User survey Report 2017/5/

CPA-2

CPA and its monitored value	Data source
For 2017 Long Shaft: 12 hours daily (287.5 operational days per year) Short Shaft: 12 hours daily (269.7 operational days per year)	User survey Report 2017/5/

Review of User Survey reports/5/ confirms that the values are correct, and it is further confirmed that the same values are applied in the ER spreadsheet/18/.

$Q_{T,i}$ - Number (quantity) of IWMs of type i installed under the project activity

CPA-1: Long Shaft: 160 Short Shaft: 2039	Testing and Commissioning report/database
CPA-2: Long Shaft: 45[2] Short Shaft: 1093[2]	

IWM with tag no AEPC/IWM/002/1010 (part of CPA2) which was initially registered as long-shaft is running in short-shaft mode due to the impact caused by earthquake, this change in mode of operation has got an impact on the ER calculation, so the CME has corrected the database as part of on-going continuous monitoring and also conservatively corrected the ER sheet for this MR period– (Since it was clarified during the site visit that the change in mode of operation is of temporary in nature and that it would be set right in due course, a FAR (FAR01) is raised to verify the operational type in the next verification.)

Review of PCC reports/10/ which also include the commissioning reports and the IWM subsidy checklist which is the means of cross check of the total IWMs installed in both the CPAs conforms that the value considered is correct and accepted.
Thus it is confirmed by the verification team that the QA/QC procedures as defined in the registered PoA-DD/CPA-DD/1/ are compiled for this monitoring period.

[2] However, for calculation of CERs for this MR period one implemented long shaft IWM (AEPC/IWM/002/1010 – Name: Krishna Prasad Pakuwal) was verified to be operating in short shaft mode due to impact by earthquake. so in CER calculation, the total no of long shaft IWM is decreased by one (i.e 45) and total no of short shaft IWM is increased by one (i.e 1093)

E.3.4.3. Implementation of sampling plan

Means of verification	As per para 320 of VVS version 2.0[/4/], the verification team assessed whether the compliance of the sampling efforts and surveys with the registered sampling plan is in accordance with the "Guideline for sampling and surveys for CDM project activities and programme of activities"[/6/] version 4.0, if the PP had applied a sampling approach to determine data and parameters monitored.
Findings	No CAR/CL is raised in this section.
Conclusion	As discussed in above sec E.3.4.2 the two parameters 1) '$Q_{OP,i}$' Number (quantity) of IWMs of type i operating under the project activity and 2) $OH_{i,y}$ - Operating hours of IWM for mechanical power generation are determined through surveys. Ex-post Monitored parameters through survey mainly includes identification of non-operational IWMs as per type and operating hours of individual IWMs as per type. The users survey is carried out annually for each CPA, for the current MR period the survey is carried out for all the two CPAs (01 to 02). Survey for CPA 1 is not carried out for the year 2015, so it is reported as temporary deviation from the registered monitoring plan (refer PRC report for CPA01, ver 2.2 dated 20/06/2019[/22/] submitted along with this issuance)

CPA	No of IWMs	Survey period	Total no of samples
CPA-1	2199	2016	45
CPA-1	2199	2017	45
CPA-2	1138	2017	45

Sample size was determined using stratified random sampling (the strata being the type of the IWMs i.e long shaft and short shaft) in consistent with the monitoring plan of the validated and approved PoA-DD, respective CPA-DDs (01 to 02), and the Guidelines for sampling and surveys for CDM project activities and programme of activities[/20/].

Reliability and precision calculation:

The verification team has verified the sample size calculation spreadsheets with the monitored data, where the actual achieved precision is calculated against the guidelines outlined under "Standard for sampling and surveys for CDM project activities and programme of activities", version 7.0, and confirm that the calculation of achieved reliability was done correctly. The verification team confirmed from the sample size calculation spreadsheet that the required precision was kept 10% during sample size calculation.

Parameters	Precision achieved[/26/]			Is required precision achieved? (<10%)
	In 2016	In 2017		
	CPA-1 (%)	CPA-1 (%)	CPA-2 (%)	
Operational Status, ($Q_{OP,i}$)	7.50	7.50	9.75	Yes
Operational hours per day, ($OH_{i,y}$)	5.06	5.25	5.02	Yes
Operational hours per year, ($OH_{i,y}$)	6.68	4.71	4.44	Yes

From the above table, it is conformed that sampling was performed within the desired level of precision of 10% and a confidence level of 90%, for all the

monitored parameters, and therefore the survey results were directly used in the ER calculations.

The verification team has reviewed the sampling approach through onsite visit interview and by the review of the methodology followed by the surveying entity (Sustainable Energy and Technology Management P. Ltd. (SETM) for CPA 1 for the period 2016 and Universal Consultancy Service Pvt. Ltd. for CPA 1 for the period 2017 and for CPA 2 for the period 2017). The sampling method adopted in all the individual surveys of the 2 CPA's is verified to be in compliance with the guideline.

Samples are allocated proportionally to the type of IWMs (i.e. short shaft and long shaft) based on proportion of IWMs installed in these two strata randomly.

Sample allocation for survey

CPAs	Number of IWMs			Sample calculated			Sample adjusted		
	SS	LS	Total	SS	LS	Total	SS	LS	Total
2016									
CPA-1	160	2039	2199	2	28	30	3	42	45
2017									
CPA-1	160	2039	2199	2	28	30	3	42	45
CPA-2	46	1092	1138	1	29	30	2	43	45

*SS – Short Shaft, LS – Long Shaft

The verification team has reviewed the correctness of the samples in the users survey report[/5/] prepared by the independent agency i.e Sustainable Energy and Technology Management Pvt Ltd. and Universal Consultancy Service Pvt. Ltd. for the CPA's for the current MR period. It is confirmed that the survey has been carried out as per EB Guidelines for sampling and surveys for CDM project activities and programme of activities[/20/]. The training to the enumerators, questionnaire[/6/] used in the survey were verified by the verification team.

It is observed that, all the IWMs installed are registered under the AEPC database and their operational performance is monitored through field surveys of a random sample of the installed IWMs. The operating hours of the IWM are captured through the surveyed data. The number of IWMs in operations is determined in terms of %, it is calculated by identifying the no of IWMs that are operational against the no of IWMs that are installed for each type in the CPAs. This approach is verified to be as per the validated PoA-DD and CPA-DD's[/1/].

E.3.4.4.

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

Means of verification	Not applicable as there is no monitoring equipment involved as per the registered monitoring plan in the PoA-DD and CPA-DD[/1/]
Findings	Not applicable
Conclusion	The project activity does not involve any monitoring instruments that require calibration, hence no further assessment is done.

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	As per VVS version 2.0[/4/], the verification team assessed whether the data and calculations of baseline emission resulting from the PoA-DD and CPA-DD[/1/] is correct. The verification team has checked whether calculations of

	baseline GHG emissions have been carried out in accordance with the formulae and methods described in the PoA-DD and CPA-DD[/1/].
Findings	No CAR/CL is raised in this section.
Conclusion	According to paragraph 16(a) of approved methodology AMS.I.B (Version 12), the baseline emissions (BE_y) are calculated using either of the two approaches below: i. 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" ii. 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 CO_2 per kg of diesel fuel. For the purpose of calculation of the emission displacement, option (i) has been chosen by the project, this is as per the validated PoA-DD/CPA-DD[/1/]. 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: $IC_{add} = IC_{IWM} - IC_{TWM}$ Where, IC_{IWM} - IWM installed capacity, kW (for long shaft: 2.8 kW and for short shaft: 1.39 kW) IC_{TWM} - TWM installed capacity, kW (0.35 kW) IC_{add} – Additional Installed Capacity, kW As per option (i) para 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. $ER_y = \sum_{i=1}^{n} \frac{Q_{OP,i} * IC_{add,i} * OH_i * EF_{Diesel}}{1000}$ Where, $Q_{OP,i} = Q_{T,i} - Q_{NW,i}$ ER_y :Emission Reductions in year y (tCO2e) $Q_{OP,i}$: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. i :Counter for equipment type n : 2 (for long shaft and short shaft) $Q_{T,i}$ Number (quantity) of IWMs of type i installed under the project activity (units). $Q_{NW,i,y}$ Number (quantity) of IWMs of type I not working under the project activity (units). $OH_{i,y}$ Operating hours of IWM for mechanical power generation

	EF_{Diesel} 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 CO_2/kWh) All the ex-post parameters are determined through survey, except the total number of IWM installed. The assessment of the survey is already discussed in the above sections, therefore substituting those values in the equation the baselines emission are as below: Total emission reduction for CPA-1 for the monitoring period: 15,191 tCO_2e (Survey for CPA 1 is not carried out for the year 2015, so baseline emission is conservatively considered as zero for the year 2015 – this approach is reported as temporary deviation from the approved monitoring plan (refer PRC report for CPA01, ver 2.2 dated 20/06/2019/22/ submitted along with this issuance)) Total emission reduction for CPA-2 for the monitoring period: 3,804 tCO_2e Calculations, applied formulae and method for calculation of baseline emission are in accordance with the registered monitoring plan and are in line with the requirements of the applied methodology. Further, the assessment of data and the calculation of baseline emission reduction in the MR/17/ and the CER excel sheet/18/ have been verified as per the set of supporting documents listed in Appendix 3. Hence, the verification team confirms that the baseline emissions for the current monitoring period calculated as 18,995 tCO2 is in order

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

Means of verification	As per VVS version 2.0/4/, the verification team assessed whether the data and calculations of project emission resulting from the PoA-DD and CPA-DD is correct. The verification team has checked whether calculations of project GHG emissions have been carried out in accordance with the formulae and methods described in the PoA-DD and CPA-DD.
Findings	There is no CAR/CL raised in this section.
Conclusion	Non consideration of project emission for the project activity is as per the monitoring plan of validated PoA-DD and CPA-DD

E.3.6.3. Calculation of leakage GHG emissions

Means of verification	As per VVS version 2.0/4/, the verification team assessed whether the data and calculations of leakage emission resulting from the PoA-DD and CPA-DD is correct. The verification team has checked whether calculations of leakage GHG emissions have been carried out in accordance with the formulae and methods described in the PoA-DD and CPA-DD.
Findings	There is no CAR/CL raised in this section.
Conclusion	Non consideration of leakage emission for the project activity is as per the monitoring plan of validated PoA-DD and CPA-DD

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

Means of verification	As per VVS/4/ version 2.0, the verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of GHG emission reduction have been carried out in accordance with the formulae and methods described in the registered monitoring plan.

Findings	There is no CAR/CL raised in this section.
Conclusion	The verification team analysed all factors and issues that constitute the basis for emission reductions from the project activity for the current monitoring period. The verification team checked the formulae and data used in the emission reduction calculations and confirms that the same are correct. No lack of evidence and missing data were detected during this monitoring period. The verification team confirms that all assumptions, emission factors and default values have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report. According to the registered PoA-DD and CPA-DDs/1/ and validated monitoring plan/1/ as explained in sec E.3.5.1 to E.3.5.3 above, no project and leakage emissions are associated with the project activity. Therefore, the net emission reductions ER = 18,995 tCO_2e/18/

Title and UNFCCC reference number of the CPA	Baseline emissions or baseline net GHG removals by sinks (tCO_2e)	Project emissions or actual net GHG removals by sinks (tCO_2e)	Leakage (tCO_2e)	GHG emission reductions or net GHG removals by sinks (tCO_2e)		
				Amount achieved before 1 January 2013	Amount achieved from 1 January 2013	Amount achieved in the entire monitoring period
9889-0001	15,191	0	0	0	15,191	15,191
9889-0002	3,804	0	0	0	3804	3,804
Total	**18,995**	**0**	**0**	**0**	**18,995**	**18,995**

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

Means of verification	The verification team has determined the CER achieved during this monitoring period with the estimated value and reason for increase if any.
Findings	There is no CAR/CL raised in this section
Conclusion	The verification team analysed the emission reductions reported during the subject monitoring period in comparison with the estimate in the registered CPA-DDs, and found that the ex-ante determined value is on the higher side in comparison to the actual realised value.

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)
9889-0001	15,191	25,517
9889-0002	3,804	10,315
Total	**18,995**	**35,832**

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

Means of verification	The verification team has determined the CER achieved during this monitoring period with the estimated value and reason for increase if any.

<table>
<tr><td>Findings</td><td>There is no CAR/CL raised in this section</td></tr>
<tr><td>Conclusion</td><td>The ex-ante determined value is on the higher side in comparison to the actual value, this variation is due to the lesser number of IWMs installed during the MR period as compared to the estimate, further emission reduction of CPA1 is considered to be zero for the year 2015.
<table>
<tr><td></td><td colspan="3">Expected IWMs as Per CPA-DD</td><td colspan="3">Actual IWMs for the MR period</td></tr>
<tr><td></td><td>Long shaft</td><td>Short shaft</td><td>Total</td><td>Long shaft</td><td>Short shaft</td><td>Total</td></tr>
<tr><td>CPA 1</td><td>440</td><td>1760</td><td>2200</td><td>160</td><td>2039</td><td>2199</td></tr>
<tr><td>CPA 2</td><td>450</td><td>1800</td><td>2250</td><td>45</td><td>1093</td><td>1138</td></tr>
</table>
Since the actual values are less than ex-ante values no further explanations is deemed necessary.</td></tr>
</table>

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

Means of verification	NA
Findings	NA
Conclusion	NA

E.3.8. Global stakeholder consultation

Means of verification	As per VVS version 2.0[/4/], the verification team assessed whether the GSCP comments are received for the first Monitoring report.
Findings	NA
Conclusion	Since this is the first MR of the PoA, the MR was webhosted for GSCP, and the commenting period was (06 June 2018 to 20 June 2018). No GSCP comments were received that required follow-up.

SECTION F. Internal quality control

>>

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

SECTION G. Verification opinion

>>

EPIC Sustainability Services Private Limited (EPIC) has been contracted by AEPC to undertake the initial independent verification of the registered CDM programme of activity titled "PoA for Promotion of the Improved Water Mills (IWM) in Nepal" (UNFCCC reference number: 9889). The objectives of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 09/09/2015 to 31/12/2017 (first and last day included); and to verify that the data reported are complete and transparent.

The verification team determines the conformity of the actual project activity and its operation with the registered project design document. EPIC has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the registered PoA-DD[/1/] and CPA-DDs[/1/] (CPA 01 to 02) are in place, and that the project participants have operated the CDM project activity as per the validated and approved PoA-DD and CPA-DDs[/1/].

Thus the verification team has concluded that the project activity was implemented and operated as per validated and approved PoA-DD and CPA-DDs[/1/], and that all physical features of the project are in place.

The verification team, based on the site visit and document review, was able to conclude that the project activity has been implemented as per the validated and approved PoA-DD and CPA-DDs[/1/]. The start date of this monitoring period is 09th Sep 2015 which is in line with the UNFCCC project webpage[/1/].

The monitoring report for this monitoring period is in compliance with the monitoring plan of the validated and approved PoA-DD and CPA-DDs[/1/]. The project activity was registered by applying the small scale methodology AMS I-B version 12.0[/22/] and the verification was carried out in accordance with the applied methodology. It was confirmed during the site visit that the project activity during the current periodic verification is in accordance with the applicability criteria of the methodology.

The management of project participants is responsible for the preparation and reporting of GHG emissions data, and the reported GHG emission reduction on the basis set out within the project monitoring plan. The development and maintenance of records and reporting procedures in accordance with the monitoring plan, including the calculation and determination of GHG emission reduction from the project is the responsibility of the management of the project. It is the responsibility of EPIC to express an independent GHG verification opinion on the GHG emissions reductions and on the calculation of GHG emission reductions from the project for this monitoring period based on the reported emission reduction in the monitoring Report.

EPIC's verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive board. EPIC's approach was risk-based, drawing on an understanding of the risks associated with reported GHG emissions data and the controls in place to mitigate these. The examination includes assessment of evidence relevant to the amounts and disclosures in relation to the project's GHG emission reductions for this monitoring period.

The verification team has planned and performed the work to obtain the information and explanations that is considered necessary to provide sufficient evidence for it to give reasonable assurance that the amount of calculated GHG emission reductions for this monitoring period were fairly stated.

The verification team has verified that the information included in the revised monitoring report is correct and that the emission reduction achieved has been determined correctly. Based on the information seen and evaluated, the verification team confirms the following:

Project title[/1/]:	PoA for Promotion of the Improved Water Mills (IWM) in Nepal
UNFCCC ref[/1/] no:	9889
PoA-DD[/1/] CPA-DD (CPA01) CPA-DD (CPA02) Monitoring report[/17/]	Version 10.0, dated 22/04/2019 Version 10.0, dated 22/04/2019 Version 4.0, dated 22/04/2019 Version 4.0, dated 17/06/2019; 01st Verification
Methodology used for verification[/3/]:	AMS-I.B. ver. 12 - Mechanical energy for the user with or without electrical energy
Applicable monitoring period[/17/]:	09/09/2015 to 31/12/2017 (including both days)
Emissions reductions	**18,995** tCO_2e

verified[18]:	

SECTION H. Certification statement

>>

EPIC Sustainability Services Private Limited (EPIC has carried out the initial verification of the emission reductions that have been reported for the PoA titled “PoA for Promotion of the Improved Water Mills (IWM) in Nepal” (UNFCCC reference number: 9889), covering CPA 01 and CPA 02 for the period 09/09/2015 to 31/12/2017.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

EPIC takes responsibility for issuance of an independent verification statement on the reported GHG emission reductions from the project activity.

The verification was done on the basis of the baseline and monitoring methodology AMS-I B, Version 12.0, the registered PoA-DD, version 8.0 and CPA-DDs (CPA-DD 01, version 8.0 and CPA-DD 02, version 2.0), validated and approved PoA-DD, version 10.0 and CPA-DD’s (CPA-DD 01, version 10.0 and CPA-DD 02, version 4.0) and the monitoring report (version 04.0) dated 17/06/2019. The verification included checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and the collection of evidence supporting the reported data.

The emission reductions are calculated correctly and EPIC could certify that the emission reductions from the CDM PoA 9889 “PoA for Promotion of the Improved Water Mills (IWM) in Nepal” during the period 09/09/2015 to 31/12/2017 is 18,995 tonnes of CO2 equivalent.

Appendix 1. Abbreviations

Abbreviations	Full texts
AEPC	Alternative Energy Promotion Centre
AMS	Approved Methodology for Small-scale
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reductions
CME	Coordinating Managing Entity
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
CR	Clarification Request
DOE	Designated Operational Entity
ER	Emission Reductions
ESSPL	EPIC Sustainability Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse gases
GoN	Government of Nepal
GSC	Global Stakeholder Consultation
IPCC	Intergovernmental Panel on Climate Change
IWM	Improved Water Mill
kW	Kilo Watt
LE	Leakage Emissions
MoV	Means of Verification
NA	Not applicable
PCC	Project Completion Certificate
PCP-PoA	Project Cycle Procedure - Programme of Activities
PDD	Project Design Document
PE	Project Emissions
PP	Project Participant
PRC	Post Registration Changes
PS-PoA	Project Standard - Programme of Activities
QA/QC	Quality Assurance/Quality Control
RFP	Request for Proposal
RSC	Regional Service Centre
ToR	Terms of Reference
TWM	Traditional Water Mill
UNFCCC	United Nations Framework Convention on Climate Change
US	User Survey
VVS-PoA	Validation and Verification Standard - Programme of Activities

Appendix 2. Competence of team members and technical reviewers

The following validation team has been assigned to carry out the verification of the project.

Name	Mr. Narendra Ghimire	Mr. A. Prabu Das	Dr G Vishnu	Mr. K. Sudheendra
Role	Host country expert	Auditor - Team Leader	Technical Reviewer	T.E assisting Technical Reviewer
Competence in relevant sectors	Sector 1 including TA 1.2	Sector 1 and Sector 13 including TA 1.1. and TA 13.1	Sector 1 and Sector 13 including TA 1.1. and TA 13.1	Sector 1
Responsibility	Document review, onsite, DVR preparation, DVR resolution	Document review, DVR preparation, DVR resolution, FVR preparation	Technical review	Technical review

Mr. A Prabu Das, holds a Master of Technology degree in Energy Conservation and Management and Bachelor of Technology Degree in Petro-chemical Technology. He is a certified Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has around 11 years of work experience in Design of biomass Power plants, preparing Techno Economic Feasibility Reports (TEFR), carrying out energy audits, of which last eight years have been in CDM/GS/VCS consultancy and validation/verification services. He has participated in the validation / verification of various CDM/VCS/GS/GHG and sustainability projects globally. He has undergone extensive training on CDM validation and verification and is a qualified lead auditor for Sectoral Scope 1 under Technical Area “TA 1.2 Renewables” in accordance with procedures of EPIC sustainability services Pvt. Ltd. Further, he has been thoroughly trained in Social Carbon’s latest Standard and qualified to perform social carbon validation and verification. He is also an ISO 26000 lead auditor certified by Professional Evaluation and Certification Board (PECB). He is a Certified Sustainability Assurance Professional from AccountAbility, UK. Among other qualifications, he is recognised by Gold Standard Foundation to perform fast track audits.

Mr. Narendra Ghimire has 10 years of experience working in the field of Hydropower sectors in various capacities. He has been extensively involved in Planning and engineering of number of hydropower projects for the development. He has served as Hydropower Engineer and Team Leader in the designing and Construction supervision of Hydropower Projects in Nepal. He has Worked as Resident Engineer and Deputy Resident Engineer for the Hydropower Projects in Nepal. He has led multi-disciplinary team of Engineers, Geologists, Economists, Sociologists and Environmental experts assigned to conduct pre-feasibility, feasibility studies and design of hydropower projects. He served as Team Leader and Design Team Leader in conducting studies of various hydropower projects. He is a qualified Technical Expert under CDM validation and verification services for Sectoral Scope 1 in accordance with procedures of EPIC Sustainability Services Pvt. Ltd.

Dr. G. Vishnu holds a Masters and Doctorate in Environmental Science. He has around 12 years of experience in the field of research and consultancy related to water, wastewater, solid waste management systems, implementation of new, Cleaner Production technologies and biomass assessment studies. He has more than eight years' experience in validation verification of more than seventy CDM, projects and has undergone extensive training on GHG validation and verification. He is a Lead Auditor for various technical areas. He is also an ISO 26000 lead auditor and ISO 50001 auditor certified by Professional Evaluation and Certification Board (PECB). He is a Certified Sustainability Assurance Practitioner (CSAP) from AccountAbility, UK. He is qualified as Lead Auditor based on EPICs CDM accreditation procedures.

Mr. K. Sudheendra, holds a Bachelor's Degree in Electrical Engineering. He has more than 30 years of experience in Energy Sector. He has been trained in the CDM validation and verification processes, and he is a qualified Technical Expert as well as Technical Reviewer as per EPIC' qualification criteria.

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	AEPC	PoA-DD titled "PoA for Promotion of the Improved Water Mills (IWM) in Nepal", Version 8.0 and 10.0 CPA 9889-0001: PoA for Promotion of the Improved Water Mills (IWM) in Nepal, Version 8.0 and 10.0 CPA 9889-0002: PoA for Promotion of the Improved Water Mills (IWM) in Nepal, Version 2.0 and 4.0	1	Publicly available; CME
2	TUV-SUD	Validation report of PoA-DD and CPA-DD for CPA1	2	Publicly available
	KBS Certification Services Pvt. Ltd.	Validation report of CPA2		
3	UNFCCC	AMS-I.B. ver. 12 - Mechanical energy for the user with or without electrical energy	3	Publicly available
4	UNFCCC	Validation and Verification Standard for Programme of activities, Version 2.0 Project Standard for Programme of activities, Version 2.0	4	Publicly available
5	Sustainable Energy and Technology Management P. Ltd.	IWM User Survey 2016_CPA-1	5	CME
	Universal Consultancy Service Pvt. Ltd.	IWM User Survey 2017_CPA-1 IWM User Survey 2017_CPA-2		CME
6	Third party survey team	Filled in Questionnaires_CPA 1 Filled in Questionnaires_CPA 2	6	CME
7	AEPC	RFP-User Survey 2017_IWM PoA RFP-IWM Emission reduction monitoring study_Final Approved 2016	7	CME
8	GoN	Nepal Earthquake 2015 - Post Disaster Needs Assessment, National Planning Commission, by Government of Nepal	8	CME
9	AEPC	CME Manual - PoA for Promotion of the Improved Water Mills (IWM) in Nepal, Version 3.0	9	CME
10	Regional Service Provider	Project Completion Certificates	10	CME
11	Energy Development Services P. Ltd	Determining the capacity of LS and SS IWM_EDS	11	CME
12	AEPC	IWM Installation record confirmation by Integrated Subsidy Processing Unit, AEPC	12	CME
13	AEPC	Workshop Proceeding on Orientation Workshop on Implementation Modality of IWM Technology to Relevant Stakeholders	13	CME
14	AEPC	IWM Implementation guideline	14	CME
15	DL Energy Concern Pvt. Ltd.	Manufacturing Process Manual Improved Water Mill Kit (Runner)	15	CME
16	Sustainable Energy and Technology Management P. Ltd.	Third party Monitoring/verification of installed renewable energy systems survey	16	CME
17	AEPC	MR initial Version 1.0 and Final MR version 4.0	17	CME
18	AEPC	ER Sheet initial Version 1.0 and Final ER sheet version 2.1	18	CME

19	AEPC	Database for IWMs included in the CPAs	19	CME
20	UNFCCC	Standard for sampling and surveys for CDM project activities and PoAs (version 07.0)	20	Publicly available
21	UNFCCC	Guidelines on Sampling and surveys for CDM project activities and programmes of activities (version 04.0)	21	Publicly available
22	EPIC	PRC report (Ver 2.2 dated 20/06/2019) of CPA01 for temporary deviation submitted along with this issuance track	22	EPIC
23	UNFCCC	AMS I.F. "Renewable electricity generation for captive use and mini-grid", version 03	23	Publicly available
24	EPIC	PRC report (Ver 1.4 dated 19/05/2019) of CPA01 and CPA02 for permanent changes to the registered monitoring plan	24	EPIC
25	EPIC	PRC report (Ver 1.4 dated 19/05/2019) of PoA for permanent changes to the registered monitoring plan	25	EPIC
26	AEPC	a) Data analysis for sample CPA1 for the year 2017 b) Data analysis for sample CPA1 and CPA2 for the year 2017 c) Precision calculation spreadsheet	26	CME

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

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

FAR ID	NA	**Section no.**	NA	**Date:** DD/MM/YYYY
Description of FAR				
NA				
CME response				**Date:** DD/MM/YYYY
NA				
Documentation provided by the CME				
NA				
DOE assessment				**Date:** DD/MM/YYYY
NA				

Table 2. CLs from this verification

CL ID	01	**Section no.**	E.2.1	**Date:**17/09/2018
Description of CL				
CME to clarify, as part of continual improvement of monitoring system is there any practice to capture the change in ownership of the IWM either by sale to other individual or through inheritance				
CME response				**Date:**23/09/2018
If the change in the ownership is reported during the monitoring survey or by any other means, AEPC indicates the same by updating the database of the corresponding CPA. Since there is no provision of official registration of IWM in any government agencies, the Project Completion Report (PCC) and other documents remained same. This will ease the future monitoring of the CPAs to identify the exact IWM during field monitoring. Since this is the first verification, there are no such events reported officially during user survey. As a part of the continuous improvement of monitoring system, AEPC is committed towards this.				
Documentation provided by the CME				
Nil				
DOE assessment				**Date:** 05/10/2018
The explanation provided by CME to update the database as part of continual improvement of monitoring system, as and when the change in ownership is observed, is accepted by the verification team. **CL 01 Closed**				

CL ID	02	**Section no.**	E.3.4.2	**Date:**17/09/2018
Description of CL				
As per QA/QC procedures for the ex-post parameters “Samples will be selected randomly and covering five development regions and two ecological regions to get the best representative” – clarify whether it is followed for this MR period				
CME response				**Date:** 23/09/2018
While doing the monitoring, samples are allocated in three different ways to maintain the representativeness. Samples are allocated proportionally to the ecological belts; development regions and the types of IWMs based on proportion of IWMs installed in these two areas. This procedure was applied during the ex-post monitoring of the CPAs. See section 2 of the IWM User Survey Reports for both CPAs (SD 2.1, SD 2.2 and SD 2.3).				
Documentation provided by the CME				
SD 2.1# IWM User Survey 2016_CPA-1.pdf *SD2.2#IWM USER Survey 2017_CPA-1.pdf* *SD2.3#IWM User Survey 2017_CPA-2.pdf*				
DOE assessment				**Date:** 05/10/2018
The survey was carried out as per the QA/QC procedures of the ex-post parameters as defined in the PoA-DD and the CPA-DD. Review of user survey documents related to the samples chosen for both the CPAs for the entire MR period conforms the same. In this regard, the explanation provided by the CME is identical to the survey process followed; hence it is accepted by the verification team. **CL 02 Closed**				

CL ID	03	Section no.	E.2.2	Date:17/09/2018

Description of CL

Relating to the annual monitoring survey, CME to clarify the following:

- Training to field enumerators, composition of survey team, questionnaire used in the survey, filled in questionnaire copy etc
- TOR copy to verify that "CME hire a qualified individual third party for annual monitoring survey"
- In the survey whether 'outliers' and 'fences' as defined in PoA-DD are applied for the current MR period
- Whether any specific attention is given to earthquake affected regions, in the sample selection

CME response **Date:** 23/09/2018

- *AEPC conducts IWM user survey not only to cover the monitoring parameters given in the PoA DD but also to capture the socio-economic benefit of the IWM to the user and the IWM owners. So, the effective data collection is an integral part of the survey. To collect the data from user and owner, the third party consultant has to mobilize the enumerator by providing the trainings for data collection, pre-testing the questionnaires etc. Those information are included in User Survey Reports (see, section two of the user survey reports for the methodology applied- SD 2.1, SD 2.2 and SD 2.3). Sample filled in questionnaires for the CPA-1 and CPA-2 are attached with this response (SD 3.1 and SD 3.2).*

- *Being a government entity, AEPC has to follow Public Procurement Act to procure the qualified third party. The "Request for Proposal" document used for hiring consultant is attached with this response (SD 3.3). For ToR, see section 5 of this document.*

- *As a part of statistical quality control, CME confirm that outliers and fences have to be taken into account for data analysis. This has been taken care during the data analysis. During this monitoring period no outliers were identified during the survey.*

- *The sampling was done to cover ecological belts, development regions and types of the IWM to get the best representative samples. But CME also ensured that at-least one districts of highly affected districts by Earthquake is covered during the survey within the sampling done as per PoA-DD. Please see the Figure 1 for categories of earthquake affected districts published by National Planning Commission in "Post Disaster Needs Assessment" (SD 3.4). The name of the districts selected for the survey is given in the survey reports.*

Documentation provided by the CME

SD3.1# Sample Filled in Questionnaires for CPA-1
SD3.2# Sample Filled in Questionnaires for CPA-2
SD3.3 # Request for Proposal for Conducting "Emission Reduction monitoring (User Survey) of Improved Water Mill Clean Development Mechanism (CDM) Programme of Activity (PoA) – 2017" (RFP-User Survey 2017_IWM PoA.pdf)
SD3.4# Post Disaster Needs Assessment (PDNA_volume_BFinalVersion.pdf)

DOE assessment **Date:** 05/10/2018

- The verification team has reviewed the Training requirement given to the field enumerators, composition of survey team, questionnaire copy etc, this details are also detailed in the user survey report and reviewed to be meeting the requirement
- Request for Proposal is reviewed for the conformance and accepted
- Review of survey reports conforms that 'outliers' and 'fences' are not applicable for the current MR period
- Nepal earthquake affected districts are published by National Planning Commission in the document titled "Post Disaster Needs Assessment", review of this document and the user survey documents conforms the statement provided by the CME "to include highly affected districts of earthquake in the survey", hence accepted by the verification team

CL 03 Closed

CL ID	04	Section no.	E.3.5.1	Date:17/09/2018
Description of CL				
The value of the parameter '$OH_{i,y}$' Operating hours of IWM for mechanical power generation for CPA2 – short shaft, is not as per survey report – CME to clarify				
CME response				**Date:** 23/09/2018
The values are corrected as per the final survey reports. Please see the section E.3 of revised MR and the revised ER calculation spreadsheet.				
Documentation provided by the CME				
• *Revised MR.(9889_MR_IWM PoA_V02.doc)* • *Revised ER calculation spreadsheet. (9889_Emission Reduction Calculation spreadsheet_v2.xlsx)*				
DOE assessment				**Date:** 05/10/2018
The typographical error is now corrected in the revised submission (both MR and ER sheet), and is verified to be as per the submitted survey reports. **CL 04 Closed**				

CL ID	05	Section no.	E.3.4.2	Date:17/09/2018
Description of CL				
Considering that C.P for CPA1 is from Sep 2015, and the initial survey was done only in Feb – April 2017, whereas as per registered documents the frequency of monitoring survey is annual – CME to clarify				
CME response				**Date:** 23/09/2018
CME response 1 *As indicated in the registered PoA-DD, the monitoring of the CPAs implemented under the PoA is done during various stages beginning from the IWM installation to post-installation period. The Regional Service Centers check the IWM installation and preparation the Project completion certificate (PCC) for reporting to AEPC. The completeness of the PCC and correctness of information, and site verification is done through sampling. Thereafter, annual user survey is conducted for Operational Status, operation hours of IWM for mechanical energy, other parameters associated with the community benefit.* *Aligned with the same, the PCC report is prepared once the construction of IWM has been completed. The PCC report consists of information like file no. kit no., completion date, type of IWM, Detail of IWM, Signature of the IWM owner and the installer with the stamp (as a proof that IWM has been installed). Commissioning report is a part of PCC document and is done for all the IWMs. Sample PCCs are being submitted. AEPC commissioned a third party for monitoring the IWMs on sample basis in 2015 and the said report too is being submitted. Further, the user survey for the IWMs was initiated in October 2016. Moreover, after the first survey, annual frequency is being maintained for the subsequent survey.* *Furthermore, please also refer to SSC_683 wherein it is clarified that for the determination of the parameters, survey may be done at any point in time during the monitoring period, using conservative approach for determination of the number of systems in place and operated during the entire period or during part of it. The delay can be expected to have no impact, or a conservative impact, on emission reduction of the PoA.* ***CME response 2*** *As per the methodology and the registered monitoring plan, monitoring shall consist of: (a) Recording annually the number of systems operating; and (b) Estimating the annual hours of operation for the equipment, if necessary using sampling methods. The ex-post 2017 user survey is conservative as it accounts for the drop-outs for the entire period, although there might have been lesser dropouts if done earlier. In other words, an earlier survey could have had higher number of IWMs operating. Further, the survey results are for covering the ex-post period and not thereafter.* *Nevertheless, section C.3.1 of the MR has been revised. The annual recording of operation hours for 2015 could not be performed due to earthquake and after-shocks. Therefore, following the CDM project standard for programmes of activities, Version 01.0, para 229(b), as the most conservative values approach, the baseline emissions for 2015 are being considered as zero*				
Documentation provided by the CME				

• *Revised ER calculation spreadsheet. (9889_Emission Reduction Calculation spreadsheet_v2.xlsx)* • *SD 4.2# sample PCCs* • *Third party monitoring/verification of improved water mills (Monitoring report 2015)* • *RFP-IWM Emission reduction monitoring study_Final Approved_11102016*
DOE assessment **Date:** 11/10/2018
DOE assessment 1 As part of on-going monitoring activity, right from the installation to post installation of IWMs, checks and balances are available at each levels. Regional service center's prepare the Project Completion Certificates (PCC) reports for each of the IWMs, once it is commissioned, thereafter AEPC through third party monitoring, verify the installation of IWMs and the correctness of the information contained in the PCC. It is observed that based on this third party survey the subsidy to the individual IWMs are released, further heavy penalty is levied for any wrongful information reported in the PCC. This third party monitoring survey whose report along with IWM subsidy list was reviewed by the verification team, and the process to conduct the regular user survey was initiated in October 2016 (Request for Proposal) and the actual survey was carried out during Feb – April 2017, thereafter the subsequent user survey was done at annual frequency for the current MR period. Further with reference to SSC_683 (https://cdm.unfccc.int/methodologies/SSCmethodologies/clarifications/90438), wherein it is clarified that for the determination of the parameters, *survey may be done at any point in time during the monitoring period, using conservative approach for determination of the number of systems in place and operated during the entire period or during part of it*. T*he CME to explain how the 2017 survey values are conservative for the MR period in 2015.* **DOE assessment 2** The survey could not be performed for the year 2015, so it is reported as temporary deviation from the registered monitoring plan and the CERs are not claimed for the year 2015. Please refer to Validation report on Post Registration Changes, Ver 1.0 dated 11/10/2018 for the assessment of Temporary deviation. **CL 05 Closed**

Table 3. CARs from this verification

CAR ID	01	**Section no.**	E.3.1	**Date:**17/09/2018
Description of CAR				
Submit the following:- • CME manual • PCCs (Project Completion Certificate) of IWMs • Document to confirm that the technical capacity of IWM is less than 5kW • IWM subsidy checklist to conform no of IWMs of type (i) installed under the project activity (it is the QA/QC of the parameter $Q_{T,i}$)				
CME response				**Date:** 23/09/2018
• *CME manual is submitted along with this response (SD 4.1)* • *Sample PCCs of IWMs are submitted along with this response (SD 4.2)* • *Capacity assessment of the long shaft and short shaft IWMs was done by AEPC through third party. The average capacity of Long shaft and short shafts IWM were found as 3.25 kW and 1.75 kW. The report is attached with this response (SD 4.3).* • *A confirmation by subsidy processing unit on the construction of the IWMs under the CPA is attached with this response (SD 4.4).*				
Documentation provided by the CME				

• *SD 4.1# CME Manual_IWM PoA_V3.pdf* • *SD4.2# Sample PCCs.pdf* • *SD 4.3# Determining the capacity of LS and SS IWM_EDS.pdf* • *SD 4.4# Confirmation by Subsidy Processing Unit.pdf*
DOE assessment **Date:** 05/10/2018
Above requested documents have been reviewed to be meeting the requirement, and accepted by the verification team. **CAR 01 Closed**

CAR ID	02	**Section no.**	E.3.1	**Date:**17/09/2018
Description of CAR				
Confirmation that the same technical specification of IWM's as defined in Sec A.6 (Pg 8) of the PoA-DD is followed for both the CPA's for the current MR period.				
CME response **Date:** 23/09/2018				
The specification of IWMs are standardize for long shaft and short shaft. Those IWMs are eligible for the subsidy policy. Those standards has to be checked during the project completion before the subsidy is delivered. CME confirms that the defined technical standards are used for the IWMs receiving the government subsidy and included in the PoA. See the IWM standards in annex appendix 11 of the report "Determining the capacity of LS and SS IWM_EDS.pdf)"				
Documentation provided by the CME				
• *SD 4.3# Determining the capacity of LS and SS IWM_EDS.pdf*				
DOE assessment **Date:** 05/10/2018				
The installed IWMs have the same technical specifications as defined in PoA-DD, review of *the report "Determining the capacity of LS and SS IWM_EDS.pdf", PCC, CPA database, on-site visit conforms the same.* **CAR 02 Closed**				

CAR ID	03	**Section no.**	E.3.1	**Date:**17/09/2018
Description of CAR				
CME to confirm that Emission reduction right transfer agreement signed with the IWM owner is valid for the current MR period.				
CME response **Date:** DD/MM/YYYY				
The emission reduction right transfer agreement is not time bound and is valid for the whole period of PoA and CPAs particularly for the emission reduction related activities. See the attached ER right transfer agreement included in commissioning report (page 11) for the reference (SD 5.1).				
Documentation provided by the CME				
• *SD 5.1# Commissioning Report including application confirming start date.pdf*				
DOE assessment **Date:** 05/10/2018				
Validity of the ER right transfer agreement is conformed through the review of the signed agreement, further interaction with the IWM users and the CME team confirms the same. **CAR 03 Closed**				

CAR ID	04	**Section no.**	E.3.1	**Date:**17/09/2018
Description of CAR				
Evidence to support the start date of CPA-2 (signed letter from APEC related to this, also submit application form submitted by IWM owner as described in PoA-DD)				
CME response **Date:** 23/09/2018				
The signed letter for CPA-2 start date (SD 6.1) and the commissioning reports with application submitted by IWM owner that resembles the CPA start (SD 5.1) are attached herewith.				

Documentation provided by the CME	
• *SD 6.1# IWM Start Date Letter_CPA2.pdf* • *SD 5.1# Commissioning Report including application confirming start date.pdf*	
DOE assessment	**Date:** 05/10/2018
The submitted documents are reviewed for meeting the requirement and accepted. **CAR 04 Closed**	

CAR ID	05	**Section no.**	E.3.4.2	**Date:**17/09/2018
Description of CAR				
During site visit it was observed that:- • IWM with tag no AEPC/IWM/002/1010 (Krishna Prasad Pakuwal) which was affected in the earthquake is now running in short shaft mode, where as it was registered as long shaft mode. Since it has the impact on the ER's – CME to address this observation • Kit no mismatch is observed for AEPC/IWM/001/1089 (Ram Bahadur Tamang)				
CME response				**Date:** 23/09/2018
• *Though the IWM initially was installed as long shaft, the team during the field verification found that the IWM now is running in short shaft mode after the earthquake. If CME finds such a change during monitoring, the database will be updated and will account the change appropriately for the calculation of ER in consecutive verification. As a conservative approach, this change is accounted in the calculation for this monitoring period as well. Please see the section E.2 of revised MR and updated database and the updated ER calculation spreadsheet accordingly.* • *That kit no for the Ram Bahadur Tamang (AEPC/IWM/001/1089) was typo error in database. Now the actual kit ID B3/27 (see the list of the data provided by subsidy processing unit in SN 450 under SD 4.4). This has now been updated in the database. See updated database attached with this response.*				
Documentation provided by the CME				
• *Revised MR.(9889_MR_IWM PoA_V02.doc)* • *Revised ER calculation spreadsheet. (9889_Emission Reduction Calculation spreadsheet_v2.xlsx)* • *Database of PoA (IWM CPA Database_Updated.xlsx)* • *SD 4.4# Confirmation by Subsidy Processing Unit.pdf*				
DOE assessment				**Date:** 05/10/2018
• IWM with tag no AEPC/IWM/002/1010 which was initially registered as long-shaft is running in short-shaft mode due to the impact caused by earthquake, this change in mode of operation has got an impact on the ER calculation, so the CME has updated the database as part of on-going continuous monitoring and also conservatively corrected the ER sheet – this is accepted by the verification team. Further it was also clarified by the IWM owner that the damaged component of IWM would be set right in due course to be functional as long shaft again. In this regard CAR 05 raised is closed and FAR 01 is opened to verify the operational type of this IWM in the next verification. • The typo error for AEPC/IWM/001/1089 in database is now corrected in the updated database **CAR 05 Closed**				

CAR ID	06	**Section no.**	E.3.1	**Date:**17/09/2018
Description of CAR				
CME to explain the database management system followed in the inclusion of IWMs in the CPA's with specific emphasis on avoiding double counting				
CME response				**Date:** 23/09/2018

AEPC had database managed in software called Navision before along with the database management in excel sheet. The CDM ID code and the Kit Id are unique numbers. The database avoids the duplication of those unique ID number to avoid double counting for the subsidy. AEPC's internal server was attacked by virus in 2018 but the database in excel is still secured. The climate and carbon unit responsible for the carbon projects under AEPC check carefully the duplication of the ID codes and Kit no. The database avoids the double counting of the CDM code and Kit ID which can be checked in the database attached with this response.
Documentation provided by the CME
• *Database of PoA (IWM CPA Database_Updated.xlsx)*
DOE assessment **Date:** 05/10/2018
Based on the explanation provided by the CME it is found acceptable that the double counting is effectively avoided at the inclusion stage, the verification team has also reviewed the database and PCC reports for the conformance. **CAR 06 Closed**

CAR ID	07	**Section no.**	E.2.2	**Date:**17/09/2018
Description of CAR				
As per Sec C of PoA-DD (Pg 23), as part of continued improvement of PoA management system, CME to list out the activities done by APEC so far eg: updation of training manual, IWM design updates, capacity building, Data Management System, CME manual (it is mentioned that it is subjected to review every two years) etc				
CME response				**Date:** 23/09/2018
AEPC is committed for the continuous improvement of the PoA management systems. For this AEPC has updated the CME manual accordingly. See the updated CME manual (SD 4.1). As a part of the capacity building, AEPC formally or informally train the staffs associated with it. A formal training report is attached herewith for the response (SD 7.1). IWM Implementation manual and guidelines are prepared and updated as required (SD 7.2 and SD 7.3). AEPC is committed to continuously improve its PoA management systems in future as well.				
Documentation provided by the CME				
• *SD 4.1#CME Manual_IWM PoA_V3.pdf* • *SD 7.1# Workshop Proceeding_IWM_Everest Hotel_29 Nov_13.pdf* • *SD 7.2# IWM Implementation guideline.pdf* • *SD 7.3# Final Manual _ IWM kit mfg process.pdf*				
DOE assessment				**Date:** 05/10/2018
The documentary evidences submitted are reviewed to be supporting the CME response to the query raised, further the interview of the monitoring team conforms the management system followed. **CAR 07 Closed**				

CAR ID	08	**Section no.**	E.2.2	**Date:**17/09/2018
Description of CAR				
As per Page 41 of PoA: IWM project information records database – continuous update by the CME based on sample survey records and reports will be generated for the specific MR period – clarify if it is done for the current MR period.				
CME response				**Date:** 23/09/2018
CME updates the database based on the sample survey records and any other monitoring. There was no deviation observed during user survey but the change found during the site verification is accounted in the database and also in ER calculation. The updated database will be used for consecutive monitoring. See the updated database.				
Documentation provided by the CME				
Database of PoA (IWM CPA Database_Updated.xlsx)				
DOE assessment				**Date:** 05/10/2018

Considering this is the first verification of both the CPAs and no deviation was reported in the user survey the database was not updated, however based on the deviation observed during verification site visit by the verification team this information was updated in the database which is accepted by the verification team. **CAR 08 Closed**

CAR ID	09	**Section no.**	E.1.1	**Date:**17/09/2018
Description of CAR				
Survey related information is not detailed in the submitted MR				
CME response				**Date:** 23/09/2018
Survey related information is detailed out in section E.3 of revised MR.				
Documentation provided by the CME				
• *Revised MR.(9889_MR_IWM PoA_V02.doc*				
DOE assessment				**Date:** 05/10/2018
The survey information of both the CPAs i.e CPA1 and CPA2 for the entire MR period is now presented in the revised MR submitted, and the details is reviewed to be uniform across the user survey reports, ER sheets and MR. **CAR 09 Closed**				

Table 4. FARs from this verification

FAR ID	01	**Section No.**		**Date:** 11/10/2018
Description of FAR				
IWM with tag no AEPC/IWM/002/1010 (Krishna Prasad Pakuwal) which was initially registered as long-shaft is running in short-shaft mode due to the damage caused by earthquake, since it was clarified by the IWM owner that the damaged component of IWM would be set right in due course to be functional as long shaft again, the operational type of this IWM shall be verified in the next verification.				
CME response				**Date:** DD/MM/YYYY
xx				
Documentation provided by the CME				
xx				
DOE assessment				**Date:** DD/MM/YYYY
xx				

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Document information

Version	*Date*	*Description*
03.0	31 May 2019	Revision to: • 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.

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