



**Programme design document form for
small-scale CDM programmes of activities
(Version 04.0)**

Complete this form in accordance with the Attachment "Instructions for filling out the programme design document form for small-scale CDM programmes of activities" at the end of this form.

PROGRAMME DESIGN DOCUMENT (PoA-DD)

Title of the PoA: PoA for Promotion of the Improved Water Mills (IWM) in Nepal

Version number of the PoA-DD: 8.0

Completion date of the PoA-DD: 03/08/2015

Coordinating/ managing entity: Alternative Energy Promotion Centre (AEPC)

Host Party(ies): Federal Democratic Republic of Nepal

Sectoral scope(s) and selected methodology(ies), and where applicable, selected standardized baseline(s): Sectoral Scope- 01 Energy industries (renewable - / non-renewable sources),
Methodology- AMS I.B. "Mechanical energy for the user with or without electrical energy"

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

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PoA for Promotion of the Improved Water Mills (IWM) in Nepal.

Version: 8.0

Dated: 03/08/2015

A.2. Purpose and general description of the PoA

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The PoA for Promotion of the Improved Water Mills (IWM) in Nepal is a program of Alternative Energy Promotion Centre (AEPD). IWM program is currently under the framework of National Rural and Renewable Energy Program (NRREP). With financial assistance from Government of Nepal (GoN) and donor agencies (currently Government of Norway and Government of Denmark), Regional Service Centres (RSCs) will assist AEPD as a service centre to implement the IWM Programme. The main objective/goal of the IWM Project of AEPD in Nepal is to promote dissemination of IWM replacing existing low powered, less efficient Traditional Water Mills (TWMs) to the existing owners or new installers¹ (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 project activity will contribute towards improving livelihoods of the rural households through improved access to energy services from the renewable energy based IWMs, and meeting the increasing motive power needs of off-grid rural communities² of hills and mountains. The small-scale CPAs under the programme will be implemented, coordinated, managed and maintained by AEPD in Nepal.

The Rural Energy Policy 2006 has set framework and policy for RE promotion. IWM is one of the technologies being promoted in the country under RE. This project falls under the development plan of the GoN and has been given high importance in policy documents to increase rural access to renewable forms of energy. The current subsidy policy of the government also provides financial subsidy to IWM recognizing its environmental and social benefits. Because of the nature of this project, there will be negligible environmental problems.

Under the Subsidy Policy for Renewable Energy (2069³), Subsidy is provided to mill owners through IWM Service Centres as follows :

Type of Improved Water Mill	Subsidy Amount in Rs.		
	Category "A" VDC ⁴ s	Category "B" VDCs	Category "C" VDCs
Short Shaft	20,000	18,000	16,000
Long Shaft	40,000	38,000	35,000

Note: The category of VDC- A, B and C is detailed in Annex 1 of the Subsidy Policy for Renewable Energy 2069 BS

¹ New installer are those entrepreneur other than existing TWM owners who are potential diesel mill owners

²Off-grid areas in Nepal are those where electricity is not supplied through the national grid

³ Government of Nepal Ministry of Science, Technology and Environment, Feb 2013. http://www.aepd.gov.np/index.php?option=com_content&view=category&layout=blog&id=88&Itemid=117

⁴Village Development Committee. Category A VDCs refer to very remote VDCs, category B VDCs refer to remote VDCs and Category C VDCs refer to accessible VDCs.

The aim of the PoA is to enhance the penetration of efficient IWMs and avoidance of diesel based mills. 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 carbon revenues will be utilised to recover the portion of the costs.

Project Background

In the hilly (hills and mountain)⁵ areas of the country, TWMs or *Ghattas*⁶ are located on the banks of water sources with one mill typically serving 20 - 50 households. For TWM, with their low efficiency, it is hard to cope with the increasing processing needs (e.g. grinding, hulling, oil expelling, etc.) of the off-grid rural communities. As a consequence, number of diesel powered mills are growing in rural areas and increasingly taking over processing tasks as many communities still don't have access to national grid. In order to avoid possible switchover/installation of the proliferating Diesel Mills (DMs) by existing TWM owners and/or new installer⁷ in the hilly areas, where there used to be TWMs, an improved version of TWM is being promoted in Nepal.

The IWM is a modified/improved version of TWM, which is more efficient. The project will support installation of IWMs (long shaft and short shaft) in various parts of Nepal replacing TWMs. IWM technology has improved performance and is more reliable compared to TWMs. Due to the increased performance, the scope of services of the mills can be widened. The technology has been tested extensively and has already proven its effectiveness by fulfilling the requirement of the rural communities. The objective of the IWM Programme is to further up-scale IWM to improve livelihoods of water mill owners and users, and strengthen capacity of institutional set up for the sustainability of IWM sector as a renewable energy solution in rural Nepal.

The programme will provide technical support to and enhance capacity of local enterprises for technology transfer and replication. The project addresses the increasing processing needs(e.g. grinding, hulling, oil expelling, etc.) of rural communities, which currently depend on the services of local TWMs and encroaching DMs. As the low powered, less efficient TWMs have not been able to cater to the increasing processing needs of people, DMs are fast entering the potential areas. There is an increasing trend of switching to a high carbon emitting DMs due to its faster processing time, less waiting time and great volume of processing capacity. These mills have disturbed the self-reliant set up of villages, increased the dependency on imported machinery and fossil fuel, and affected the environment in the villages due to local air pollution and greenhouse gas (GHG) emissions in the atmosphere. The project will avoid installation of diesel based mills for processing (e.g. grinding, hulling, oil expelling, etc.), thus avoiding fossil fuel (diesel) consumption and reducing GHG emission. Considering the huge amount of diesel required to run DMs, replacing DMs with IWMs would have a huge potential of GHG emission reduction.

Besides curtailing GHG emission, the programme aims to contribute to the sustainable development of the country in following ways:

- Use available natural energy resources efficiently
- Improve livelihoods of rural households i.e. mill owners and users
- Increase access to basic energy services to rural people
- Avoid local pollution from diesel mills in communities
- Reduce dependency on fossil fuels
- Reduce time for processing (e.g. grinding, hulling, oil expelling, etc.)

The PoA for Promotion of the Improved Water Mills (IWM) in Nepal is developed by the AEPC on voluntary basis with financial assistance of GoN and donor agencies (currently Government of

⁵ Hilly areas are the potential location of IWM installation in hills and mountain areas of Nepal where AEPC is promoting IWM as specified by the RE-Subsidy-Policy 2009.

⁶ Ghatta is the local term used for water mill

⁷ New installer are those entrepreneur other than existing TWM owners who are potential diesel mill owners

Norway and Government of Denmark) to promote Renewable Energy initiative in Nepal. There are no mandatory requirements or legal obligations in Nepal regarding adoption or the implementation of energy efficient IWMs. The targets formulated by the GoN for the implementation of IWMs are not mandatory. The implementation of IWM is a voluntary action by the entrepreneurs and the approach of the programme is demand driven.

GoN has been planning to promote different renewable energy based technologies since its 7th five year plan⁸; however there were no plans for IWM until the ninth year plan (1997-2002). IWM programme was considered in government plan since tenth year plan (2003-2007)⁹. This plan targeted to install 4,000 IWMs. It is, therefore, clear that none of the government plans before 2002 have neither policies nor targets to promote IWM program in the country.

GoN brought Renewable Energy Subsidy Policy in 2000 as a sector policy to promote renewable energy technologies in Nepal. However, this subsidy policy didn't address and support to promote improved water mill program.

A.3. CME and participants of PoA

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Alternative Energy Promotion Centre (AEPC) would be the managing/coordinating entity (CME) of the PoA and would communicate with the Board. Contact details are listed in Annex 1.

A.4. Party(ies)

Name of Party involved (host) indicates host Party	Private and/or public entity(ies) project participants, CME (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Federal Democratic Republic of Nepal (Host country)	Alternative Energy Promotion Centre (AEPC)	No

A.5. Physical/ Geographical boundary of the PoA

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Geographical area: The hilly (hill and mountain) districts coming under the political boundary of Nepal is chosen as the country/geographical boundary of the SSC-PoA. The geographical area within which all small-scale CDM programme activities (SSC-CPAs) included in the PoA will be implemented in Nepal. Nepal is located between 80.2 degree to 88.2 degree east longitude, and 26.23 degree to 30.45 degree north latitude.¹⁰

The SSC-CPAs that would be included under the SSC-PoA would follow applicable national and/or sectoral policies and regulations of the country.

⁸http://www.npc.gov.np/new/uploadedFiles/allFiles/seventh_eng.pdf

⁹http://www.npc.gov.np/new/uploadedFiles/allFiles/10th_eng.pdf

¹⁰Between 80 degree 12' to 88 degree 12' east longitude, and 26 degree 22' to 30 degree 27' north latitude (Village Development Committee Profile of Nepal: A Socio-Economic Development Database of Nepal, 2008).



Figure 1: Map of Federal Democratic Republic of Nepal

A.6. Technologies/measures

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Under IWM Programme, standard low capacity TWMs of capacity 0.35 kW¹¹ would be replaced by energy efficient IWMs (short shaft and long shaft) of installed capacity ranging from 1.39 kW (minimum value, more than 97% of Short Shaft IWMs will be above this value) to 2.83 kW¹² (on minimum value, more than 97% of Long Shaft IWMs will be above this value) SSC-CPAs will include installation of high capacity IWMs replacing traditional low powered, less efficient water mills which will avoid installation of diesel mills to meet increasing high power requirements. Each CPA shall only disseminate one specific technology as described below. The technical description and technical details shall be described in the respective SSC-CPA-DD.

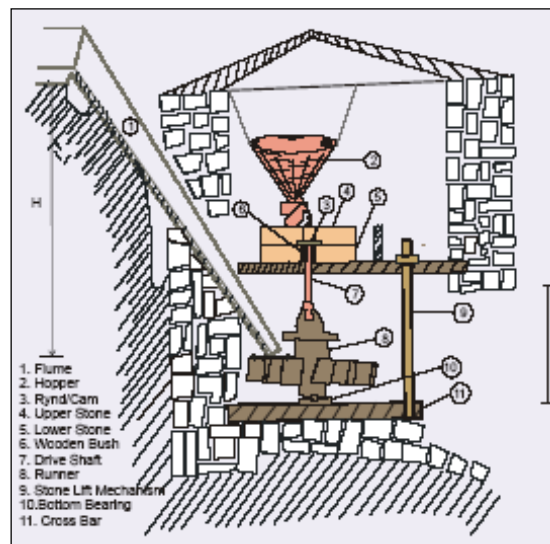
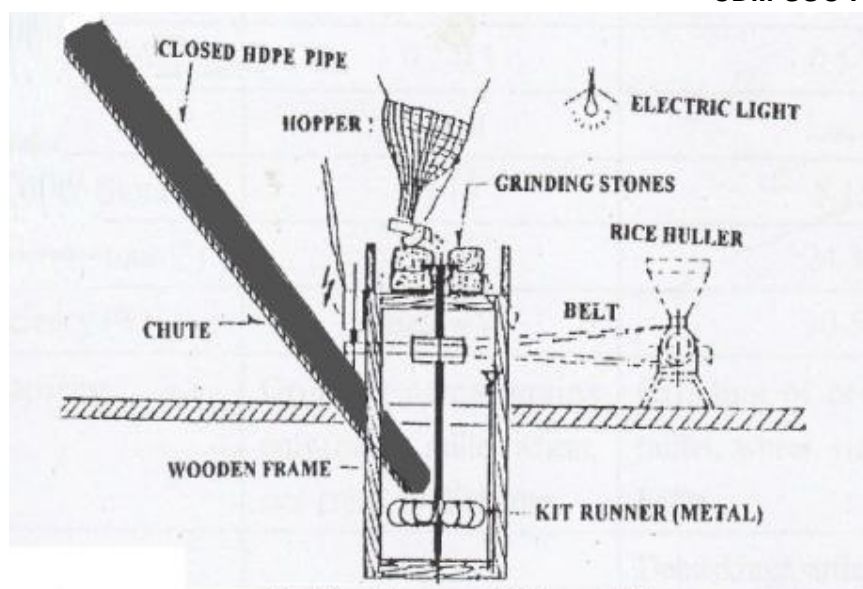


Figure 2: Improved Water Mill

¹¹Table 2, Page 11, Determining the capacity of Long Shaft and Short Shaft Improved Water Mill (IWM), Final Report, Energy Development Services Pvt. Ltd. May 2012. The report mentions average capacity of TWM is 0.35 kW.

¹² Report on "Determining the capacity of Long Shaft and Short Shaft Improved Water Mill", Energy Development Services Pvt. Ltd, May 2012.



*Sketch of Improved Water Mill
(Grinder at the Top of the Runner while the Huller Installed Aside)*
Figure 3: Improved Water Mill with end use applications

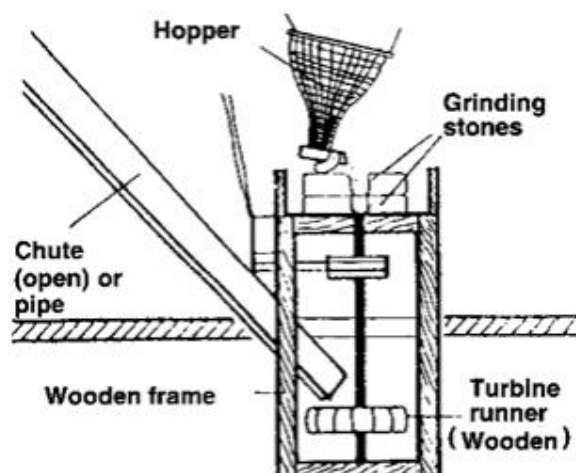


Figure 4: Traditional Water Mill

Basic Technical Features of the Traditional and Improved Water Mills ¹³	
Traditional Water Mill	Improved Water Mills
Wooden water wheel with flat paddles	Metal runners with buckets
Wooden hub covers the wooden vertical shaft	Metal vertical shaft
Wooden open chute of uniform cross-section	6"-8" diameter, HDPE pipes (with nozzle)
Runner mounted on to a wooden frame	Runner mounted on to a wooden frame
	A pulley and belt system is introduced for power transmission (except for short shaft, for grinding)
Requires high flow of water to run TWM	Low amount of water suffices to run IWM
Grinding of cereal grains only maize, millet, wheat, rice, etc. with 10-20 kg per hour output	Grinding of cereal, 20-50 kg per hour paddy hulling, 50-70 kg per hour oil expelling, 1-3 kW electricity generation

¹³ Improved Water Mill Programme Year Book 2008, page 3 (AEPC/CRT/N/SNV)

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. TWM is characterised by lower efficiency and inability to provide desired level of power for the end use. Hence the new installers and/or existing TWM owners are installing diesel run mills, which provide higher quantum of power with the similar size unit. The proposed IWM will do the same job of the TWM by improving the flat paddled wooden runner. The increased power output will 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. These reduce the drudgery of hand processing of paddy and oil seed. 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. During day time, the turbine is connected with the pulley that conveys power to milling unit while in the evening the pulley is connected with the generator to generate electricity. Although there is possibility for the generation of electrical energy, only mechanical energy generated by IWMs will be counted towards emission reductions. The indicative diagram explaining the operation of the long shaft IWM with electrification end use is presented below.

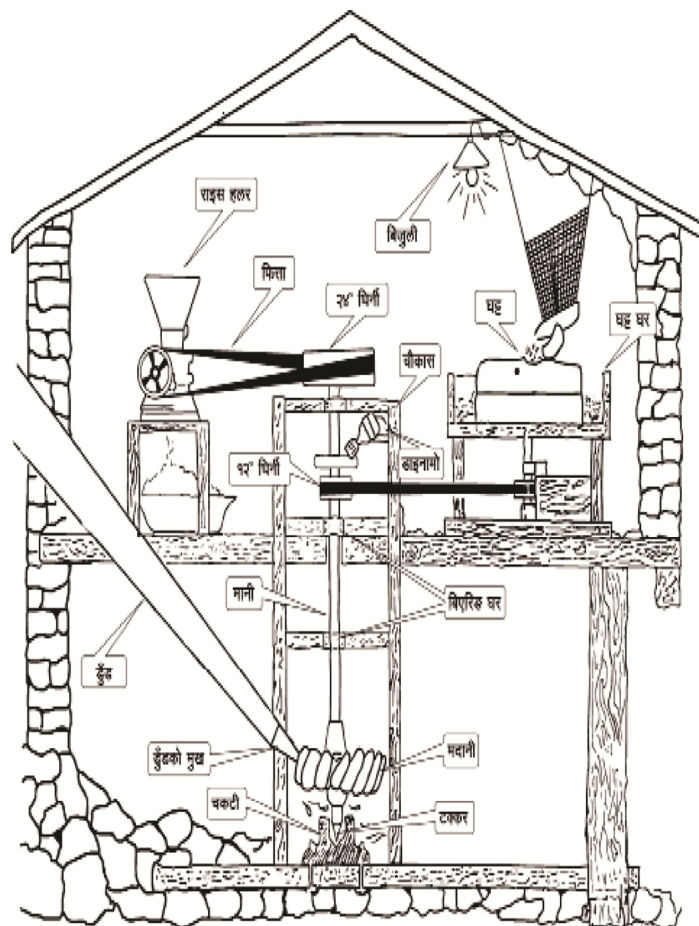


Figure 5: Long Shaft IWM indicating the milling components and electrical component

IWM technology improves performance as well as reliability of the mills. In addition, due to the increased performance, the scope of services of the mills can be widened. The technology has been tested extensively and proves appropriate and compatible with the rural environment. There is no technology transfer from Annex 1 countries. There is use of local indigenous technology.

Summary technical specifications of IWM components¹⁴

Component & description	Material	Dimension
1. Fali – a device used to hold shaft through key to the upper grinding stone of SS IWM	Mild steel	L150 x W60 x D20 fabricated out of 20 x 20 section rods welded together; Central rectangular hole size L38 x W20
2. Short Shaft – a device used to hold runner and transmit power to grinder at the top	Mild steel	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
3. Long Shaft – a device used to hold runner and transmit power to driver pulley at the top	Mild steel	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
4. Runner (Nepal Yantra Shala Model) – a device with 14 buckets to convert hydraulic power to mechanical power	Mild steel	Outer Dia. 600 runner Dia. 240 bucket Dia. 115 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
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

¹⁴ Appendix 11, Table 3, Report on Determining the capacity of Long-shaft and Short Shaft Improved Water Mill (IWM)

		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 base plate of IWM in the form of a Chakati on which Takkar rotates with a Ball in between		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 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 a oil bath

A.7 Public funding of PoA

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The IWM units installations covered under this PoA receive partial financial subsidies and technical support from GoN through AEPC. GoN would partially cover the cost of the IWMs in the form of subsidies (40 to 50% of improvement cost) with financial assistance from donor agencies (currently Government of Norway); balance amount is expected as equity investment of the individual IWM owner..The Norwegian government through Energy Sector Assistance Programme (ESAP) started supporting for the promotion of IWM since January 2011.¹⁵ This support from Norwegian government will ended in 15 July 2012 with the end of ESAP Phase II program¹⁶ and the government has implemented National Rural Renewable Energy Program (NRREP) from 16 July 2012. IWM is under the Community Electrification sub-component of the NRREP. There is partial funding from donors for additional 4000 IWMs installation from 2012-2017. In this context, CDM revenue is very crucial to meet the funding gap to ensure continuation of the program in off grid areas of the country.

The IWMs included in this PoA receive subsidies and technical support under the Community Electrification Sub-component (CES) of NRREP. The IWM programme presently receives funding from the following sources:

- Government of Nepal
- Government of Norway
- Government of Denmark

¹⁵ Please see document “Contract for the operation of AEPC/ESAP January 1st to June 2011 activities”

¹⁶ Please see agreement between Norwegian Ministry of Foreign Affairs and Government of Nepal, dated November 26, 2010; and Joint Financing arrangement between Ministry of Foreign Affairs of Denmark, Ministry of Foreign Affairs of Norway and Government of Nepal and ESAP Phase II Programme Documents, Vol. I.

Referring to OECD guidance on use of ODA funding for CDM projects the issue of diversion of ODA has been addressed for all donors involved in the CES under NRREP¹⁷. The ODA non-diversion letters are presented in Appendix 2 of this document.

The funding from the sources is deposited to the basket fund of NRREP and this fund shall be utilized for implementation of, including others, all CPAs of IWM PoA developed during the five year span of NRREP. Hence all the CPAs that will be implemented under this PoA within the five year span of NRREP will receive public funding from the same sources, therefore letter for ODA non-diversion is issued at PoA level.

SECTION B. Demonstration of additionality and development of eligibility criteria

B.1. Demonstration of additionality for PoA

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The information presented here shall constitute the demonstration of additionality of the PoA as a whole.

- (i) The proposed PoA is a voluntary coordinated action;

The PoA for Promotion of the Improved Water Mills (IWM) in Nepal is developed by the AEPC on voluntary basis with financial assistance of GoN and donor agencies (currently Government of Norway) to promote Renewable Energy initiative in Nepal. There are no mandatory requirements or legal obligations in Nepal regarding adoption or the implementation of energy efficient IWMs. The targets formulated by the GoN for the implementation of IWMs are not mandatory. The implementation of IWM is a voluntary action by the entrepreneurs and the approach of the programme is demand driven.

- (ii) If the activity is implementing as a voluntary coordinated action, it would not be implemented in the absence of the CDM benefits

The voluntary coordinated action will not be implemented in the absence of the PoA, due to the high financial barriers. The voluntary coordinated action is not financially viable in the absence of CDM. Therefore, the programme would not have been implemented in the absence of CDM.

Additionality Justification:

The additionality of the PoA is demonstrated by following the criteria outlined in "Guidelines for demonstrating additionality of small scale project activities" (version 09) EB 68 Annex 27. The paragraph 2 of this guideline states that,

"Documentation of barriers, as per paragraph 1 above is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW)"

The sub-section 2 (c) of paragraph states that,

"Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size¹⁸ of each unit is no larger than 5% of the small-scale CDM thresholds."

¹⁷ OECD, 2004. DAC/CHAIR(2004)4/FINAL: ODA eligibility issues for expenditures under the clean development mechanism (CDM), available at: <http://www.oecd.org/dataoecd/12/47/33657913.pdf>

¹⁸ That is the size of each unit under 750 kW installed capacity or under 3000 MWh of energy saving per year or 3000 tonnes of emission reduction per year.

Each unit of IWM has the capacity of 2.83 kW(refer calculation in the emission reduction spread sheet) which is less than 750 kW (5% of 15 MW) installed capacity. The PoA is thus additional and there is no need for further assessment and demonstration of additionality. This will be demonstrated using eligibility criterion 5 mentioned in section B.2 of the PoA-DD.

B.2. Eligibility criteria for inclusion of a CPA in the PoA

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AEPC, as the SSC-PoA coordinating/managing entity, shall verify eligibility conditions before allowing a SSC-CPA under the SSC-PoA. The eligibility criteria under the SSC-PoA shall be stated and confirmed in each SSC-CPA document:

S. N	Eligibility Criteria	Means for confirmation for CPA inclusion	Confirmation
1	SSC-CPA will involve installation of IWM in the geographical boundary of Nepal (an LDC)	This will be confirmed by Checking location of IWM in the IWM Project Completion Certificate (PCC)	Yes/No
2	The CPA will remain under the total installed capacity threshold of 15 MW. ¹⁹ Each IWM installed under a CPA will be either long shaft or short shaft with minimum capacity of 2.83kW and 1.39 kW respectively.	The maximum power output of IWM is 5 KW and SSC threshold is 15 MW. Therefore maximum number of IWM to be included in the CPA = threshold capacity/max power of IWM= 15000/5= 3000, on conservative basis. The IWMs installed under the CPA meets the technical specifications as specified in the section A.6 of the PoA DD.	Yes/No
3	The improved water mills included in a CPA shall offer higher level of services through diversified end use (services of hulling/expelling etc.) and/or efficient grinding that will reduce the time for agro processing compared to that offered by traditional mills in baseline.	This will be confirmed by using technical specification in eligibility criteria 2.	Yes/No
4	SSC-CPA shall follow the baseline and monitoring methodology AMS I.B version 12 and shall meet the applicability criteria as discussed in section B.3.	This will be confirmed using eligibility criteria 2, 6 and 9	Yes/No
5	The CPA is exclusively bound to the PoA. Each IWM to be included in the CPA will have a unique identification numbers (AEPC-IWM-XXX-XXXX) as mentioned in section C. These unique identification numbers will prevent double counting of IWM in the PoA as well as in other IWM	This will be confirmed using Unique identification number of each IWM unit	Yes/No

¹⁹ Para 2 of Guidelines for demonstrating additionality of small scale project activities, ver 9, Annex 27, EB 68 states that project activities solely composed of isolated units where the users of the technology/measure are households or communities or small and medium enterprises (SMEs) and where the size of each unit is no larger than 5% of the small scale CDM thresholds. That is the size of each unit under 750 kW installed capacity or under 3000MWh of energy savings per year or 3000 tonnes of emission reduction per year.

S. N	Eligibility Criteria	Means for confirmation for CPA inclusion	Confirmation
	projects.		
6	The IWMs disseminated under the CPA has to be of higher capacity (compared to TWM) in the range of 1.39 kW for short shaft (minimum) and 2.83 kW for long shaft (minimum). Two types of IWM i.e. long shaft and short shaft to be considered. All IWM to be included in the CPA will be implemented complying with the technical specifications specified by AEPC as specified in section A.6 of the PoA-DD and ensures that the IWM is subject to the level and type of service, performance specifications including compliance with testing/certification.	This will be confirmed using IWM Project Completion Certificate (PCC) issued by the service provider	Yes/No
7	IWM owners contractually cede their rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC to the coordinating/managing entity (AEPC) of the PoA.	This will be confirmed using Emission Reduction Right Transfer agreement	Yes/No
8	Start date of the CPAs will be on or after the date of GSP of PoA. The starting date of the CPA will be verified by the database maintained by AEPC and also a signed letter from AEPC will be issued which will mention the starting date of each CPA.	This will be confirmed using application form submitted by the TWM or new IWM user to AEPC.	Yes/No
9	The target group of the CPA will be the TWM owners, and potential new IWM installers of the off-grid areas of the hilly areas. The IWM kit, supplied by prequalified (PQ) IWM manufacturers, will be directly installed by Service Centres.	This can be confirmed by checking the location of the IWM installation site. Government data will be used to confirm that the site is an off-grid area.	Yes/No
10	All CPAs will comply with the conditions related to sampling requirements for a PoA in accordance with the approved Guidelines for Sampling and Surveys for CDM project activities and POA (EB 75 Annex 8), refer to Appendix 5 for detailed sampling plan	This will be confirmed using criterion in Appendix 5 of PoA-DD.	Yes/No
11	All CPAs will comply with the conditions to provide an affirmation that funding from Annex 1 parties, if any, does not result in diversion of official development assistance (ODA).	This will be confirmed using letter of no diversion of ODA	Yes/No
12	All CPAs will comply with the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories	This will be confirmed using CPA-DD	Yes/No
13	The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact	Stakeholder consultation has already been performed at PoA level so not required at CPA level. Environment	Yes/No

S. N	Eligibility Criteria	Means for confirmation for CPA inclusion	Confirmation
	Analysis	Impact Assessment not required for IWM Projects ²⁰	

B.3. Application of technologies/measures and methodologies

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The approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA is AMS.I.B, titled “**Mechanical energy for the user with or without electrical energy**”, version 12.

The justification of the choice of the methodology and its applicability as defined in para 4 of AMS.I.B version 12 to SSC-CPA is as follows:

S. N.	AMS I.B, Version 12 Requirements	Project activity applicability
1.	To replacement or retrofitting of existing facilities	The project activity will involve installation of Improved Water Mills which will avoid installation of the diesel mills. The IWMs involve the capacity enhancement of low powered traditional water mills and new installations of the improved water mills.
2.	To greenfield facilities or project activities involving capacity additions	The project activities involve the new installation as well as the capacity enhancement of traditional water mills in absence of which the mechanical energy for the users would have been generated by fossil fuel (diesel). This refers to eligibility criteria 9 mentioned in section B.2 of the PoA DD.
3.	The methodology comprises renewable energy generation units that supply individual or group of households or users with mechanical energy who otherwise would have been supplied with fossil fuel based energy. These units include technologies such as hydropower, wind power, renewable biomass based energy generation and other technologies that provide mechanical energy, all of which is used on-site by the individual household (s) or user(s), such as wind-powered pumps, solar water pumps, water mills and wind mills.	Project activity is an installation of Improved Water Mill (IWM), which will avoid installation of diesel mills. In the absence of those IWMs, the mechanical energy for the users would have been provided by fossil fuel (diesel) based mills. This refers to eligibility criterion 5 mentioned in section B.2 of the PoA-DD
4.	Where generation capacity is specified, it shall be less than 15MW. If the generation capacity is not specified, the estimated diesel-	The total installed capacity of individual CPAs covered under this PoA will be less than 15 MW, to meet small scale project activity criteria (EB68, Annex 27).

²⁰ As per EPA and EPR (1997) (as amended on February 2, 2009), IEE is required for the hydropower projects from 1MW to 50 MW, while EIA is required for the project above 50MW. Projects less than 1MW do not require documentation of any impact assessment. (Source: EPA and EPR, 1997)

S. N.	AMS I.B, Version 12 Requirements	Project activity applicability
	based electricity generating capacity that would be required to provide the same service or mechanical energy shall be less than 15 MW. In the case of irrigation where diesel fuelled pumps are used directly, the cumulative rating of diesel-fuelled pumps shall not exceed 15 MW. The size of a diesel-based generator or a diesel pump that would be required shall be justified.	The IWM installation will prevent installation of DMs in the future. At present, DMs of installed capacity 10hp to 16hp are in operation in Nepal. ²¹ This refers to eligibility criterion # 2 mentioned in section B.2 of the PoA-DD.
5.	For irrigation applications involving replacement of the pump in addition to renewable energy use, the operating characteristics (head v/s discharge and efficiency) of the new pump should be similar to or better than the system being replaced or would have been replaced. In irrigation applications where the water distribution system is replaced or modified, the new system should have distribution efficiency similar to or better than the replaced system.	NA since the project activity is not under irrigation application in compliance with eligibility criterion # 1 mentioned in section B.2 of the PoA-DD.
6.	If the project equipment includes renewable units and diesel fired units (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable units. For co-fired systems, the total installed mechanical energy generation capacity of the project equipment, when using both fossil and renewable fuel, shall not exceed 15MW.	The total installed capacity of individual CPAs covered under this PoA will be less than 15 MW. This refers to the eligibility criterion # 2 mentioned in section B.2 of the PoA-DD. Project activity only covers renewable energy component.
7.	<ul style="list-style-type: none"> In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units; 	<ul style="list-style-type: none"> The project activities involve addition of renewable energy generation units. Once a IWM unit under the project activity is installed, it is tagged with the unique IWM identification tag which will physically distinguish it from other existing units. Project activity fits under both Cases: <ol style="list-style-type: none"> Adding new units Replacing old units for more efficient units. <p>The total installed capacity after adding the new units (case I) and installed capacity of</p>

²¹This has been confirmed by the "Baseline study of Improved Water Mills (IWM) as a Clean Development Mechanism (CDM) project" conducted on May 2012.

S. N.	AMS I.B, Requirements	Version 12	Project activity applicability
	<ul style="list-style-type: none"> In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW. 		more efficient units (IWMS) (case 2) covered under the each CPAs of this POAs will be less than 15 MW. This will be validated using eligibility criterion 1 and 2 mentioned in section B.2 of the PoA-DD.

B.4. Date of completion of application of methodology and standardized baseline and contact information of responsible person(s)/ entity(ies)

>>Date of completion of final draft of the baseline section and monitoring methodology (under re-submission)

28/08/2014

Name and contact details of the person/entity determining the baseline

Name: Mr. Raju Laudari
 Position: Assistant Director, AEPC, Nepal
 Contact No: +977-1-5539390
 Email: raju.laudari@aepec.gov.np

Mr. Hemant Nandanpawar
 International Carbon Market Specialist-Consultant
hnandanpawar@cmp-adb.org

Asian Development Bank (ADB)
 Technical Support Facility, Carbon Market Program (CMP)
 Regional & Sustainable Development Department (RSDD)
 6, ADB Avenue, Mandaluyong City, 1550, Metro Manila, Philippines

SECTION C. Management system

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AEPC would implement, coordinate and manage the project and PoA activity. AEPC is the implementer of all CPAs. Overall roles and responsibilities of AEPC are mentioned herewith. AEPC would execute the PoA in all the potential districts of Nepal. The specific tasks that AEPC would take up under CDM - PoA implementation are as follows, in line with the CME manual/guideline.

- (i) Task 1: Record keeping system for each CPA under the PoA

The AEPC would ensure that project specific documents and records are maintained. RSCs would register all IWM implemented under the PoA in a database and report to AEPC. AEPC would maintain appropriate records documenting the following²²:

1. The exact location of each IWM included in the CPA e.g. district, Village Development Committee (VDC), Ward/Tole²³ etc.

²²Tripartite agreement

The details of the IWM installed will be recorded by collecting the following information: miller's name, district, VDC, ward number, village name, name of the river, type of IWM, installation date and manufacturer's name. Each IWM will be tagged with unique identification number (AEPC-IWM-XXX-XXXX) which contains the CPA reference.

2. The name, address, specifications and number of TWMs replaced along with details of IWMs installed in the CPA.

According to the design of the PoA, an IWM request form would be delivered to each eligible TWM owner where IWM would be installed by AEPC. The TWM owners, with the help of GOA, submits duly filled in and signed application form to the local Service Centre. The Service Centre, after feasibility study²⁴, orders IWM kit to the pre-qualified IWM manufacturer on behalf of owners. The application forms will be retrieved along with the TWMs from the consumer to whom IWMs are delivered and installed in place of TWMs. The forms would have a unique identification number of IWM (AEPC-IWM-XXX-XXXX) and would bear the signature and Citizenship number of the IWM owner. Thus it would help track the IWM's which have been delivered and the TWMs which have been retrieved. It will also help in the overall monitoring of the Project. After the installation of IWM, the Project Completion Certificate (PCC) is submitted to RSCs. After evaluation of PCC and monitoring field visit (random), RSCs will make recommendation for subsidy to AEPC.²⁵

3. The names, addresses and monitoring data of each IWM owner involved in sample monitoring for ex-post monitoring surveys to determine ex-post IWM usage.
4. Destruction of TWMs:
Replaced TWM parts will not be used at any other location as only wooden shaft and runner are replaced. Hence, maintenance of destruction records is not required.
5. Procedure for technical review of inclusion of CPAs
 - a. PoA concerned person/team of CME will check the new CPA's thoroughly as per the CPA inclusion eligibility criteria mentioned in the section B.2 complying the available standard of Annex 5 of EB 74
(http://cdm.unfccc.int/filestorage/w/c/RW9OMG0PD8HLYK46SBQZT2V713IUNE.pdf/eb74_r_eplan05.pdf?t=cXd8bXc3MjR4fDAeOTRFNt8u4zJ-hJ6EEt9n)
 - b. A small report of CPA eligibility will be then submitted to higher responsible authority of CME for checking, discussion and approval.
 - c. Any issues raised by the CME authority will be addressed appropriately while finalising about CPA eligibility for inclusion into the PoA.

- (ii) Task 2: System/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as CDM project activity or as a CPA of another PoA

The IWMs installed under IWM Programme are listed in AEPC database along with unique identification number (AEPC-IWM-XXX-XXXX). These IWM units will not be accounted in any other CDM project. The unique identification number of each installed IWM will ensure that each installed IWM are not counted double.

²³ A ward is a subdivision of a municipality or VDC. Nine wards make up a VDC. A tole is a specific community area in a VDC or municipality. There may be more than one tole in certain ward of a VDC/municipality.

²⁴ CRT/N will evaluate the feasibility study and quality control of the IWM kit and its installation.

²⁵ AEPC, only after evaluation of PCC, releases 90% of subsidy to Service Centre and Manufacturer and holds 10% amount as guarantee fund that will be released after a year from third party consultant.

AEPC would also cross-check with the UNFCCC data available on registered IWM projects from Nepal to ensure that IWMs already covered under the CPAs is not a part of another PoA and is not a registered CDM project.

Double counting is avoided by giving each IWM a unique identification number. The disseminated IWM can be traced to one specific CPA to avoid double counting through its unique identification number. One separate hard copy file is created for each IWM disseminated.

PP will keep record of CAR/CLs raised by DoE during each CPA addition process and further these issues will be assessed and accordingly process of CPA inclusion will be improved.

- (iii) Task 3: The provisions to ensure that individual IWM owner covered under CPA are aware and have agreed that their activity is being subscribed to the PoA;

As a CDM requirement, there has to be an agreement between individual IWM owner and AEPC as the operating/managing entity of PoA. The agreement should cover that the individual IWM owner under the IWM programme, are aware and have agreed that their project activity covered in specific CPA is being subscribed to the PoA. Also, it should cover CER sharing arrangement between AEPC and individual IWM user.

The IWM owners transfer all legal rights, credits, entitlements, and benefits from the project to AEPC. The service centre will inform the individual IWM owners during feasibility study and issuance of the PCC that each IWM will be the part of the respective CPA and the emission reductions from the owner will transferred to AEPC as AEPC is the implementer of all CPAs.

- (iv) Task 4: The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.

The proposed project is not a de-bundled component of a large-scale CDM project activity. The paragraph 14 of methodological tool "Assessment of de-bundling for small-scale project activities (Version 04, EB83 annex 13) states that *"If each of the independent subsystems/measures (e.g., biogas digester, residential solar energy systems, kerosene or incandescent lighting replacements) included in one or more CDM project activities is no greater than 1% of the small-scale thresholds defined by the applied methodology and the subsystems/measures are indicated in the PDDs to be each implemented at or in multiple locations (e.g. installed at or in multiple homes), then these CDM project activities are exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity."*

Each independent measure of the CPA is installation of IWMs of max 5.0 KW installed capacity which is far less than 1% of 15 MW limit applicable for small scale projects as per methodological tool "Demonstration of additionality of small scale project activities", Ver 10, EB83, Annex 14, paragraph 11 "c".

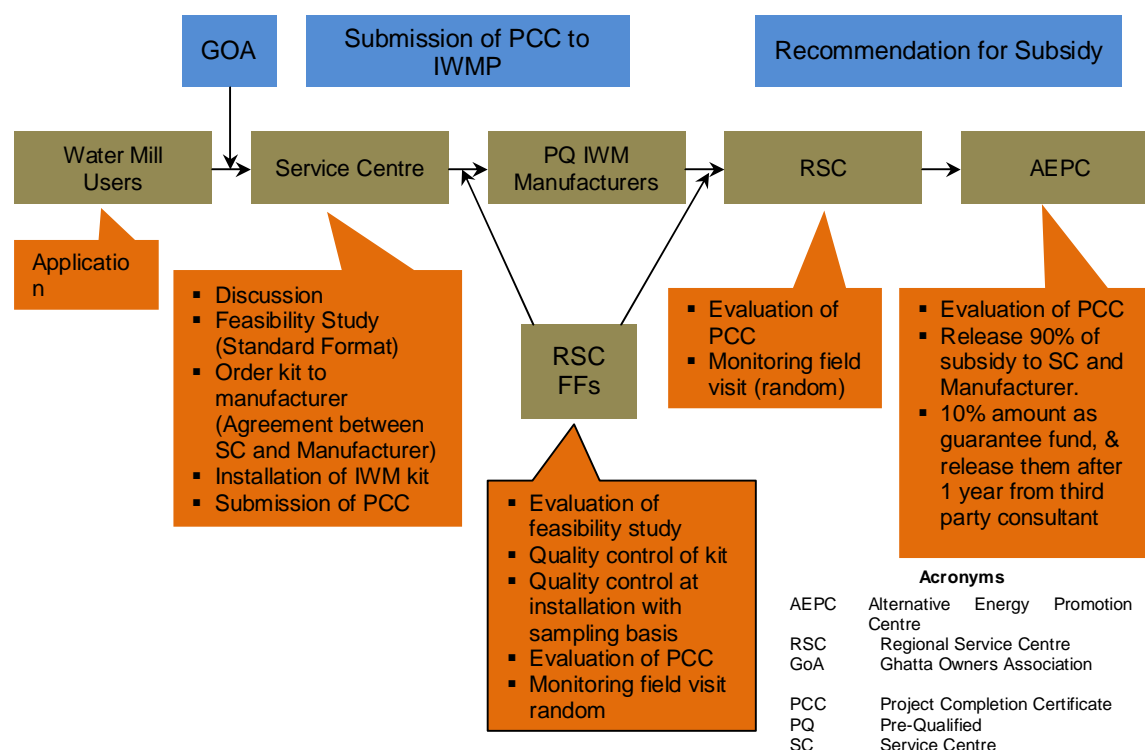


Figure 6: Parties involved in IWM installation and their roles and responsibilities

Stakeholders	Roles and Responsibilities
AEPC	<ul style="list-style-type: none"> Evaluation of PCC Release 90 percent of subsidy to SC and manufacturer 10 percent amount as guarantee fund and release them after one year from third party consultant
Regional Service Centre (RSC)	<ul style="list-style-type: none"> Evaluation of feasibility study Quality control of kit Quality control at installation with sampling basis Evaluation of PCC Monitoring field visit (random)
Donor	<ul style="list-style-type: none"> Provide financial assistance
Service Centre	<ul style="list-style-type: none"> Discussion Feasibility study in standard format Order kit to manufacturer (agreement between SC and Manufacturer) Installation of IWM kit Submission of PCC
GoA	<p>Umbrella organization of the mill owners whose specific roles and responsibilities are to:</p> <ul style="list-style-type: none"> Advocate and policy lobby with other stakeholders for the benefits of water mill owners Conduct marketing campaigns for the promotion of IWM Conduct capacity building activities to the mill owners Act as guardian for the issues related with water mill
Water Mill Owners	<ul style="list-style-type: none"> Application for Improved Water Mill Installation Provide core service i.e. grinding, hulling, oil expelling etc Handle the IWM kit properly and do small repair and maintenance Promote the end use activities such as electricity generation, beaten rice, <i>chiuri</i> processing, tea processing etc.

The PoA management system is elaborated as per para 19 EB 74 Annex 05 is presented below:

	Requirement	Justification
a)	Responsibilities of the concerned stakeholders.	<p>AEPC is responsible for</p> <ul style="list-style-type: none"> ▪ Implementation of the PoA . ▪ Support GoN in formulation of policies, plans for promotion of Renewable Energy Technologies in Nepal. ▪ Selection of the Regional Service Centres (RSCs). ▪ Administration of subsidy for IWM. ▪ Assure the competence of staffs involved in executing the PoA and review and assess the performance of staffs involved in executing the PoA using the competency matrix.²⁶ ▪ Establishing and maintaining the IWM credit fund²⁷ for IWM owners. <p>The specific roles and responsibilities of components under AEPC for the implementation of this PoA are as follows:</p> <p>Climate and Carbon Subcomponent (CCS) is responsible for:</p> <ul style="list-style-type: none"> ▪ Ensuring full compliance with CDM processes related to documentation, validation, monitoring and verification of IWM PoA. ▪ Establishing communication with the UNFCCC and DOE on the matters related to CDM PoA. ▪ Conducting Annual IWM Users' Survey for Emission Reduction monitoring. ▪ Releasing annual activities to Regional Service Centres (RSCs) regarding implementation and monitoring of IWM PoA. <p>Community Electrification Subcomponent (CES) is responsible for:</p> <ul style="list-style-type: none"> ▪ Management to ensure the proper implementation of IWM PoA. ▪ Facilitates AEPC in administration of subsidy for IWM. ▪ Quality control, component internal monitoring of IWM through RSCs and service centers (SCs). ▪ Pre-qualification of the IWM kit manufacturing companies and SCs. ▪ Releasing annual activities to Regional Service Centres (RSCs) regarding the capacity building of concerned stakeholders i.e. Service Centers, Ghatta Owners Association (GOA), IWM owners, Kit manufacturing companies. <p>Regional Service Centers (RSCs) are regional NGOs or companies working for AEPC for the implementation of</p>

²⁶Details of competence checking and performance appraisal has been discussed on the CME manual, please refer CME manual for details..

²⁷This fund is not in place till now but is envisaged to be piloted by FY 2013/14 in three districts of Nepal.

		<p>renewable energy programmes. For this PoA RSCs are responsible for:</p> <ul style="list-style-type: none"> ▪ Facilitating the implementation of IWM PoA at regional and district levels. ▪ Evaluating the project completion report submitted by SCs and process it for subsidy release. ▪ Capacity building of Service Centers, Ghatta Owners Association (GOA), IWM owners, Kit manufacturing companies. ▪ Monitoring the status of IWM installed by SCs under the PoA. ▪ Maintaining the database of IWM installed under the PoA and report monthly to AEPC. ▪ Maintain documentation of IWM installation report and ER transfer slip in hard copies. <p>Service Centres (SCs) are local partner organizations working for RSCs for the implementation of IWM at specific local levels. In some cases, the Ghatta Owners Association (GOA) handles the dual responsibilities of SCs and GOAs; however, the responsibilities discussed here are for the Service Centres (SCs) and not for GOAs but applies to GOAs that act as service centres. For this PoA, SCs are responsible for:</p> <ul style="list-style-type: none"> ▪ Demand creation of IWM at local level. ▪ Conduct a feasibility study for the application received and submit it to the RSCs.. ▪ Order for manufacturing of the IWM Kits with the Kit Manufacturing Companies once the feasibility study is approved by RSCs. ▪ Install IWM at the respective site and once the installation is complete submit project completion report to RSCs. ▪ Facilitate the monitoring of CPAs in their service coverage area during annual IWM users' survey conducted by an independent third party. ▪ Filling in the IWM owners information in the Owners Booklet and submit the details to the IWM owners <p>IWM Kit Manufacturers are the private companies pre-qualified by AEPC (CES) for the manufacturing of the IWM kits and spare parts. For this PoA, the Kit Manufacturers are responsible for:</p> <ul style="list-style-type: none"> ▪ Preparing the IWM kits based on approved standards and guidance set out specifically for the construction of IWM kits.
b)	Competence review of personnel involved in CPA inclusion	<p>As a CME of the PoA, AEPC will be responsible to review the competence of the personnel involved in CPA inclusion. The CPA inclusion process essentially requires input from the concerned program officers of the respective sub-components; namely, Climate and Carbon Sub-component and Community Electrification Sub-component. AEPC ensures the qualified personnel in the capacity of respective program officers through the following:</p> <ul style="list-style-type: none"> ▪ All the concerned personnel are recruited through competitive selection procedure and the required sectoral knowledge is the most prominent criteria

		<p>during selection procedure.</p> <ul style="list-style-type: none"> ▪ In order to get satisfied with the competence of the concerned personnel in deliverance of desired output, they are closely observed during the probation period of 3 months and after the successful completion of this probation period, the employment is confirmed. ▪ Performance of the concerned personnel is evaluated through annual appraisal by the immediate supervisor of the concerned individual. The contract of the personnel is extended only if he/she has performed the assignments acceptably otherwise the contract is terminated. Personnel are evaluated on the grounds of achievements made against the annual activities outlined in work plan and the mode of action for conducting those activities. ▪ Despite the competence review process mentioned above, AEPC has right to terminate contract of any personnel if he/she fails to deliver the output.
c)	Training and capacity development	<p>AEPC ensures quality control and quality assurance by providing the following capacity building activities to different stakeholders through RSCs:</p> <ul style="list-style-type: none"> ▪ Service Centres <ul style="list-style-type: none"> ○ IWM installation training ○ IWM repair and maintenance training ○ Subsidy form processing ▪ IWM Kit Manufacturing Companies: <ul style="list-style-type: none"> ○ IWM design and manufacturing training ○ QA/QC while fabricating the IWM kits ▪ IWM Owners: <ul style="list-style-type: none"> ○ Enterprise development training, ○ Orientation to IWM owners about GESI in the enterprise ○ General repair and maintenance training. ○ Orientation on the monitoring of different components of the IWM. ▪ Ghatta Owners Association (GOA) <ul style="list-style-type: none"> ○ Orientation on water right and land use
d)	Procedures for technical review of inclusion of CPAs	<ul style="list-style-type: none"> ▪ All required data/information (user's name, address, IWM installation date, the name of the installer, unique identification number etc) of all IWM that are installed will be recorded in the central database at AEPC. ▪ Data of particular IWM will be stored CPA wise in the AEPC's database system. This will help to differentiate the IWMs according to respective CPA. ▪ Once the installation number of IWM reaches 3,000 (maximum), Carbon Financing Officer at Climate and Carbon Subcomponent with the concerned Program Officer of Community Electrification Subcomponent will review the database and check all the information required for inclusion of the IWM in a CPA. Maximum 3,000 IWMs will then be bundled as a single CPA. ▪ The Program Officers at Climate and Carbon Subcomponent and Community Electrification

		<p>Subcomponent will verify the information in the ER transfer slip with the information at central database system.</p> <ul style="list-style-type: none"> ▪ During CPA inclusion, the program officer will check the eligibility criteria as mentioned in the PoA-DD. ▪ National Advisor of Climate and Carbon Subcomponent will review the CPA inclusion procedure in line to the requirement of the PoA-DD. ▪ Manager of Climate and Carbon Subcomponent will perform the quality check and recommend for inclusion of the specific CPA in the PoA. ▪ Finally AEPC will submit all necessary documents to DOE for the inclusion of CPA in the PoA
e)	A procedure to avoid double counting	<ul style="list-style-type: none"> ▪ All IWMs disseminated under the PoA will be provided with unique identification number (CDM Code) which will ensure the avoidance of double counting. ▪ The CDM code will be provided to the RSCsin the form of metallic tag which will have printed IWM unique code over it and it will be tagged in the IWM. As the individual tag will contain unique number, this prevents double counting. this tag will be different The web-portal prevents the CDM code double counting i.e. a single code cannot be allocated to more than one IWM. ▪ The IWM tags will be provided to the installer through RSCs. Once the installer installs IWM and tags unique code in it, he/she also record the owner information in the IWM users manual. ▪ IWM CDM codes will be also cross-checked and verified internal monitoring of IWM by RSC staffs and also during the monitoring of IWM during subsidy release process. This will also prevent the multiple subsidy allocation to the same owner. ▪ All IWM implemented under the PoA will be listed in the database. The database system will be designed with the principle of not accepting the same unique number twice. ▪ Double counting check will also be done during the annual IWM users' survey conducted by an independent third party. ▪ A double counting check will be conducted by checking the UNFCCC database, to compare this PoA with the CPAs of other PoAs or other registered CDM project. Similarly, the database of other carbon schemes like Gold standard and VCS will also be checked to confirm that the CPA of the proposed PoA is not a part of CPAs of other PoAs or other registered CDM projects.
f)	Records and documentation control process for each CPA under the PoA	<ul style="list-style-type: none"> ▪ The numbers of IWM disseminated will be reported by SCs to RSCs. The RSCs will enter the data in its database and will send monthly IWM installation report to AEPC. The quarterly and semi annual progress reports of RSCs on IWM activities in hard copy will also be submitted to AEPC. AEPC will manage the overall database of the program. ▪ AEPC will maintain the central database in

		<p>electronic format as well as hard copy. The database will include all the information regarding the ICS users-unique number (including CPA number), user's name, address, date of IWM installed, name of installer and the amount of direct subsidy given for every IWM disseminated.</p> <ul style="list-style-type: none"> ▪ The hard copies of the database, ER transfer slips and unique ID (CDM code) will be filed and kept (recorded) at AEPC and RSCs ▪ The record of installation report, progress report, ER transfer slip will be also monitored during the annual IWM users' survey conducted by an independent third party.
g)	Measures for continuous improvements of the PoA management system	<ul style="list-style-type: none"> ▪ AEPC will implement continuous monitoring and improvement processes in order to ensure proper implementation of the PoA complying with the CDM processes. ▪ Continuous improvement will be done by AEPC through processes such as internal monitoring, update on training manuals, designs of IWM, trainings and capacity building of program staffs and continuous monitoring on recommended changes or updates by UNFCCC of related PoA procedures. ▪ AEPC will also improve and upgrade the data management system and procedures for quality assurance. These systems and procedures will be reviewed on a continuous basis to ensure that no double counting of emission reductions occurs within and across CPAs ▪ In order to ensure that the CME manual embraces all recent developments, it is subject to review in every 2 years.

SECTION D. Duration of PoA

D.1. Start date of PoA

>>

05/10/2011 (GSP uploading date)

D.2. Duration of the PoA

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28 years

The typical life of the IWM is 10 years. After every 10 years installed IWM will be checked for refurbishment /modification for continued operation for next 10 years (long shaft or short shaft) and continue of GHG emission reduction contribution. The IWM will not be included in respective CPAs, if it is not refurbished or modified as per the maintenance requirement.

SECTION E. Environmental impacts

E.1. Level at which environmental analysis is undertaken

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1. Environmental Analysis is done at PoA level
2. Environmental Analysis is done at CPA level



Justification of conducting at PoA level is that the PoA covers the entire country and the environmental impact would be felt at a national level. Also aggregation of data and monitoring can be best managed federally with institutional support from the implementing agencies.

As per the Environment Protection Act (EPA) dated 30 January 1997 and Environment Protection Regulation (EPR) dated 26 June 1997, 12 sectors are required to undertake environmental impact assessment studies. It should be noted here that documentation of the environmental impacts, Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) is not a regulatory requirement in Nepal for installation of the IWM. As described above referring to Environment Protection Act, 1997, EIA is not required for IWM project in Nepal.²⁸ As per the eligibility criterion 5, the maximum energy output of IWM is 5 KW which is less than 1 MW so there is no need of conducting project EIA.

The implementation of IWM does not result in any significant negative environmental impact; on the contrary, it brings several benefits to the environment like- usage of renewable energy, time saving during processing, and drudgery of rural people reduced by using IWM. Since IWM is renewable energy based technologies, it will not have any adverse impact on human and environment.

As there will be no variation in the IWM basic technology at CPA level and no negative impacts are expected from the implementation of the IWM project, Environmental Analysis will not be required at CPA level.

E.2. Analysis of the environmental impacts

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As per the Environment Protection Act dated 30 January 1997 and Environment Protection Regulation dated 26 June 1997, 12 sectors are required to undertake environmental impact assessment studies. Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) is not a regulatory requirement in Nepal for installation of the IWM. The IWM being a renewable energy project and small scale project, the project activity has no significant impact on the environment and the same are discussed below:

A) Environmental Impact during construction phase

- **Impact on air quality** - Movement of construction material during construction will have some impact on the air. Emissions during this phase are localized and temporary, limited to the construction period only. As transportation is not substantial for the project activity, the impacts will be negligible. Overall, the project will have a beneficial impact on air quality due to the avoidance of fossil fuel based energy generation.
- **Impact on water quality** - As there is no involvement of chemicals, groundwater contamination due to disposal of chemicals is ruled out. Not much water discharge takes place during construction. However, proper sanitary arrangements need to be provided by the project proponents.
- **Impact due to noise** - The noise levels produced during construction will not have a significant impact on existing ambient noise levels at receiving sites as noise generating activities are dispersed and is confined to the construction phase only. Hence, the negative impact from construction noise is deemed to be negligible. Personal protective equipments were provided to workers involved in the construction activity to mitigate the effects of noise pollution, but they have no impact on ambient noise level.

B) Environmental Impact during Operation and Maintenance Phase

²⁸ As per EPA and EPR (1997) (as amended on February 2, 2009), IEE is required for the hydropower projects from 1MW to 50 MW, while EIA is required for the project above 50MW. Projects less than 1MW do not require documentation of any impact assessment. (Source: EPA and EPR, 1997)

- **Impact on air** – IWMs are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation.
- **Impact on water** - There is absolutely no effluent discharge during operation of run of the river based water mills. No water pollution.
- **Impact on ecology** – Project being similar to run of the river installation of water mill, the Project will have no impact on biodiversity. No impact on wildlife habitat is predicted. Overall no harm on the ecological environment is envisaged.
- **Impact due to noise** - Noise is generated due to the movement of rotor blades but it is very much below the regulatory norms. It has no direct effect on the population, as the area is less populated and noise generated will be attenuated by ambient conditions. Considering the overall impact of the project in reducing GHG's, makes this effect negligible.
- **Socio-Economic Impacts** - There is no inconvenience to the local community due to the installation of IWMs. The locals are direct beneficiaries. The project activity improves employment rate and livelihood of local populace. Moreover, the project generates eco-friendly, GHG free power, which contributes to sustainable development of the region.

Conclusion - The project activity does not have any substantial adverse impacts on environment during its construction or operational phase. The human interest parameters would show positive impacts due to project activity contribution towards improving livelihoods of the rural households through improved access to energy services from the renewable energy based IWMs.

SECTION F. Local stakeholder consultation

F.1. Solicitation of comments from local stakeholders

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The local stakeholder consultation for the PoA has been undertaken by AEPC as the PoA co-ordinator through meetings with stakeholders like potential users of IWMs, owners of IWMs, TWMs and diesel mills, district government officials, media person, etc. The invitations for the stakeholder meeting were sent to the relevant stakeholders through individual letters distributed by door-to-door canvassing. The notice regarding the stakeholder consultation was also published in the local news paper "Lokmanch Daily" dated 03 April 2011. The local stakeholder consultations process was conducted at Surkhel on 18 April, 2011. A wide range of stakeholders were identified and invited through individual letters and were grouped under the following broad categories:

- Representatives from the mill owners (IWM, TWM, diesel mills)
- Residents of nearby districts, using services of water/diesel mills
- Media person
- Investors/Partners of the IWM programme
- Representatives from concerned government departments
- Local public representatives

Following information was provided to the stakeholders to get their comments, views and suggestions on the project.

- Information about climate change
- About the Technology, IWM
- The concept and objectives of the project
- Effects and benefits of the project
- Baseline scenario
- GHG Effect and Kyoto Protocol
- Clean Development Mechanism (CDM) and CDM Programme of Activities (PoA)

- Role of DNA
- Project implementation mechanism
- Legal requirements for the project
- Role of AEPC and responsibilities of participating IWM owners

After presentation about the programme, objective of the programme, introduction of Kyoto Protocol, CDM, role of stakeholder, role of DNA and about the IWM, floor was opened for the discussion, comments and suggestions. The comments and suggestions have been noted and filed. The major comments and queries from the stakeholders seem encouraging and motivated by concerns over the social and economical positive impacts of the programme.

F.2. Summary of comments received

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In general, the IWM Project is welcomed by the stakeholders after understanding about the project in view of its high potential to contribute towards improving livelihoods of the rural households through improved access to energy services from the renewable energy based IWMs and to meet the increasing motive power needs of off-grid rural communities.

The participants welcomed both the programme and the opportunity to exchange their view at the meeting. They were happy to know about the various technical, economical and environmental advantages of installation of IWM under the project which will meet their high power milling requirements. They were happy to know that the IWM will lead to the faster milling and less waiting time with more efficient mills, reduction of workload (mainly for women and children) from mechanized milling of paddy and pressing oil thus avoiding drudgery related to manual milling and diversified processing services will be available for rural households from this project. The participants were happy to know about the subsidy policy of Nepal for IWM which would promote the local entrepreneurship since the technology and the spare parts for the improved water mills are manufactured locally in the region through the companies pre-qualified by AEPC for such activities.

The participants were also happy to know that the IWM implementation programme will help in optimum utilisation of natural resources (water) and reducing environmental degradation and climate change. Further, the participants appreciated the efforts of AEPC for exploring the possibility of additional financing through CDM which may in turn, will help to further reduce the IWM installation cost. Overall impression about the project was very positive and participants also mentioned that the meeting was useful, educative and informative.

F.3. Report on consideration of comments received

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The comments were positive as the IWM is environment friendly and it will help to avoid DM installation. The summary of the answers/responses provided to stakeholder's queries/concerns by the AEPC team and other concerned experts during stakeholders' consultation process is as under.

S.N	Stakeholder queries/concerns	Response of PoA CME and other concerned experts
1	How many renewable energy CDM projects have been registered in Nepal?	There are altogether three registered CDM projects in Nepal. The two projects are related to the Biogas one project is related to the Micro hydro power.
2	Is AEPC involved in developing other new CDM projects apart from the biogas, IWM and	AEPC is currently in the process of developing two biogas CDM project

S.N	Stakeholder queries/concerns	Response of PoA CME and other concerned experts
	microhydro projects?	activities, one biogas PoA, ICS PoA CDM project activity.
3	What is the current amount of subsidy for installing the improved water mills?	The amount of subsidy is different for different districts in Nepal and it also varies as per the use of IWMs (whether it is only for Grinding or for other end use activities). The amount of subsidy for installing the IWMs can be found in the Rural Energy Subsidy Policy 2009.
4	Are there any benefits for the diesel mills owner from CDM?	The project which reduces the GHG is eligible for the CDM. The diesel mills owner can get benefit from CDM if they switch from diesel mill to IWM.
5	What would be the subsidy amount for installing IWM in Surkhet District?	As per the Rural Energy Subsidy Policy 2009, the subsidy amount for installing the IWM in Surkhet is NPR 12,000 for the short shaft and NPR 27,000 for long shaft with other end use activities.
6	What would be the benefits to the users for installing the Improved Water Mill instead of Traditional Water Mill?	The IWM will lead to the faster milling and less waiting time with more efficient mills, reduction of workload (mainly for women and children) from mechanized milling of paddy and pressing oil thus avoiding drudgery related to manual milling, and diversified processing services will be available for rural households from this project.
7	Will this IWM provide any employment opportunity?	The IWM would promote the local entrepreneurship as the technology and the spare parts for the improved water mills are manufactured locally in the region through the companies pre-qualified by AEPC for such activities.
8	How will the IWM project activity reduce the greenhouse gases?	The project will lead to reduction of GHG emissions, mainly CO ₂ by avoiding diesel mills installation and hence diesel fuel consumption that would be used for processing units in the absence of IWMs.
9	What would be the additional role and responsibilities of owners and other stakeholders after registering the IWM programme as CDM?	The continuous operation of the IWM is a must for receiving the carbon revenue from the IWM CDM project. The owner would thus be required to operate the IWM on a continuous basis. In addition to this, the IWM owner has to provide the emission reduction right transfer to AEPC for enabling AEPC to prepare CDM related documents such as the project design document, emission reduction calculation, monitoring reports etc.
10	What are the additional benefits to owners and other stakeholders after registering the IWM	AEPC is currently preparing the Carbon Revenue Utilization Guideline which

S.N	Stakeholder queries/concerns	Response of PoA CME and other concerned experts
	programme as CDM?	discusses about the utilization of carbon revenue earned by different CDM projects of renewable technologies. In this guideline, IWM has been identified as one of the technology that is eligible for earning carbon revenue. It is proposed that part of the revenue received from IWM CDM POA will be utilized for providing subsidy to new users, part of the revenue will be utilized for the user benefit plan, preparation of the CDM related documents, validation, verification etc. The 2% of the revenue received will also go to the DNA. The exact proportion of the benefits will be finalized and made available after the approval of Carbon Revenue Utilization Guideline from cabinet.

SECTION G. Approval and authorization

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The letter of approval (LoA) for the PoA was received from the designated national authority (DNA) on 19/05/2015.

PART II. Generic component project activity (CPA)

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPAs

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The PoA for Promotion of the Improved Water Mills (IWM) in Nepal, CPA # [add number] is a CDM program activity implemented and managed by Alternative Energy Promotion Centre (AEPC). IWM program is currently under the framework of National Rural and Renewable Energy Program (NRREP). With financial assistance from Government of Nepal (GoN) and donor agencies (currently Government of Norway and Government of Denmark) Regional Service Centre (RSC) will assist AEPC as the service centre to implement the IWM Programme. The main objective/goal of the IWM Project of AEPC in Nepal (Nepal) is to promote dissemination of IWMs replacing existing low powered, less efficient Traditional Water Mills (TWMs) to the existing TWM owners and or new installer²⁹ (potential diesel mill owners) in Nepal and to avoid possible switchover / installation of diesel based high powered mills to meet high powered milling requirements. The project activity will contribute towards improving livelihoods of the rural households through improved access to energy services from the renewable energy based IWMs and meeting the increasing motive power needs of off-grid³⁰ rural communities of hilly³¹ (hills and mountains) areas of Nepal.

The PoA for Promotion of the Improved Water Mills (IWM) in Nepal – CPA # [add number] consists of a set of IWMs which will avoid switchover to / installation of new high powered diesel operated mill (DM). Each CPA is defined as consisting of IWMs installed /to be installed pre defined time frame and within the limits of a small-scale project activity. The IWM units are installed with total power output capacity of less than 15 MW.

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. TWM is characterised by lower efficiency and inability to provide desired level of power for the end use. Hence the new installers and/or existing TWM owners are installing diesel run mills, which provide higher quantum of power with the similar size unit. The proposed IWM will do the same job of the TWM by improving the flat paddled wooden runner. The increased power output will 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. These reduce the drudgery of hand processing of paddy and oil seed. 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. During day time, the turbine is connected with the pulley that conveys power to milling unit while in the evening the pulley is connected with the generator to generate electricity. Although there is possibility for the generation of electrical energy, only mechanical energy generated by IWMs will be counted towards emission reductions.

Project Background

²⁹ New installer are those entrepreneur other than existing TWM owners who are potential diesel mill owners.

³⁰ Off-grid areas in Nepal are those where electricity is not supplied through the national grid.

³¹ Hilly areas are the potential location of IWM installation in hills and mountain areas of Nepal where AEPC is promoting IWM as specified by the RE-Subsidy-Policy 2009

In the hilly (hills and mountain)³² areas of the country, TWMs or *Ghattas*³³ are located on the banks of water sources with one mill typically serving 20 - 50 households. For TWM, with their low efficiency, it is hard to cope with the increasing processing needs (e.g. grinding, hulling, oil expelling, etc.) of the off-grid rural communities. As a consequence, number of diesel powered mills are growing in rural areas and increasingly taking over processing tasks as many communities still don't have access to national grid. In order to avoid possible switchover/installation of the proliferating Diesel Mills (DMs) by existing TWM owners and/or new installer³⁴ in the hilly areas, where there used to be TWMs, an improved version of TWM is being promoted in Nepal.

The IWM is a modified/improved version of TWM, which is more efficient. The project will support installation of IWMs (long shaft and short shaft) in various parts of Nepal replacing TWMs. IWM technology has improved performance and is more reliable compared to TWMs. Due to the increased performance, the scope of services of the mills can be widened. The technology has been tested extensively and has already proven its effectiveness by fulfilling the requirement of the rural communities. The objective of the IWM Programme is to further up-scale IWM to improve livelihoods of water mill owners and users, and strengthen capacity of institutional set up for the sustainability of IWM sector as a renewable energy solution in rural Nepal.

The programme will provide technical support to and enhance capacity of local enterprises for technology transfer and replication. The project addresses the increasing processing needs (e.g. grinding, hulling, oil expelling, etc.) of rural communities, which currently depend on the services of local TWMs and encroaching DMs. As the low powered, less efficient TWMs have not been able to cater to the increasing processing needs of people, DMs are fast entering the potential areas. There is an increasing trend of switching to a high carbon emitting DMs due to its faster processing time, less waiting time and great volume of processing capacity. These mills have disturbed the self-reliant set up of villages, increased the dependency on imported machinery and fossil fuel, and affected the environment in the villages due to local air pollution and greenhouse gas (GHG) emissions in the atmosphere. The project will avoid installation of diesel based mills for processing (e.g. grinding, hulling, oil expelling, etc.), thus avoiding fossil fuel (diesel) consumption and reducing GHG emission. Considering the huge amount of diesel required to run DMs, replacing DMs with IWMs would have a huge potential of GHG emission reduction.

Besides curtailing GHG emission, the programme aims to contribute to the sustainable development of the country in following ways:

- Use available natural energy resources efficiently
- Improve livelihoods of rural households i.e. mill owners and users
- Increase access to basic energy services to rural people
- Avoid local pollution from diesel mills in communities
- Reduce dependency on fossil fuels
 - (i) Reduce time for processing (e.g. grinding, hulling, oil expelling, etc.)

SECTION B. Application of a baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology (ies) and standardized baseline(s)

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³² Hilly areas are the potential location of IWM installation in hills and mountain areas of Nepal where AEPC is promoting IWM as specified by the RE-Subsidy-Policy 2009.

³³ Ghatta is the local term used for water mill

³⁴ New installer are those entrepreneur other than existing TWM owners who are potential diesel mill owners

The approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA is AMS.I.B, titled “**Mechanical energy for the users with or without electrical energy**”, version 12.

B.2. Applicability of methodology (ies) and standardized baseline(s)

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The justification of the choice of the methodology and its applicability as defined in para 4 of AMS.I.B version 12 to SSC-CPA is as follows:

S. N.	AMS I.B, Version 12 Requirements	Project activity applicability
1.	To replacement or retrofitting of existing facilities	The project activity will involve installation of Improved Water Mills which will avoid installation of the diesel mills. The IWMs involve the capacity enhancement of low powered traditional water mills and new installations of the improved water mills.
2.	To greenfield facilities or project activities involving capacity additions.	The project activities involve the new installation as well as the capacity enhancement of traditional water mills in absence of which the mechanical energy for the users would have been generated by fossil fuel (diesel). This refers to eligibility criteria 9 mentioned in section B.2 of the PoA DD.
3.	The methodology comprises renewable energy generation units that supply individual or group of households or users with mechanical energy who otherwise would have been supplied with fossil fuel based energy. These units include technologies such as hydropower, wind power, renewable biomass based energy generation and other technologies that provide mechanical energy, all of which is used on-site by the individual Household (s) or user(s), such as wind-powered pumps, solar water pumps, water mills and wind mills.	Project activity is an installation of Improved Water Mill (IWM), which will avoid installation of diesel mills. In the absence of those IWMs, the mechanical energy for the users would have been provided by fossil fuel (diesel) based mills. This will be validated using eligibility criterion 5 mentioned in section B.2 of the PoA-DD
4.	Where generation capacity is specified, it shall be less than 15MW. If the generation capacity is not specified, the estimated diesel-based electricity generating capacity that would be required to provide the same service or mechanical energy shall be less than 15 MW. In the case of irrigation where diesel fuelled	The total installed capacity of individual CPAs covered under this PoA will be less than 15 MW, to meet small scale project activity criteria (EB68, Annex 27). The IWM installation will prevent installation of DMs in the future. At present, DMs of installed capacity 10hp to 16hp are in operation in Nepal. ³⁵ This will be validated using eligibility criterion 2 mentioned in section B.2 of the PoA-DD.

³⁵This has been confirmed by the “Baseline study of Improved Water Mills (IWM) as a Clean Development Mechanism (CDM) project” conducted on May 2012.

S. N.	AMS I.B, Version 12 Requirements	Project activity applicability
	<p>pumps are used directly, the cumulative rating of diesel-fuelled pumps shall not exceed 15 MW.</p> <p>The size of a diesel-based generator or a diesel pump that would be required shall be justified.</p>	
5.	For irrigation applications involving replacement of the pump in addition to renewable energy use, the operating characteristics (head v/s discharge and efficiency) of the new pump should be similar to or better than the system being replaced or would have been replaced. In irrigation applications where the water distribution system is replaced or modified, the new system should have distribution efficiency similar to or better than the replaced system.	NA since the project activity is not under irrigation application as per the compliance with eligibility criterion 1 mentioned in section B.2 of the PoA-DD.
6.	If the project equipment includes renewable units and diesel fired units (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable units. For co-fired systems, the total installed mechanical energy generation capacity of the project equipment, when using both fossil and renewable fuel, shall not exceed 15MW.	The total installed capacity of individual CPAs covered under this PoA will be less than 15 MW. This will be validated using eligibility criterion 2 mentioned in section B.2 of the PoA-DD.
7.	<ul style="list-style-type: none"> ▪ In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units; ▪ In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW. 	<ul style="list-style-type: none"> ▪ The project activities involve addition of renewable energy generation units. Once a IWM unit under the project activity is installed, it is tagged with the unique IWM identification tag which will physically distinguish it from other existing units. ▪ Project activity fits under both Cases : <ol style="list-style-type: none"> 1) Adding new units 2) Replacing old units for more efficient units. <p>The total installed capacity after adding the new units (case 1) and installed capacity of more efficient units (IWMs) (case 2) covered under the each CPAs of this POAs will be less than 15 MW. This will be validated using eligibility criterion 1 and 2 mentioned in section B.2 of the PoA-DD.</p>

B.3. Sources and GHGs

Table below shows the emission sources and gases included or excluded in the project boundary

	Source	Gas	Included?	Justification/Explanation
Baseline	Operation of diesel based mill to generate mechanical power which will be avoided due to the project activity	CO ₂	Yes	Main emission source
		CH ₄	No	No significant emissions.
		N ₂ O	No	
Project Activity	Additional mechanical power generation with Improved Water Mill, in the project activity	CO ₂	No	Since the proposed project activity is similar to the run-of-river renewable hydropower project, there will not be generation of CH ₄ and other GHG emissions. Hence the project activity emissions are taken as nil.
Leakage	New IWM in place of TWM	CO ₂	No	No energy generating equipment is transferred from another activity or the existing equipment is transferred to another activity. Hence the leakage is not considered.

B.4. Description of baseline scenario

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The baseline scenario is the use of diesel based mills to cater the milling related services. Para 12 of the methodology AMS.I.B version 12 requires project proponent to demonstrate that equipment used to generate mechanical energy is fossil fuel based generator(s) or pump(s) without renewable component or co-firing of renewable biomass and para 14 specifies the conditions where the diesel is deemed to be the baseline under the suppressed demand scenario. Similarly, para 15 (b) deems the existence of the scenario of suppressed demand if the project activity is located, among others, in the Least Developed Countries (LDC). Since, Nepal is a least developed country³⁶³⁷, according to para 14 of the methodology, the baseline for the project is diesel based milling services by default.

Apart from the methodological guidance, for the project activity of IWMs replacing existing TWMs in Nepal, four alternative scenarios could be possible. Each of these alternative scenarios has been passed through the barrier test as described below for identification of project baseline scenario.

Four alternative scenarios are possible to the IWM Programme:

- a) Mandatory replacement of old TWMs and diesel based mills with new IWMs with same or greater efficiency without being registered as a CDM project activity:

This alternative is not applicable as there is no mandated legal requirement for replacing TWM and diesel based mills with IWMs in Nepal.

³⁶ http://www.un.org/en/development/desa/policy/cdp/ldc/ldc_list.pdf

³⁷ <http://unctad.org/en/Pages/ALDC/Least%20Developed%20Countries/UN-list-of-Least-Developed-Countries.aspx>

- b) Replacing TWMs with new IWMs with same or greater efficiency without being registered as a CDM project activity i.e. growth of IWMs in Nepal.

The Norwegian government is providing financial support for the promotion of IWM since January 2011 through ESAP.³⁸ This support from Norwegian government ended on March 2012 with the end of ESAP Phase II program.³⁹ There is funding commitment for installation of additional IWMs in NRREP. In this context, CDM revenue is very crucial to meet the funding gap to ensure continuation of the program in off-grid areas of the country; and installation of IWMs with replacement of TWMs is not possible without CDM revenue (Please refer to section A.7 for details).

- c) Continued use of TWMs

As per the baseline study report, to meet the increasing processing needs (e.g. grinding, hulling, oil expelling, etc.), trend of switching over to the diesel mills is evident hence in view of increasing demand of high powered mills, scenario of continued use of TWMs does not represent the situation.

- d) Replacement of TWMs with IWMs avoiding installation of high power diesel Mills

Existing low powered TWM owners and/or new installer are switching over to the high powered diesel mills since past few years. This activity has become a common business as usual scenario in Nepal. This fact is also supported by the third party conducted the Baseline study of Improved Water Mills (IWM). This has further been supplemented by the GoN Ministry of Environment, Science and Technology⁴⁰.

In view of above, the scenario of 'Replacement of TWMs with IWMs avoiding installation of high power diesel Mills' represents the situation appropriately and hence considered as baseline scenario of the project activity.

B.5. Demonstration of eligibility for a generic CPA

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Sr. No	Eligibility Criteria	Means of Verification for CPA inclusion	Confirmation
1	SSC-CPA will involve installation of an IWM in the geographical boundary of Nepal (an LDC)	This will be verified by Checking location of IWM in the IWM Project Completion Certificate (PCC)	Yes/No

³⁸ Please see document "Contract for the operation of AEPC/ESAP January 1st to June 2011 activities"

³⁹ Please see agreement between Norwegian Ministry of Foreign Affairs and Government of Nepal, dated November 26, 2010; and Joint Financing arrangement between Ministry of Foreign Affairs of Denmark, Ministry of Foreign Affairs of Norway and Government of Nepal and ESAP Phase II Programme Documents, Vol. I.

⁴⁰ Supporting document- Letter Provided by GoN MoSTE

2	The CPA will remain under the total installed capacity threshold of 15 MW. ⁴¹ Each IWM installed under a CPA will be either long shaft or short shaft with minimum capacity of 2.83kW and 1.39 kW respectively.	The maximum power output of IWM is 5 KW and SSC threshold is 15 MW. Therefore maximum number of IWM to be included in the CPA = $\frac{\text{threshold capacity}}{\text{max power of IWM}} = \frac{15000}{5} = 3000$, on conservative basis. The IWMs installed under the CPA meets the technical specifications as specified in the section A.6 of the PoA DD.	Yes/No
3	The improved water mills included in a CPA shall offer higher level of services through diversified end use (services of hulling/expelling etc.) and/or efficient grinding that will reduce the time for agro processing compared to that offered by traditional mills in baseline.	This will be confirmed by using technical specification in eligibility criteria 2.	Yes/No
4	SSC-CPA shall follow the baseline and monitoring methodology AMS I.B version 12 and shall meet the applicability criteria as discussed in section B.3 of PoA DD.	This will be verified using eligibility criteria 2,6 and 9	Yes/No
5	The CPA is exclusively bound to the PoA. Each IWM to be included in the CPA will have a unique identification numbers (AEPC-IWM-XXX-XXXX) as mentioned in section C. These unique identification numbers will prevent double counting of IWM in the PoA as well as in other IWM projects.	This will be verified using Unique identification number of each IWM units	Yes/No
6	The IWMs disseminated under the CPA has to be of higher capacity (compared to TWM) in the range of 1.39 kW for short shaft (minimum) and 2. 83 kW for long shaft (minimum). Two types of IWM i.e. long shaft and short shaft to be considered. All IWM to be included in the CPA will be implemented complying with the technical specifications specified by AEPC as specified in section A.6 of the PoA-DD and ensures that the IWM is	This will be verified by using IWM Project Completion Certificate (PCC) issued by the service provider	Yes/No

⁴¹ All CPAs will ensure to meet the requirements pertaining to the demonstration of additionality as mentioned in paragraph 9, Annex 05, EB 74 of “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”, which mentions that PoAs that will include one or more small-scale projects as CPAs shall include eligibility criteria derived from the relevant requirements of the “Guidelines for demonstrating additionality of small-scale project activities”. The paragraph 2(c), Annex 27, EB 68 of this guideline explains that project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size (i.e. the size of each unit under 750 kW installed capacity or under 3000 MWh of energy savings per year or 3000 tonnes of emission reductions per year.) of each unit is no larger than 5% of the small-scale CDM thresholds are included as positive list of technologies and are automatically additional..

	subject to the level and type of service, performance specifications including compliance with testing/certification.		
7	IWM owners contractually cede their rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC to the coordinating/managing entity (AEPC) of the PoA.	This will be verified by using Emission Reduction Right Transfer	Yes/No
8	Start date of the CPAs will be on or after the date of GSP of PoA. The starting date of the CPA will be verified by the database maintained by AEPC and also a signed letter from AEPC will be issued which will mention the starting date of each CPA.	This will be confirmed using application form submitted by the TWM or new IWM user to AEPC.	Yes/No
9	The target group of the CPA will be the TWM owners, and potential new IWM installers of the off-grid ⁴² areas of the hilly areas. The IWM kit, supplied by prequalified (PQ) IWM manufacturers, will be directly installed by Service Centre.	This can be verified by checking the location of the IWM installation site. Government data will be used to confirm that the site is an off-grid area.	Yes/No
10	All CPAs will comply with the conditions related to sampling requirements for a PoA in accordance with the approved Guidelines for Sampling and Surveys for CDM project activities and PoA (EB 75, Annex 08), refer to Appendix 5 of PoA for detailed sampling plan.	This will be validated using criterion in Appendix 5 of PoA-DD.	Yes/No
11	All CPAs will comply with the conditions to provide an affirmation that funding from Annex 1 parties, if any, does not result in diversion of official development assistance (ODA).	This will be confirmed using letter of no diversion of ODA	Yes/No
12	All CPAs will comply with the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories	This will be confirmed using CPA-DD	Yes/No
13	The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact Analysis	Stakeholder consultation has already been performed at PoA level so not required at CPA level. Environment Impact Assessment not required for IWM Projects ⁴³	Yes/No

⁴² Off-grid areas in Nepal are those where electricity is not supplied through the national grid.

⁴³ As per EPA and EPR (1997) (as amended on February 2, 2009), IEE is required for the hydropower projects from 1MW to 50 MW, while EIA is required for the project above 50MW. Projects less than 1MW do not require documentation of any impact assessment. (Source: EPA and EPR, 1997)

B.6. Estimation of emission reductions of a generic CPA**B.6.1. Explanation of methodological choices**

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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.I.A.: 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 CO₂ per kg of diesel fuel.

For the purpose of calculation of the emission displacement, option (i) has been chosen. Since the TWM itself has certain power output required for milling purpose and IWM will provide the additional power required for high capacity milling, the emission reduction will be calculated only for the additional capacity. The additional capacity of the IWMs installed is calculated as given in the equation (1):

$$IC_{add} = IC_{IWM} - IC_{TWM}(1)$$

Where :

IC_{add} – Additional Installed Capacity, kW

IC_{IWM} – IWM installed capacity, kW

IC_{TWM} - TWM 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 for the generation of mechanical energy and emission factor of diesel. Since the proportion of the IWMs operating in a particular year “y” is important parameter in calculating the emission reductions, this has also been accounted in the formula. Further, the equation is denominated by “1000” in order to have conversion of kW to MW. The formula given in equation (2) below:

$$ER_y = \sum_{i=1}^n \frac{Q_{OP,i} * IC_{add,i} * OH_i * EF_{Diesel}}{1000} \quad (2)$$

Where:

$$Q_{OP,i} = Q_{T,i} - Q_{NW,i} \quad (3)$$

IC_{add} Additional Installed Capacity, kW

ER_y Emission Reductions in year y (tCO_{2e})

$Q_{OP,i}$ Number (quantity) of IWMs of type i operating under the project activity/units in year y (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) in year y .

$OH_{i,y}$ Operating hours of IWM in year y for the generation of mechanical energy

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 CO₂/kWh)

B.6.2. Data and parameters fixed ex-ante

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(Copy this table for each data and parameter.)

Data / Parameter:	IC_{TWM}
Data unit:	kW
Description:	Traditional Water Mill (TWM) installed capacity, kW
Source of data:	Study report- Determining the capacity of Long Shaft and Short Shaft Improved Water Mill (IWM), Final Report, Energy Development Services Pvt. Ltd. May 2012
Value(s) applied:	0.35 (during the study the average capacity of TWM was found to be 0.35 kW)
Choice of data or Measurement methods and procedures:	Standard installed capacity of TWMs in Nepal
Purpose of data	Required for calculation ex-ante
Additional comment:	

Data / Parameter:	IC_{IWM}
Data unit:	kW
Description:	Improved Water Mill (IWM) installed capacity
Source of data:	Mill specifications
Value(s) applied:	Minimum value of 1.39 kW for short shafts and Minimum value of 2.83 kW for long shaft IWMs will be used on conservative basis as more than 97% of SS and LS IWMs are with installed capacity above these values (as per the third part study report)
Choice of data or Measurement methods and procedures:	Based on eligibility criterion 5, the capacity of SS and LS IWM is 1.39 and 2.83 KW respectively have been fixed on conservative basis.
Purpose of data	Required for calculation ex-ante
Additional comment:	

Data / Parameter:	EF_{Diesel}
Data unit:	kg CO ₂ /kWh
Description:	Emission Factor of diesel based power generators. For diesel based mills

Source of data:	Version 3 of AMS I.F																												
Value(s) applied:	1.2																												
Choice of data or Measurement methods and procedures:	1.2 for 100% load, 1.4 for 50 % load and 2.4 for 25% load. As the emission factor for diesel is more conservative with 100% load, this has been chosen for emission factor for diesel.																												
Purpose of data	Required for calculation ex-ante																												
Additional comment:	<p>AMS.I.B (Version 12) para 16 (a), option (i) allows the project participant to determine the emission factor for diesel generator systems according to procedures specified in “AMS-I.A: Electricity generation by users”. AMS I.A. (version 16) allows, with adequate justification, in paragraph 9, for a small scale project proponent to use a higher emission factor from Table I.F.1 under category AMS I.F. “Renewable energy generation for captive use and mini-grid”. Since the maximum capacity of the Diesel Mills prevalent in Nepal is of 12 kW (the baseline study conducted on May 2012 comes up with a finding that the diesel mills in Nepal have the capacity range between 10hp to 16 hp, taking the unit conversion from hp to kW as 0.75, the corresponding kW for 16 hp diesel mill is 12 kW). Hence, the corresponding most conservative (100% loading consideration) emission factor of 1.2 Kg CO₂/kWh has been chosen (refer table below taken from AMS.I.F, version 03).</p> <p>Table 2. Emission factors for diesel generator systems (in kg CO₂e/kWh^(a)) for three different levels of load factors^(b)</p> <table><tr><th>Cases</th><th>Mini-grid with 24 hour service</th><th>(a) Mini-grid with temporary service (4-6 hr/day); (b) Productive applications; (c) Water pumps</th><th>Mini-grid with storage</th></tr><tr><td>Load factors [%]</td><td>25%</td><td>50%</td><td>100%</td></tr><tr><td><15 kW</td><td>2.4</td><td>1.4</td><td>1.2</td></tr><tr><td>>=15 <35 kW</td><td>1.9</td><td>1.3</td><td>1.1</td></tr><tr><td>>=35 <135 kW</td><td>1.3</td><td>1.0</td><td>1.0</td></tr><tr><td>>=135<200 kW</td><td>0.9</td><td>0.8</td><td>0.8</td></tr><tr><td>> 200 kW^(c)</td><td>0.8</td><td>0.8</td><td>0.8</td></tr></table> <p>^(a) A conversion factor of 3.2 kg CO₂ per kg of diesel has been used (following revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories);</p> <p>^(b) Values derived from figures reported in RETScreen International's PV 2000 model retrieved from: <http://retscreen.net/>;</p> <p>^(c) Default values.</p>	Cases	Mini-grid with 24 hour service	(a) Mini-grid with temporary service (4-6 hr/day); (b) Productive applications; (c) Water pumps	Mini-grid with storage	Load factors [%]	25%	50%	100%	<15 kW	2.4	1.4	1.2	>=15 <35 kW	1.9	1.3	1.1	>=35 <135 kW	1.3	1.0	1.0	>=135<200 kW	0.9	0.8	0.8	> 200 kW ^(c)	0.8	0.8	0.8
Cases	Mini-grid with 24 hour service	(a) Mini-grid with temporary service (4-6 hr/day); (b) Productive applications; (c) Water pumps	Mini-grid with storage																										
Load factors [%]	25%	50%	100%																										
<15 kW	2.4	1.4	1.2																										
>=15 <35 kW	1.9	1.3	1.1																										
>=35 <135 kW	1.3	1.0	1.0																										
>=135<200 kW	0.9	0.8	0.8																										
> 200 kW ^(c)	0.8	0.8	0.8																										

Data / Parameter:	N
Data unit:	
Description:	Sample size of Monitoring Survey
Source of data:	CPA database
Value(s) applied:	To be filled by SSC-CPA
Choice of data or Measurement methods and procedures:	The SSC-CPA shall determine the representative sample size with minimum 90% confidence interval and 10% error margin.
Purpose of data	Required for calculation ex-ante
Additional comment:	

B.6.3. Ex-ante calculations of emission reductions

>>

Year	New IWM Installations	Cumulative installations	IWM installed capacity (kW)	Est. project activity emissions (tonnes of CO ₂ e)	Estimation of baseline emissions (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of overall emission reductions (tonnes of CO ₂ e)
[Add Year]	[Add Number]	[Add Number]	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]
[Add Year]	[Add Number]	[Add Number]	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]
[Add Year]	[Add Number]	[Add Number]	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]
[Add Year]	[Add Number]	[Add Number]	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]
[Add Year]	[Add Number]	[Add Number]	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]
[Add Year]	[Add Number]	[Add Number]	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]
[Add Year]	[Add Number]	[Add Number]	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]
[Add Year]	[Add Number]	[Add Number]	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]
Total (tonnes of CO ₂ e)	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]	[Add Value]

B.7. Application of the monitoring methodology and description of the monitoring plan

B.7.1. Data and parameters to be monitored by each generic CPA

(Copy this table for each data and parameter).

Data / Parameter:	Q _{OP,i}
Data unit:	Number
Description:	Number (quantity) of IWMs of type i operating under the project activity
Source of data:	Ex post monitoring survey based on calculated number
Value(s) applied	NA
Measurement methods and procedures:	Monitoring Sample survey. Refer to Appendix 5 for details on sampling survey
Monitoring frequency:	Annually
QA/QC procedures:	Samples will be selected randomly and covering five development regions and two ecological regions to get the best representative
Purpose of data	Emission reduction calculation
Additional comment:	

Data / Parameter:	OH _{i,y}
Data unit:	Hrs
Description:	Operating hours of IWMfor generation of mechanical energy
Source of data:	Ex post monitoring survey
Value(s) applied	NA
Measurement methods and procedures:	Monitoring Sample survey. Refer to Appendix 5 for details on sampling survey
Monitoring frequency:	Annually

QA/QC procedures:	Samples will be selected randomly and covering five development regions and two ecological regions to get the best representative
Purpose of data	Emission reduction calculation
Additional comment:	

Data / Parameter:	$Q_{T,i}$
Data unit:	Number
Description:	Number (quantity) of IWMs of type i installed under the project activity
Source of data:	Testing and Commissioning report/database
Value(s) applied	NA
Measurement methods and procedures:	Project implementing agency records
Monitoring frequency:	Annually
QA/QC procedures:	Total number of IWM installation can be checked with IWM subsidy list
Purpose of data	Emission reduction calculation
Additional comment:	

B.7.2. Description of the monitoring plan for a generic CPA

As mentioned in the project PoA-DD document appendix 5 of Monitoring Plan, the monitoring of the CPA will be carried out with ex post sample survey. Managing entity will operate and maintain the electronic data base which will cover the information of the CPA activities.

The monitoring methodology should meet the requirements of AMS I. B, and CPA Monitoring shall consist of monitoring and record keeping of following major parameters, used for estimation of emission reductions.

- $Q_{OP,i}$ Number (quantity) of IWMs of type i operating under the project activity (units).
- $OH_{i,y}$ Operating hours of IWM for the generation of mechanical energy

Although the activity involves the replacement of TWM wooden parts (rotor, shaft and chute), record of scraping of replaced parts is not required since this will not be used in any other locations. Hence no leakage is envisaged

Further to above, IWM project information records database(s) will be updated continuously by the managing entity based on the sample survey results and reports will be generated for the specified monitoring period. The parameters to be recorded and updated as a part of monitoring are as under.

- Total number of IWMs installed in different districts
- Record of different types of IWMs installed
- Serial number of IWM installed
- Installation date
- Serial number of TWMs replaced
- Owner's details (Name, Address, etc.)
- Date of the check
- Serial number of appliances checked during sample survey
- IWM status of operation

The above data will be collected by GoAs from the mill owners. These data will be forwarded to service provider, and then to RSCs and finally to AEPC.

The monitoring of the CPAs implemented under the PoA is done during various stages beginning from the IWM installation to post-installation period. The monitoring system in totality contributes to quality control and quality assurance for the systems being deployed and their operational status. The monitoring system beginning from the pre-installation through installation and post-installation of the IWM systems is briefly presented as follows while the CME manual (attached separately) elaborates the whole system in detail.

SN	Action	Responsible Organization	Monitoring Parameters	Monitoring Organization
1.	IWM Demand Creation and Feasibility	Service Centers	Feasibility of system	Regional Service Centers
2.	Recommendation of feasibility	Regional Service Centers		
3.	Supply of IWM kits	Kit Manufacturing companies	Kit manufacturing standards	Service Centers, Regional Service Centers
4.	IWM installation and Preparation of Project completion certificate (PCC)	Service Center	Completeness of PCC	Regional Service Centers
5.	Reporting to AEPC	Regional Service Center	PCC	AEPC
6.	Data Storage / Data Banking ⁴⁴	Service Center, Regional Service Center, District Development Committee (DDC), AEPC		
7.	Subsidy release request	Regional Service Center	Completeness of the PCC and correctness of information, and site verification through sampling	AEPC, independent third party
8.	Annual IWM Users Survey	AEPC	Operational Status, operation hours of IWM for mechanical energy, other parameters associated with the community benefit	Independent third party

The database system maintains the following information:

- i. IWM serial number
- ii. IWM owner's name
- iii. Detail Address (District, VDC/Municipality, Ward)
- iv. IWM Type
- v. Kit Identification Number
- vi. CDM Unique Identification Number

⁴⁴ The data related to the IWM installation is recorded by each Service Center and Regional Service Center depending upon their service coverage area and the same is supplied to the respective DDCs and AEPC.

vii. Project Completion Date

Appendix 1. Contact information of coordinating/managing entity and responsible person(s)/ entity(ies)

CME and/or responsible person/ entity	<input checked="" type="checkbox"/> CME <input checked="" type="checkbox"/> Responsible person/ entity for application of the selected methodology(ies) and, where applicable, the selected standardized baseline(s) to the PoA
Organization	Alternative Energy Promotion Centre
Street/P.O. Box	Khumaltaar Height
Building	Thakur Mansion
City	Lalitpur Sub-metropolitan City
State/Region	
Postcode	
Country	Nepal
Telephone	+977-1-5539390/5539391
Fax	+977-1-5539392
E-mail	raju.laudari@aepec.gov.np
Website	www.aepc.gov.np
Contact person	Raju Laudari
Title	Assistant Director
Salutation	Mr.
Last name	Laudari
Middle name	

Appendix 2. Affirmation regarding public funding



CLIMATE AND
POLLUTION
AGENCY

Alternative Energy Promotion Centre
G.P.O.Box No 14237 Katmandu
Khumaltar, Lalitpur
NEPAL

Climate and Pollution Agency
P.O.Box 8100 Dep, N-0032 Oslo,
Norway
Visiting address: Strømsveien 96

Telephone: +47 22 57 34 00
Telefax: +47 22 67 67 06
E-mail: postmottak@klif.no
Internet: www.klif.no

Att. Raju Laudari

Date: 20 January 2012
Our ref.: 2009/832
Your ref.:
Contact person: Hans H. Kolshus

Official Development Assistance Non-Diversion Letter

The Climate and Pollution Agency, being the Norwegian Designated National Authority (DNA) under the Clean Development Mechanism (CDM), hereby confirms that:

- Norway provides Official Development Assistance to the Government of Nepal for the implementation of the Improved Water Mills Program (IWM). The IWM Program is implemented through the Alternative Energy Promotion Centre (AEPC).
- Norway does not intend to receive Certified Emission Reductions (CERs) to be generated from this CDM program of activities.
- The public funding from Norway does not result in the diversion of official development assistance.

Signed on behalf of Norway's Designated National Authority for the CDM,

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Audun Rosland', written over a horizontal line.

Audun Rosland
Director of the Climate Department

EMBASSY OF DENMARK
Kathmandu

Alternative Energy Promotion Centre
Khumaltar, Lalitpur
G.P.O. Box No. 14237
Kathmandu, Nepal

Att. Raju Laudari

Lazimpat (Neel Saraswati Marg)
P.O. Box 6332, Kathmandu
Tel: +977 (1) 441 30 10
Fax: +977 (1) 441 14 09
E-mail: ktemanda@um.dk
<http://www.ambicathmandu.um.dk>



Enclosure

File

Department

104.Nepal.802-300.KTM.

10 July 2013

Official Development Assistance Non-Diversion Letter

The Embassy of Denmark on behalf of the Danish Ministry of Foreign Affairs hereby confirms that:

- Denmark provides Official Development Assistance to the Government of Nepal for the implementation of Improved Water Mill (IWM) under the National Rural and Renewable Energy Programme (NRREP). Alternative Energy Promotion Centre (AEPC) is an executive Agency of this program.
- Denmark does not intend to receive Certified Emission Reductions (CERs) to be generated from any CDM Program of Activities (CPAs) of this IWM Programme of Activities (PoA) CDM.
- The public funding from Denmark does not result in diversion of official development assistance.

Yours Sincerely


Ditte Bjerregaard
First Secretary



Appendix 3. Applicability of methodology(ies) and standardized baseline(s)

Please refer to section B.3 of the PoA-DD

Appendix 4. Further background information on ex ante calculation of emission reductions

Figure 07 describes the entire cycle how emission reductions would occur and would be accounted for:

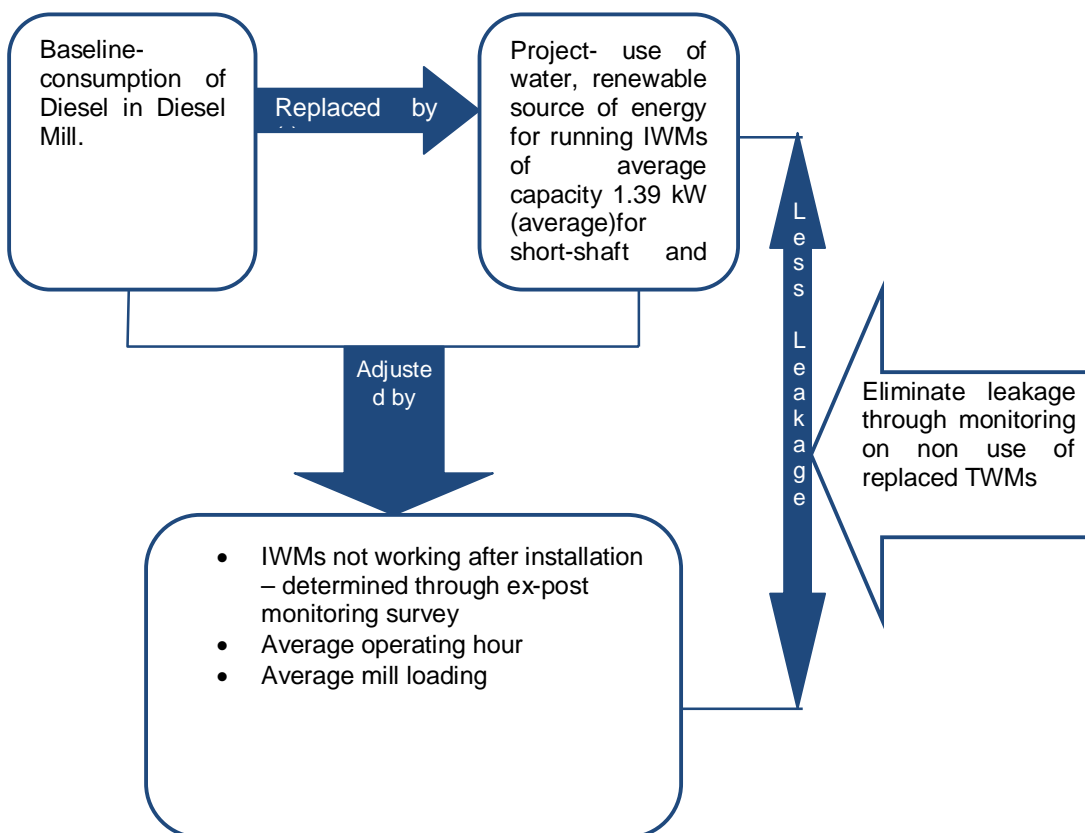


Figure 7: Cycle of Emission Reduction

The following equations, assumptions and calculations would be followed to determine the emission reductions by a SSC CPA project activity:

$$IC_{add} = IC_{IWM} - IC_{TWM} \quad (1)$$

Where :

IC_{add} – Additional Installed Capacity, kW

IC_{IWM} – IWM installed capacity, kW

IC_{TWM} - TWM 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 the IWM for mechanical energy and emission factor of diesel. Since the proportion of the IWMs operating in a particular year “y” is important parameter in calculating the emission reductions, this has also been accounted in the formula. Further, the equation is denominated by “1000” in order to have conversion of kW to MW. The formula given in equation (2) below:

$$ER_y = \sum_{i=1}^n \frac{Q_{OP,i} * IC_{add,i} * OH_i * EF_{Diesel}}{1000} \quad (2)$$

Where:

$$Q_{OP,i} = Q_{T,i} - Q_{NW,i} \quad (3)$$

ER_y Emission Reductions in year y (tCO_{2e})

$Q_{OP,i}$ Number (quantity) of IWMs of type i operating under the project activity (units).
Once all of the project IWMs are installed, $Q_{PJ,i}$ 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) in year y

$OH_{i,y}$ Operating hours for generation of mechanical energy of IWM in year y

EF_{Diesel} Emission Factor of diesel based power generators, as per table I.F.1 of AMS I.F as guided by para 9 of AMS.I.A as referred in AMS.I.B (kg CO₂/kWh)

Appendix 5. Further background information on the monitoring plan

Sampling Plan

This sampling plan is prepared in accordance with the Standard for Sampling and Surveys for CDM project activities and programme of activities, version 04 (EB 74 annex 05). Paragraph 10 of this standard states *“Where there is no specific guidance in the applicable methodology, project proponents shall use 90/10 confidence/precision as the criteria for reliability of sampling efforts for small-scale project activities and 95/10 for large scale project activities. This reliability specification shall be applied to determine the sampling requirements for each individual parameter value determined through a sampling effort.”* As the applied methodology (AMS I.B, version 12) for this PoA doesn't specify any confidence/precision to be applied, the desired confidence precision for the CPAs under this PoA is 90/10 as the PoA implements small scale project activities.

Similarly, the paragraph 20 of the standard states *“Parameter values shall be estimated by sampling in accordance with the requirements in the applied methodology separately and independently for each of the CPAs included in a PoA except when a single sampling plan covering a group of CPAs is undertaken applying 95/10 confidence/precision for the sample size calculation.”* There is no specific requirement of sampling in the approved methodology. Monitoring does not consider a single sampling plan covering a group of CPAs, thus doesn't require undertake sampling applying 95/10 confidence/precision. Rather, each CPA will be monitored separately and the confidence/precision of 90/10 will be applied.

(a) Sampling Design:

(i) Objectives and Reliability Requirements:

The sampling objective is to obtain a reliable estimate of the key variables used in the estimation of emission reductions. The monitoring would be performed annually using the level of precision of 10% and a confidence level of 90%. The sampling will be conducted for each individual CPAs of the PoA. The monitoring plan aims determining the parameters mentioned below from the annual surveys:

1. Daily operating hours of IWM for agro processing (generation of mechanical power)
2. Number of IWM operating in each CPA

(ii) Target Population:

The target population is the IWM user (entrepreneurs), spread over hilly regions in Nepal.

(iii) Sampling method

A simple random sampling method will be used. A simple random sample is a subset of population chosen randomly such that each element (or unit) of the population has the same probability of being selected. The sample based estimate (mean or proportion) is an unbiased estimate of the population parameter (para 8, Annex 8, EB 75). In this method, all the high hill and mid hill districts will be considered as a single population and the IWMs will be randomly selected from the entire population.

(iv) Sample size

The sample size is determined using the Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities Ver. 3.0 (EB75, Annex 8⁴⁵). The level of precision of 10% and a confidence level of 90% will be assessed for the parameters- daily operation hours of IWM for mechanical power generation and number of IWM operating in each CPA that is supposed to be captured by the annual surveys.

- **Sample Size for the Proportional Parameter (Number of IWMs operating)**

For the first monitoring period, the values as described below are applied. For the following monitoring periods, the estimates shall be adjusted taken the results of the previous monitoring period(s) into account.

The minimum sample size for the monitoring parameters is determined using the equation given in para 12 of appendix 1, EB 75 Annex 8, Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities Ver. 3.0.

$$n \geq \frac{1.645^2 N * p(1 - p)}{(N - 1) * 0.1^2 * p^2 + 1.645^2 p(1 - p)}$$

Where:

n = sample size

N = Total number of IWM users (Entrepreneurs) (2200 per CPA)

p = our expected proportion (0.9, being conservative and assuming 90% of the installed IWM will be in use; however, the IWM Users' Survey 2012/13 conducted by an independent third party has revealed that the 98.59% of IWM surveyed were operational)

1.645 = represents the 90% confidence required

0.1 = represents the 10% relative precision (0.1x0.5=0.05 = 5% points either side of p)

Substituting the values in the above equation gives

n = 29.67

Rounded up value 30.

The annual survey will at least consider 10% extra samples to address the non-responses. Hence, a minimum 33 samples will be retained for annual monitoring surveys.

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

For the first monitoring period, the values as described below are applied. For the following monitoring periods, the estimates shall be adjusted taken the results of the previous monitoring period(s) into account.

The minimum sample size for the monitoring parameters is determined using the equation given in para 51 of appendix 1, EB 75 Annex 8, Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities Ver. 3.0.

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

Where,

V = (SD/Mean)²

n = Sample Size

⁴⁵Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities Ver. 3.0 (EB 75, Annex 8)

N = Total number of IWM users (Entrepreneurs) = 2200

SD = Standard deviation = 2.25 hrs (this value was revealed by the study conducted by independent consultant)

Mean = Mean operational hours for agro processing = 9.52 hrs (this value was revealed by the study conducted by independent consultant)

1.645 = Represent 90% confidence required

0.1 = Represent the 10% relative precision

Substituting the values in the above equation gives

$n = 15.02$

Rounded up value 16.

Hence the number of samples required for the mean value parameter of interest (daily operating hours of IWM for agro processing) is 16. Among the above formulae the sample size calculated from the former equation results in more conservative sample size i.e. 33 (addressing the non responses also) hence the same will be retained for the annual IWM users' surveys for both, the proportional parameter and the mean value parameter.

(v) Sampling frame

The sample frame consists of selection of IWM included in the PoA spread over hilly regions. The sample to be surveyed will be drawn randomly with a geographical spread within the project boundary of the project activity.

(b) Data:

(i) Field Measurements:

1. Daily operating hours of IWM for agro processing (i.e. generation of mechanical power)
2. Number of IWM operating in each CPA

The survey will be conducted annually with the objective to target 10 percent precision and to achieve 90 percent confidence.

(ii) Quality Assurance/Quality Control:

AEPC will ensure that the survey includes all the parameters to be monitored by the independent third party. The survey will be performed by an experience team consisting of enumerators, supervisors⁴⁶ and professionals⁴⁷. Field enumerators will be trained for the data collection. The data will be collected through structured/semi structured questionnaire and the questionnaire will be pre tested before the enumerators mobilized to the field for the data collection. The field enumerator will fill the questionnaire through face to face interview with the IWM owners. The enumerator will also observe the IWM to ensure that it is operating. AEPC will ensure that all 65 questionnaires for the monitoring of the parameter S.

The independent third party will collect, compile and analyze the data and AEPC will prepare monitoring report based on the maintained database and the survey report prepared produced by the independent third party.

⁴⁶ Field supervisors will have bachelor degree with at least three years experience in the similar field (baseline/monitoring surveys, etc). The field supervisor will be mainly responsible for the supervision of the survey at the field level and also involve during questionnaire development, training of enumerators, data analysis and reporting

⁴⁷ Team leader and statistician should have master degree and at least 5 years experience in relevant field. The team leader will be responsible for the overall coordination of the survey, data analysis and reporting. Statistician will be responsible for the statistical analysis of the field data.

There might be changes of getting outliers while sampling. The following approach will be used to identify and address outliers for the samples during monitoring. If the final sample size in any monitoring period is 30 or above, outliers will be defined as those data points with values greater than three standard deviations from the mean of the sample. When the sample size is below 30 then the concept of outliers can be defined using the concept of 'fences' as defined by the upper and lower quartiles of the sampled data shown in the following formula:

Inner lower fence: $Q1 - 1.5 (Q3 - Q1)$

Inner upper fence: $Q3 + 1.5 (Q3 - Q1)$

Where Q3 and Q1 are the upper and lower quartiles of the sampled data respectively. Outliers in this case are defined as those data points in the sample below the inner lower fence or above the inner upper fence.

In either case, data points identified as outliers according to the above analysis will be examined further to correct for possible transcription and data entry errors, but will be omitted from the analysis if no such administrative errors exist.

(iii) Analysis:

Parameter 1: Daily operating hours of IWM for agro processing (mechanical power generation) and

Parameter 2: Number of IWM operating in each CPA

To monitor parameter (1) operating status and (2) operating hours of IWM for agro processing, a survey questionnaire will be prepared by the independent third party to seek responses of IWM owners. AEPC will prepare the Terms of Reference (ToR) to a hire qualified independent third party where the qualification of the person involved in the survey will be defined.

It will be ensured by the AEPC that the survey includes the parameters to be monitored by the independent third party. The independent third party consists of a team comprising of a team leader, statistician, field supervisor and enumerators. Field enumerators will be trained by the survey team (team leader and supervisor) for data collection through structured/semi structured questionnaire⁴⁸. The field enumerator will fill the questionnaire through face to face interview with the IWM users. The enumerator will inspect the sampled IWM user to ensure that it is operating and TWM has been displaced.

The independent third party will collect, compile and analyze the data to derive the daily operating hours of IWM for agro processing and number of IWM operating in each CPA. AEPC will prepare monitoring report based on the survey report prepared by the independent third party.

(c) Implementation:

The sample size calculated as per section a(iv) above requires conducting the surveying at least 33 samples with a 90% response rate. The table below shows the implementation plan for monitoring the parameters which will be used in emission reduction calculation.

Parameter	Objective/use of data	Timeframe/Frequency	Method of Data Collection	Qualification of the responsible party
OH _{i,y}	To determine the total number of operating	Annual Survey	Structured questionnaire survey conducted among the IWM user	The independent third party (registered organization) will have qualified professional for preparation of questionnaire, detail out the survey method,

⁴⁸ Semi-structured interviews/questionnaire are interviews conducted with a fairly open framework which allow for focused, conversational, two-way communication

	hours of IWMfor the generation of mechanical energy for agro processing.		(Entrepreneurs) by third party	train the enumerators, analyze the collected data and prepare the report. Similarly field enumerator will be trained/oriented for the quality and reliable data collection. AEPC will monitor the work of consultant and provide necessary information maintained in the database.
Q _{OP,i}	To determine the number of IWM operating in each CPA	Measurement taken every year	Structured questionnaire survey conducted among the IWM user (Entrepreneurs) by third party	The independent third party (registered organization) will have qualified professional for preparation of questionnaire, detail out the survey method, train the enumerators, analyze the collected data and prepare the report. Similarly field enumerator will be trained/oriented for the quality and reliable data collection. AEPC will monitor the work of consultant and provide necessary information maintained in the database

Appendix 6. Summary of post registration changes

- - - - -

Document information

Version	Date	Description
04.0	9 March 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to choice of start date of PoA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Add exception for generic CPA where technology is under positive lists; • Editorial improvement.
03.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the programme design document form for small-scale CDM programme of activities (these instructions supersede the "Guideline: Completing the programme design document form for small-scale CDM programme of activities" (Version 03.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the PoA in B.4 and Appendix 1; • Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and Error! Reference source not found.; • Change the reference number from <i>F-CDM-SSC-PoA-DD</i> to <i>CDM-SSC-PoA-DD-FORM</i>; • Editorial improvement.
02.0	13 March 2012	EB 66, Annex 13 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for small-scale CDM programmes of activities".
01.0	27 July 2007	EB33, Annex43 Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: programme of activities, project design document, SSC project activities		