CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.

SECTION A. General description of the small-scale project activity

A.1. Title of the small-scale project activity:

Micro-hydro Promotion by Alternative Energy Promotion Centre (AEPC)

PDD version as of November 27, 2006

A.2. Description of the small-scale project activity:

This project is the installation of micro-hydro plants of up to 15MW of capacity. It is promoted by the Alternative Energy Promotion Centre (AEPC) under the Ministry of Environment, Science and Technology (MOEST) of Government of Nepal (GoN), through the Rural Energy Development Program (REDP) and Energy Sector Assistance Program (ESAP).
A total of around 750 micro-hydro plants (MHPs) varying from 10 to 500 kW capacities will be installed for local communities and entrepreneurs by pre-qualified private companies through subsidy support that will be provided via REDP and ESAP. The installation will take place in a phased manner until 2011 with the first construction initiated in early 2003. Detailed feasibility surveys of 83 MHPs have been completed. The project will lead to reduced GHG emissions through:

- Replacement of household fuel used for lighting;
- Replacement of diesel fuel used for agro-processing units

This project is targeted at poor communities across several regions of Nepal. It support the Government's objective of improving energy services in rural areas by developing a viable, market-oriented micro-hydropower system by offering support to both demand and supply sides. The project provides information, training and investment subsidy – of approximately 40-70% of initial investment - for communities on the one hand, and technical training, market information and business development support services on the other for (community-owned) MHP construction and supply companies.

AEPC consolidates REDP and ESAP through the following key outputs:

- Policy guidelines, manuals and technical specifications
- Quality control and monitoring of installations, after sales services for participating micro-hydro companies
- Financial support to end-users by providing a subsidy[1] of ~US$ 141 per HH but not exceeding US$ 1,197 per kW for new MHP with some additional benefits for remote areas. An end-use promotion fund of ~US$ 141 per kW of installed power (but not exceeding ~US$ 3,521) is also provided to the plants implemented through REDP for the promotion of electrical end-use activities for the long term sustainability of plants.

Contribution to Sustainable Development

Mini-grids powered by MHPs provide a large number of rural households with electricity and power for milling and other needs. Such off-grid renewable energy systems have direct local environmental benefits in terms of:

[1] AEPC, 2006 "Subsidy for Renewable Energy, and Renewable Energy Subsidy Delivery Mechanism", Ministry of Science and Technology, Kathmandu

- Reduction in the use of fuels such as kerosene and to a lesser extent firewood, resulting in less indoor smoke pollution especially for women and children and reduced danger of in-house fires
- Reduction in diesel consumption due to electrical agro-processing mills instead of diesel operated ones
- Reduction in use of dry cells, leading to reduced chemical pollution of the direct local environment, where small children are often seen playing with leaking dry cells
- Reduction in pollution from battery charging practices by eliminating the need for continuous transport of wet lead acid batteries from houses to charging stations.

Plants constructed under the project will be managed and operated by the community or by private entrepreneurs. Adequate training for operation, repair and maintenance will be provided to the people selected by the community for smooth operation of plants. Electrical end-use enterprises will be supported to increase plant factor and there will be opportunities for self employment at the local level. The market of MHP components will flourish due to a large number of installations. There will be an increase in the number of local manufacturers, suppliers and installers that will create jobs for many and at the same time help lower the cost of MHP components due to a competitive market mechanism.

A.3. Project participants:

>> The following table provides information on the project participants.

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Government of Nepal (Host)	Alternative Energy Promotion Centre, Nepal (AEPC)	No
The Netherlands	International Bank for Reconstruction and Development as the Trustee for the Community Development Carbon Fund (CDCF)	Yes
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

AEPC, the project proponent, is a government body under the Ministry of Environment, Science and Technology and oversees the policy design and promotion of the national renewable energy sector.

The **IBRD** as the Trustee of the CDCF will be purchasing emission reductions from this project.
Contact information of the project participants is given in Annex 1 of this document.

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

Nepal

A.4.1.1. Host Party(ies):

Government of Nepal

A.4.1.2. Region/State/Province etc.:

The project is expected to cover all rural areas in Nepal where grid electricity is not available at present and the situation is expected to continue in the foreseeable future, at least the next five years.

A.4.1.3. City/Town/Community etc:

Rural Energy Development Sections (REDS) of REDP are located at each headquarter of the 25 districts. Such REDS will be established in the additional 15 district headquarters in 2007. Likewise, there are four area centers supported by ESAP in four different locations in Nepal. Additional area centers will be supported by ESAP for the proposed project.

A.4.1.4. Detail of physical location, including information allowing the unique identification of this small-scale project activity(ies):

MHP installations are scattered throughout the country. MHPs will be sold all over Nepal, basically in rural areas where there is no access to the national grid. AEPC will keep a record of the addresses of all the households/communities that buy MHPs under this program to allow for field surveys and for monitoring purposes. AEPC uses a unique identification number for each MHP and is considering providing GIS-based latitude and longitude information for each MHP to trace the physical location of the system.

MHPs have been installed mostly in the hilly regions, as show in the map below, where they are especially suitable. MHPs are targeted for areas where the national grid has not reached yet and will not do so at least within the next five years. Subsidy levels increase on the remoteness of the Village Development Committees, which are the smallest administrative units.

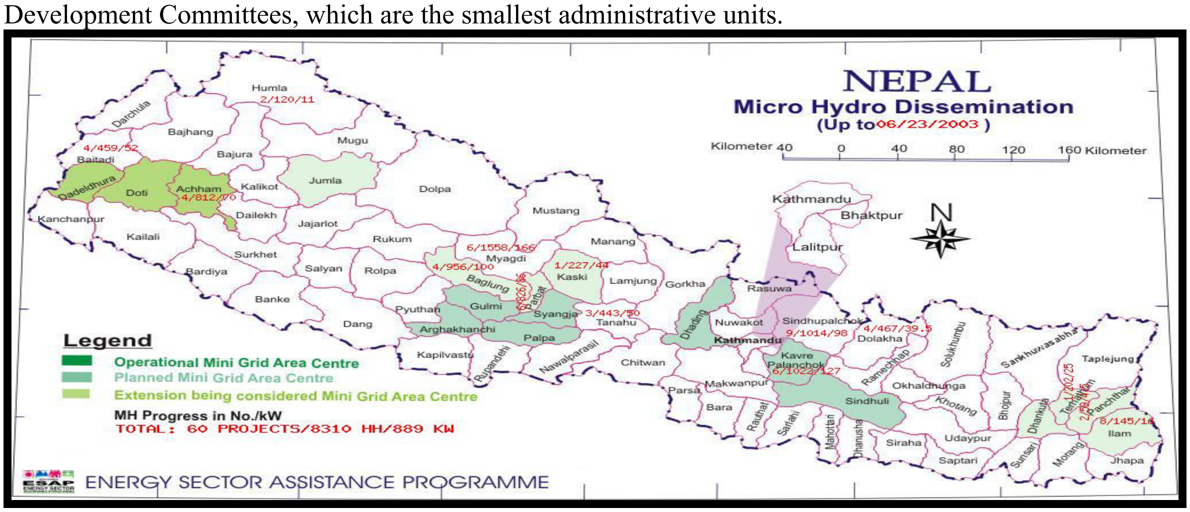

Figure 1: Map of Nepal showing micro-hydro dissemination

Source: www.aepcnepal.org

A.4.2. Type and category(ies) and technology of the small-scale project activity:

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According to Appendix B to the Simplified Modalities and Procedures for Small-Scale CDM Project Activities, the proposed project falls under the following type and category.

Type I – RENEWABLE ENERGY PROJECTS

Category I. A. - Electricity Generation by the User

The proposed project activity falls under Type I since the aggregated capacity of the micro-hydro systems to be implemented under the project will not exceed 15 MW each year throughout the entire crediting period of the project.

Micro-hydro Technology: Using the energy of falling water, micro-hydro power systems supply mechanical energy that can be used directly or be converted to electrical energy, through a generator, for use in lighting, refrigeration, milling or a number of other productive uses. The basic components of a micro-hydro system include:

- an inlet weir where the water enters the system,
- a penstock to transport the water from forebay tank to turbine,
- a turbine to convert the potential energy of the falling water into mechanical rotational energy,
- mechanical equipment to use the energy or a generator to convert it to electricity located in the power house and power line to transfer power to load, and
- a tailrace where the water leaves the system and returns to the source.

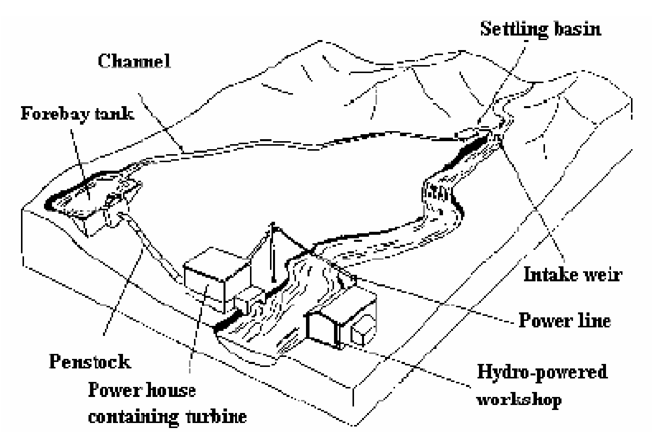

Figure 2: Simple sketch of micro-hydro
Source: http://www.itdg.org/html/technical_enquiries/docs/micro_hydro_power.pdf

Hydropower plants ranging between 3 to 100 kW, are considered as micro-hydro that supply power to participating communities through a mini-grid. Micro-hydro plants also supply power to agro-processing units that generally use diesel fuel for operation.

A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

The proposed project activity will create GHG emissions reductions by displacing kerosene used for lighting purposes and diesel used in agro-processing mills in rural communities of Nepal. It is estimated that the total emissions reductions achieved in the first 7 years of the project activity will be approximately 195,347 tCO_2eq and in 10 years the estimated emissions reductions is 332,803 tCO_2eq. More detailed information is provided in Sections B and E.

It is very unlikely that the target group will buy MHPs and communities will continue using conventional fuels to meet their lighting and agro-processing needs in the absence of the proposed project activity. This is because of the following barriers:

- Low awareness about the technology;
- High initial cost of micro hydro technology;
- Targeted rural communities are unable to afford MHP;
- Absence of financial infrastructure; and
- Lack of technical standards and quality protocols.

Despite the national government's effort to promote the technology by providing subsidy of US$ 141/household but not exceeding US$1,197/kW through the Subsidy Policy 2006, an investment in micro hydro remains an unattractive option for the rural communities because of the above barriers. These existing barriers are well known from other MHP projects in developing countries[2]. This CDM project with the help of carbon finance and unique project structure involving aggregation of several micro hydro units will assist in the removal of the above barriers and implement the hydro systems.

To better support the successful installation of MHPs, communities will have a strong monitoring, repair and maintenance mechanism, vital for the uninterrupted operation of the micro-hydro schemes throughout its life. REDP has adopted a successful decentralized approach, whereas ESAP has adopted a successful sector approach, both of which include outreach and awareness programs, quality control, subsidy, etc. (See Section B3).

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

It is estimated that the proposed project activity will lead to the reduction of 332,803 tCO_2eq in the 10 year crediting period from 2006 to 2015. It should be noted that the actual CO_2 reductions will be based on the annual meter readings of each MHP. Section E provides further details of calculations.

Please indicate the chosen crediting period and provide the total estimation of emission reductions as well as annual estimates for the chosen crediting period. Information on the emission reductions shall be

[2] Energy Sector identification study in Nepal prepared for Danida has also identified these barriers and as a result ESAP is now in operation. These barriers are documented in their micro-hydro and solar home system component description reports, 1998. See also the paper written by Wolfgang Mostert, consultant for ESAP and presented at Village Power 98 in Washington D.C. October 6 - 8, 1998 at: http://www.nrel.gov/villagepower/vpconference/vp98/Wpanel/mostert.pdf

indicated using the following tabular format

For type (iii) small-scale project the estimation of project emission is also required

Years	Annual estimation of emission reductions in tonnes of CO_2 e
2006	3,106
2007	9,262
2008	20,116
2009	32,697
2010	38,529
2011	45,819
2012	45,819
2013	45,819
2014	45,819
2015	45,819
Total estimated reductions (tonnes of CO_2e)	**332,803**
Total number of crediting years	**10**
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)_	**33,280**

A.4.4. Public funding of the small-scale project activity:

In addition to revenues from carbon finance, AEPC will require grant funding to cover initial investments in this project. The following parties provide public funding for this activity:

- Government of Nepal
- United Nations Development Program (UNDP) through REDP
- The World Bank through REDP
- DANIDA/NORAD through ESAP

The above-mentioned donors do not lay any claim on the emissions reductions realized by AEPC in return for their public funding contributions to the project. Grant funding provided by the donors is required to fill the financing gap of AEPC for providing upfront subsidy to micro-hydro systems even after the integration of carbon revenues.

A.4.5. Confirmation that the small-scale project activity is not a de-bundled component of a larger project activity:

The proposed project activity is not a de-bundled component of a large project activity. According to Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities, a proposed small-scale project activity is considered a de-bundled component of a large scale project activity if there is a registered small-scale CDM project activity or an application to register another small-scale project activity:

- With the same project participants;
- In the same project category and technology/measure; and
- Registered within the previous 2 years; and
- whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point

Since the above is not true for the proposed CDM project activity, it is not a de-bundled component of a large project activity.

SECTION B. Application of a baseline methodology:

B.1. Title and reference of the approved baseline methodology applied to the small-scale project activity:

The proposed project activity consists of selling MHPs through REDP and ESAP to provide electricity to households and other electrical end-use enterprises like agro-processing mills. Use of clean electrical energy will displace conventional fuels such as kerosene and diesel used by rural communities for lighting and agro-processing purposes.

The baseline approach adopted for the micro-hydro is based on the most recent list of the small-scale CDM project activity categories contained in Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities, i.e.,

Type I – Renewable Energy Projects
Category I. A. - Electricity Generation by the User

See also http://cdm.unfccc.int/Projects/pac/ssclistmeth.pdf

B.2 Project category applicable to the small-scale project activity:

According to Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities, Category I. A. Electricity generation by the user comprises renewable energy generation units that supply individual households or users with a small amount of electricity. These units include technologies such as solar power, hydropower, wind power, and other technologies that produce electricity all of which is used on-site by the user, such as solar home systems, and wind battery chargers. The renewable generating units may be new or replace existing fossil fuel fired generation.

The proposed project activity involves hydropower technology to produce electricity for supply to households and other electrical end-use enterprises. Use of the generated electricity will replace fossil fuels such as kerosene and diesel used in rural areas of Nepal for lighting and agro-processing needs.

The baseline for Category I. A. Electricity generation by the user of Type I – Renewable Energy Projects is given as:

"The energy baseline is the fuel consumption of the technology in use or that would have been used in the absence of the project activity. The project participants may use one of the following energy baseline formulae:

Option 1:

$E_B = \Sigma_i(n_i.c_i) / (1 - l)$

Where

E_B = annual energy baseline in kWh per year

Σi = the sum over the group of "i" renewable energy technologies (e.g. residential, rural health center, rural school, mills, water pump for irrigation, etc.) implemented as part of the project
n_i = number of consumers supplied by installations of the renewable energy technology belonging to the group of "i" renewable energy technologies during the year
c_i = estimate of average annual individual consumption (in kWh per year) observed in closest grid electricity systems among rural grid connected consumers belonging to the same category. If energy consumption is metered, ci is the average energy consumed by consumers belonging to the same group of "i" renewable energy technologies. If energy consumption is metered, c_i is the average energy consumed by consumers belonging to the group of "i" renewable energy technologies
l = average technical distribution losses that would have been observed in diesel powered mini-grids installed by public programs or distribution companies in isolated areas, expressed as a fraction

OR

Option 2:

$E_B = \Sigma_i O_i / (1 - l)$

Where
E_B = annual energy baseline in kWh per year
Σ_i = the sum over the group of "i" renewable energy technologies (e.g. solar home systems, solar pumps) implemented as part of the project
O_i = the estimated annual output of the renewable energy technologies of the group of "i" renewable energy technologies installed (in kWh per year)
l = average technical distribution losses that would have been observed in diesel powered mini-grids installed by public programs or distribution companies in isolated areas, expressed as a fraction

OR

Option 3:

A trend adjusted projection of historic fuel consumption is acceptable in situations where an existing technology is replaced.

The emissions baseline is the energy baseline calculated using either of the options mentioned above times the CO_2 emission coefficient for the fuel displaced. A default value of 0.9 $kgCO_2eq/kWh$ which is derived from diesel generation units may be used."

Micro-hydro is considered under the proposed CDM activity as explained in A.4.2.

Kind of Technology	Power Output (Range)	Applications
Micro-hydro	3 – 100 kW	lighting, small electric appliances, and agro-processing units

Measurement of power output is required as each MHP is likely to have a different combination of end-use applications of the generated electricity including agro-processing units. Option 2 as explained above is thus selected where annual output will be measured based on the installed kWh meter in the micro-hydro plant.

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The proposed project activity qualifies to use simplified methodologies because it comprises micro-hydropower technology generating electricity that is used on-site by the user and the total capacity of these renewable energy generators does not exceed 15 MW.

Emissions are reduced below that which would have occurred in the absence of this CDM project activity by virtue of the number of barriers that the project otherwise faces, described in detail below.

Investment Barrier: The proposed project activity faces an investment barrier at two levels that hinder the promotion and installation of MHPs that can lead to reduced emissions. The first level examines additionality at the program level where AEPC is aiming to install the targeted 15 MW. The second level examines barriers at the level of each individual plant.

Barrier at the Program level: AEPC has been promoting micro-hydro technology in order to increase the access of rural communities in Nepal to distributed forms of renewable energy. The proposed CDM activity aims to expand micro-hydro installations nation-wide up to a maximum capacity of 15 MW with the integration of CDM revenues. The timeline of the design of the proposed project activity is given below:

Table B.3.1: Timeline of the proposed program development

Key Event	Date
1) Conceptualisation of the development of Micro Hydro under the CDM framework and its modalities and procedures	Early 2003
2) Baseline Study and Project Design Document Preparation:	Early 2003
• Contract for PDD was signed with Winrock Nepal	July 2003
3) Discussion with multi/bilateral donors for carbon finance	October 2003

The implementation of the proposed activity requires a considerable amount of upfront capital for which a basket funding approach has been adopted. In order to install 15MW by 2011, the AEPC MHP program will require total funds of $60.518 million. This includes the costs of management of the AEPC program, grant subsidies to communities to buy down capital cost, and investments in plants made by users, local government entities (District Development Committee - DDC and VDC) and financing institutions.

Table B.3.2: Project costs

Item	**Cost in US$ million**
Development Costs	28.609
Installed Costs	26.933
Other Costs	4.976

Subsidy to users totals $20.748 million, which equals $1,383 per kW of installations on an average. Without subsidies, users would not be able to afford the MHP installations. Plant investment contributed by farmers through their labor and in kind contribution, loans from banks; and interest-free equity investment from DDCs and VDCs amount to $26.933 million. The rest of approximately $12.837 million is AEPC's operational expenses for managing and monitoring the program.

Through the basket funding approach, the World Bank and UNDP, have contributed a total of US$7.086 million through REDP of the AEPC MHP program. GoN has confirmed a contribution of $2.265 million.

DANIDA and NORAD are together expected to provide an additional contribution of US$14.314 through the IInd phase of ESAP, for which the discussion is ongoing. In addition to these funding sources, some already confirmed and others under negotiation, a financing gap of US$ 9.919 still remains for the proposed activity.

At prices of approximately $7 per tCO_2eq, the CDM is expected to bring total carbon revenues of approximately $2.329 million in the 10 year project period; this will fill a part of financing gap. The development of the program under the CDM that would contribute to program sustainability is expected to facilitate the finalisation of DANIDA's funding and to catalyse further donor support to fill the rest of the funding gap. Further talks are ongoing with UNDP, The World Bank and the Asian Development Bank for financing the funding gap that currently exists for the project. All the donors have recognized the CDM potential of this project and are considering providing grants to cover the remaining financing gap.

Investment barrier at the level of individual plant: The proposed micro hydro activity is demand driven with communities making the final decision on whether or not to invest in a Micro Hydro Scheme. The construction of a MHP requires a considerable amount of upfront capital and investment in addition to the subsidy provision from the Nepali government. The high upfront investment cost of a MHP is thus a barrier for the adoption of the technology by rural communities in the country. MHPs range from 3-100 kW and the most common plant sizes are 15 and 30 kW. Each kW of installed micro-hydro capacity can serve at most 10 households. The capital cost per kW ranges from US$ 1,900 to US$3,521/kW depending on the size of the plant, geographic remoteness and specific characteristics of the plant and its design. The government subsidy at $141 per household but not exceeding $1,197/kW covers 35% to 55% of the cost and the community has to invest the remainder. An additional transport subsidy of upto $423/kW is provided to very remote locations. In addition, the annual project operation and maintenance costs are estimated to be 3% of the total capital cost.

Once the micro hydro is constructed, the community in charge of the installed micro hydro collects revenues by selling electricity to participating households. The electricity is used for household lighting and productive uses (agro-processing). Average household electricity consumption is estimated to be 27 kWh/month, out of which 18KWh is used for lighting and 9 kWh, for productive uses. While the average lighting tariff is US$ 0.09/kWh, the tariff for productive uses is US $0.1/kWh. Depending on the capital cost of installation, these tariffs are likely to fluctuate. For example, communities that manage to install micro hydro at less cost can accordingly distribute electricity at lower tariff rates.

The Agricultural Development Bank of Nepal (ADB/N) is the primary financial institution involved in financing the micro-hydro sector in the country and provides loan at the commercial rate of 16% interest. Using this benchmark to represent standard returns in the market, the financial analysis to assess 15-year Financial Internal Rate of Return (FIRR) including the subsidy availability shows a negative net present value even for a least cost plant of 100 kW. The IRRs start diminishing with decreasing plant sizes. The lower the size of the plant, the lower the internal rate of return on the micro hydro investment as shown in Table 3.3 below. For plant sizes below 7 kW, the IRR becomes negative.

Table B.3.3: IRRs for various size plants with government subsidy:

Cost per kW/Subsidy per kW	3 kW	15 kW	30 kW	75 kW	100 kW
Least cost plant	(-)	9%	9%	13%	13%
High Cost plant	(-)	-2%	-2%	1%	1%

Before communities start considering investing in micro hydro projects, a substantial community mobilization effort is necessary to generate the interest of the communities in them. If this community mobilization cost is to be taken into account, the IRR becomes even lower. The community mobilization cost is about US$400 per kW.

As shown by the table above, the financial IRR for any size plants between 3-100 kW does not reach the benchmark of 16%. MHP construction is thus not a financially attractive course of action for rural communities in Nepal and they will opt for least cost technologies like kerosene-based lamps and diesel powered mills in the absence of the proposed CDM project activity.

Barriers due to investment and prevailing practice at the household level: Rural areas in Nepal, not served by the national grid, invariably use kerosene-based wick lamps for lighting purposes. Using kerosene-based wick lamp does not involve major investment on the part of the households and kerosene is readily available in the market centres of rural areas. Households can improvise wick lamps at a negligible cost. On average, a rural household uses 2.5 litres of kerosene in a month at the price of around $0.6[3] per litre, incurring running cost of US$18 annually.

Apart from lighting for individual households, a MHP powers other electrical end-uses like agro-processing mills. The conventional fuel used in an agro-processing mill is diesel. This diesel mill costs between US$ 840 and US$ 1,400 and usually runs for approximately 5 hours per day and 300 days per year using 1.0 litre diesel per hour. The price of diesel is around $0.8 per litre. As a result of using a diesel mill, each household additionally bears a share of at least 12 litres diesel consumption, incurring an annual expenditure of US$ 9.6 minimum.

In comparison, a MHP requires considerable amount of time and effort and expenses for households to meet their lighting requirements. The upfront cost burden on an individual household participating in the community micro hydro scheme could range from US$ 190 to 300 or higher. In addition, the household has to pay a monthly tariff for electricity consumption. On average, each household spends US$ 19.50 annually for lighting and US$10.8 for productive end use. The micro hydro subsidy provision by the government generates a capital cost relief of about US$90 to 100 for every household. The household contributes the rest either through cash or labor or both.

For a cash strapped rural household, remaining status quo i.e. continuing the prevailing practice of using kerosene wick lamp and a diesel mill is a cheaper option. If it had not been for AEPC’s unique approach through community mobilization, training and capacity building to create a demand for MHPs as well as through provision of quality control services, these rural households would have been unable on their own to garner the motivation for mobilizing themselves to invest in micro hydro projects. Hence, in the absence of the project, communities are less likely to break away from the prevailing lower cost practice. The project activity is thus additional.

Technology barrier: Although micro-hydro technology was introduced in Nepal in the early '60's, it still remains a non-commercial activity. In the absence of a quality control framework, suppliers and manufacturers of the technology would compete based solely on price. Low quality products would lead to frequent breakdowns and low performance creating extra maintenance burden on poor communities. The technology would also receive a bad reputation lowering demand. The proposed project activity has a strong quality control and assurance framework whereby only high quality products are delivered to investing communities. Since rural communities cannot discern the quality of the technology on their

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[3] An exchange rate of US$1 = NRs. 71 is used throughout this PDD.

own, AEPC through the proposed CDM project will undertake technical reviews of all plants to be constructed before approving them for subsidy and will also allow only pre-qualified companies to undertake design, manufacture, installation and supply.

In the face of the investment and technological barriers described above communities would likely continue using traditional lighting and milling technology if it were not for the CDM project activity and the benefits of carbon finance.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

According to the project category I.A. Electricity generation by the user selected for the proposed project activity, the project boundary is the physical site of each MHP. The geographic project boundary selected for the project activity is the political boundary of Nepal where there is no access to the national grid.

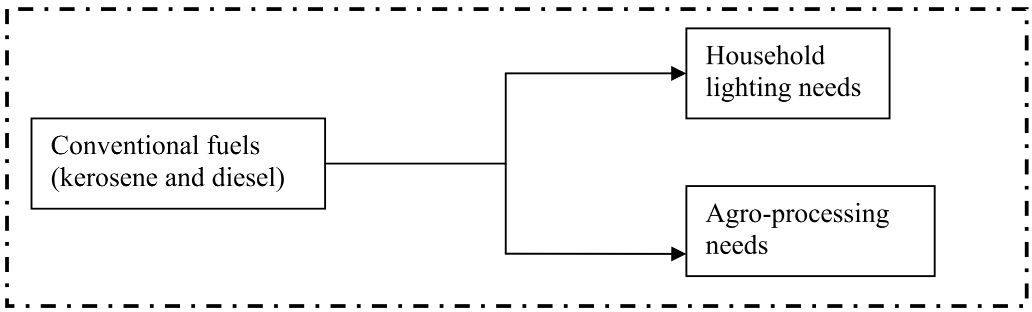

Figure 3: Baseline emissions project boundary

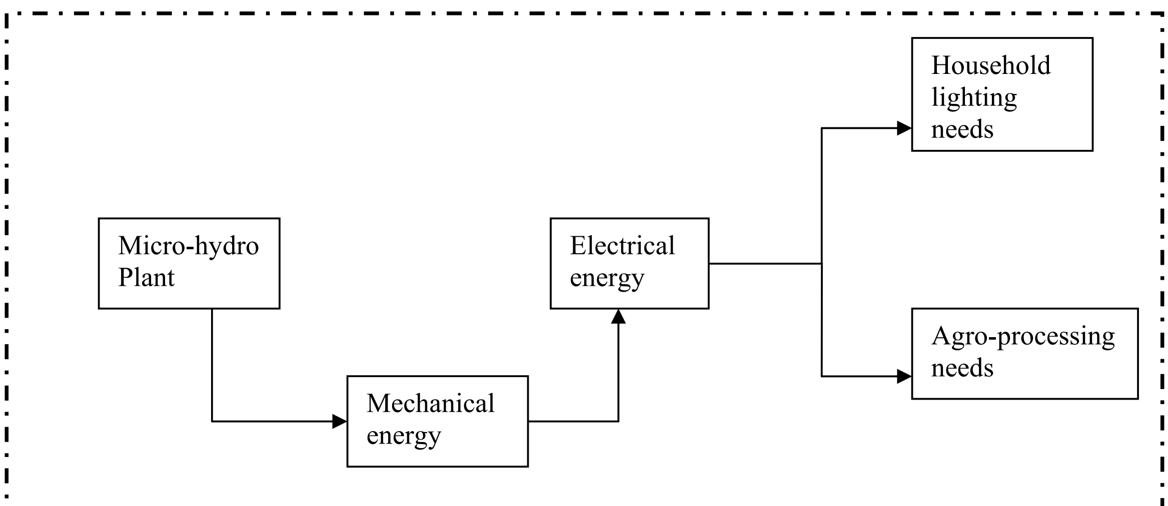

Figure 4: Project boundary

B.5. Details of the baseline and its development:

As mentioned in Section B.2, Option 2 is chosen for the annual energy baseline calculation, as given in the methodology of the small-scale project category I. A. Electricity generation by the user. Thus,

$E_B = \Sigma_i O_i / (1 - l)$

Where
E_B = annual energy baseline in kWh per year
Σ_i = the sum over the group of "i" renewable energy technologies (e.g. solar home systems, solar pumps) implemented as part of the project
O_i = the estimated annual output of the renewable energy technologies of the group of "i" renewable energy technologies installed (in kWh per year)
l = average technical distribution losses that would have been observed in diesel powered mini-grids installed by public programs or distribution companies in isolated areas, expressed as a fraction

For the proposed project activity, O_i is thus the estimated annual output of the renewable energy technology – micro-hydropower plant installed (in kWh) obtained from the annual meter reading of each MHP. Average electricity consumption per household per month in three different rural areas of the mountain district of Kavre in central Nepal, is found to be 21.64 kWh, 18.90 kWh and 20.26 kWh according to data made available by the Nepal Electricity Authority[4]. A similar study in rural areas of Lamjung district in western Nepal shows that the average monthly electricity consumption per household is only about 18.15 kWh[5]. The average of all these values is 19.72 kWh per household per month. Another study shows that the average monthly consumption per household in the domestic sector ranges from 15 kWh to 150 kWh and the weighted average of these is 27 kWh per household per month. It has also been mentioned based on field experiences that the monthly consumption of a 5 ampere meter holder (min. tariff block) increases to 20 kWh and then remains stagnant at that level[6]. Giving due considerations to all these sources, a conservative monthly consumption value of 18 kWh per household (i.e., 216 kWh per year) has been used for baseline calculations. In addition to this, a study based on actual field findings from 13 agro-processing units in rural areas of Nepal found that an average household requires about 9 kWh per month for milling purposes[7]. Thus, the average monthly electricity consumption per household would then be the addition of 18 kWh and 9 kWh, which gives a value of 27 kWh (i.e., 324 kWh per year). Further, it is assumed that on average 10 households are served by each kW of installations[8].

Average technical distribution losses l, is taken as 10% for calculations since this is the maximum limit for losses set by AEPC for plants constructed under its programs.

The emissions baseline is then the energy baseline calculated as described above times the carbon dioxide emission coefficient for the fuel displaced. A default value of 0.9 kg CO_2eq/kWh is used as provided by the methodology of the project category I. A. Electricity generation by the user in Appendix B of the Simplified Methodologies and Procedures for Small-Scale CDM Project Activities.

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[4] Field visit to Nepal Electricity Authority Office in Kavre in March, 2003.
[5] Winrock International Nepal, 2003 "Business Plan: Assessment of Financial Viability of the South Lalitpur Rural Electrification Cooperative" Winrock International Nepal, Kathmandu
[6] Woorley International, 1999 "TA No. 2911 - NEP: Rural Electrification and Distribution Improvement Project" Final report prepared in association with Shah Consult International (Pvt) Ltd and NEA counterpart team for Asian Development Bank and Nepal Electricity Authority, Kathmandu.
[7]Source: Micro-Hydro in Nepal: Development, Effects and Future Prospects with Special Reference to the Heat Generator. A study Prepared for Arbeitsgemeinschaft Kirlicher Enwicklungsdienst Stuttgart, West Germany, Daniel. E. Jantsen and Kiran Koirala; Bikash Enterprises, Inc, with No-Frills Development Consultants, Kathmandu, Nepal, January 1989.
[8] Based on technical reports of REDP and ESAP.

The date of completion of the baseline study is 10/10/2006. The baseline was developed by Winrock International, Nepal which is not a project participant. Contact information is provided below:

Anil Raut
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1103/68 Devkota Marga, Baneshwor,
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Tel: 977-1-4467087,
Fax: 977-1-4476109

SECTION C. Duration of the project activity / Crediting period:

C.1. Duration of the small-scale project activity:

>>

C.1.1. Starting date of the small-scale project activity:

>> The starting date for the project activity is January, 2003. The plants will start operation as soon as the installation is complete.

C.1.2. Expected operational lifetime of the small-scale project activity:

>> The operational lifetime of the MHPs is 15 years.

C.2. Choice of crediting period and related information:

>>

C.2.1. Renewable crediting period:

>> NA

C.2.1.1. Starting date of the first crediting period:

>>

C.2.1.2. Length of the first crediting period:

>>

C.2.2. Fixed crediting period:

>> **10-years**

C.2.2.1. Starting date:

>>**January** 2006

C.2.2.2. Length:

>> The crediting period will be of 10 years starting from 2006 till 2015. (Jan 2006 to Dec 2015)

SECTION D. Application of a monitoring methodology and plan:

>>

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

>> The monitoring methodology given in Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities, relevant to this project is given as:

I. A. Electricity Generation by the User

"An annual check of all systems or a sample thereof to ensure that they are still operating (other evidence of continuing operation, such as on-going rental/lease payments could be a substitute).

OR

Metering the electricity generated by all systems of a sample thereof."

Looking at the nature of the technology, its use, and other local conditions/practices, the second option of metering the electricity generated has been proposed for all micro-hydro systems to be installed under the project activity. Detailed justification of the choice of the approved methodology, taking into account the existing national monitoring methodology has been presented below.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

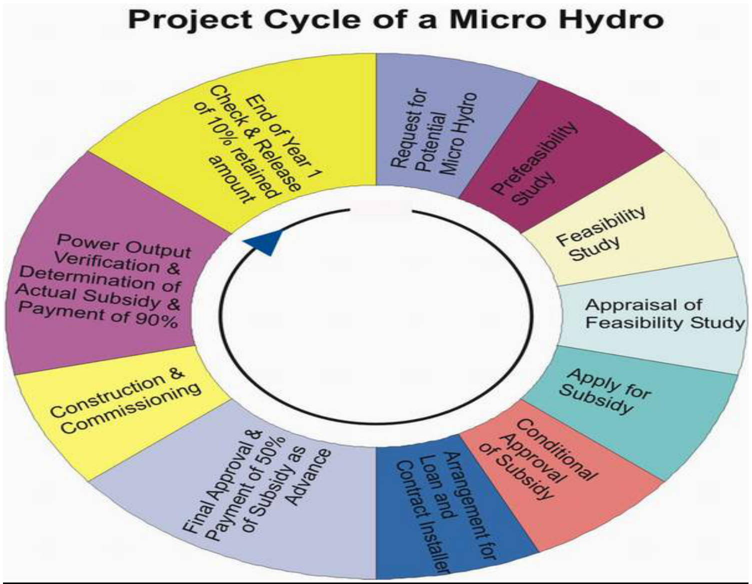
The above choice of a monitoring methodology where electricity generated by all micro-hydro systems is metered requires a slight modification to the existing monitoring procedure of AEPC.

The existing monitoring plan of AEPC is as follows:

Verification of commissioning:

The MHP project cycle consists of the following steps:

1. Request for Potential MHP
2. Pre-feasibility survey
3. Feasibility Study
4. Appraisal of the feasibility study
5. Application for subsidy to the Technical Review Committee (TRC) of AEPC
6. Conditional approval for subsidy
7. Arrangement for loan and contract installers
8. Final approval and payment of 50 % of the subsidy as advance
9. Construction, testing and commissioning
10. Power output verification and determination of actual subsidy and payment of 90%



After commissioning of the project, the entrepreneur or the community responsible for the project will request to get the output of the project verified through AEPC pre-qualified and trained power output verification inspectors. After the successful verification of the kW output, 40% of the total subsidy amount will be released with 10 percent of the amount retained against guarantee and after sales service. The retained amount will be released at the end of one year from the date of verification after ascertaining performance quality through evaluation.

The required slight modification to the existing monitoring procedure of AEPC for the proposed CDM project activity is as follows:

Metering all micro-hydro systems - At present, there is no requirement to install a kWh meter in all installed MHPs. All the micro-hydro systems to be installed under the project activity will now be required to install a kWh meter. The installed meter will meet quality standards and will be checked periodically for equipment performance and maintenance. Arrangements will be made either with the users committee and/or micro-hydro area centre and/or another third party to collect and report the annual kWh readings to AEPC. The meter readings will be monitored annually in at least 10% of the MHPs.

Acceptance of micro-hydro companies under the CDM project - Acceptance of micro-hydro companies is based on their adherence to AEPC's quality monitoring program and end-user subsidy program. The criteria for this program, which are pre-requisites for pre-qualification of the companies, are:

i. Registered as a company in the Department of Industry of HMG/Nepal;
ii. Experience in micro-hydro installation/construction;
iii. With sufficient skilled labour force;
iv. Strong financial position;
v. Good business plan.

Sales registration - Micro-hydro installed by pre-qualified companies will become eligible as soon as they are registered in the AEPC database. AEPC will report through an annual system installation report of all eligible micro-hydro plants. The annual system installation report will be issued per micro-hydro company. It will provide the information necessary for CER calculations and for verification that the MHPs have actually been sold.

Given its experience while handing out subsidies for micro-hydro, AEPC has abundant experience in verifying sales records of participating micro-hydro companies. Under the CDM, AEPC will continue to verify at least 10% of the systems sold in that year.

Monitoring of the performance of the system - Since CERs can only be claimed on the basis of realized emission reductions, the monitoring parameters are:

- the number of kWh generated at each MHP measured by the installed kWh meter
- the number of households connected to the MHP

REDP and ESAP carry out detailed quality assurance and monitoring visits.

Records of latitude and longitude of the systems for plant verification will be maintained by AEPC. Once this is recorded, double counting of installed systems will not be possible.

D.3 Data to be monitored:

>>

Monitoring of performance of the system

The following table shows the system performance monitoring plan.

ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
1	Sales registration	No. of MHP sold	Registration of sales	M	continuous	100%	Electronic	Crediting period plus 2 years	Data is annually reported in the annual installation report
2	Sales monitoring	Sold MHP installed in the field	Verification of installation	M on basis of a sample	Annually	Based on statistically significant sample	Electronic	Crediting period plus 2 years	Data will be aggregated monthly and yearly
4	Meter reading	kWh	kWh reading	M	Annually	Based on statistically significant sample	Electronic	Crediting period plus 2 years	Data is annually reported

ID	Benefits	Indicator	Data Source and Methodology	Collection Responsibility	Measurement Unit	Baseline Values	Compliance Value*
A	Number of installation of micro-hydro projects	Annually installed capacity (kW)	Testing and commissioning Report, Power Output Verification, Annual Plan of REDP and MGSP, Annual Progress report of REDP and MGSP	REDP and MGSP	Same as indicator i.e. kW		Refer to the installed capacity requirement under Section E.1.1 of PDD
B	Sustained performance of micro-hydro projects	Functional status of the installed plants No of operating days of MH plants	Quality Inspection Report Annual impact assessment Final payment to installer (upon successful performance of the MH at the end of one year from the date of commissioning)	REDP and MGSP	% of functioning plants Plant outage time		Maximum 35 days outage
Once the above installation and sustainability targets are achieved, the following benefits logically accrue and must therefore be monitored/measured.							
1	Number of HHs connected	HHs electrified	Testing and Commissioning Report, Power Output Verification Annual impact	REDP and MGSP	Same as indicator	Detailed Feasibility Study Report	As indicated in Detailed Feasibility Study Report

			assessment				
2	Employment creation at local level	Number of Full time and part time employment	Annual impact assessment Annual progress report of REDS and Area Center	REDP and MGSP	Same as indicator	At least 2 full time employment per MHP	As indicated in Detailed Feasibility Study Report
3	Basic infrastructure for small business/industry	Number and type of small business/industry and income generation activity	Annual impact assessment Annual progress report of REDS and Area Center	REDP and MGSP	Same as indicator	Detailed Feasibility Study Report	As indicated in Detailed Feasibility Study Report
4	Time saving, availability of additional time and its utilization	Utilization of time in income generating, social and other activities	Annual impact assessment Annual progress report of REDS and Area Center	REDP and MGSP	Same as indicator	Detailed Feasibility Study Report	No compliance value of its own but its compliance depends on the compliance of the above benefits (A & B)
5	Educational benefits	Percentage of households possess means of communication (Radio, TV) Enrolment, drop out, Adult literacy classes	Annual impact assessment Annual progress report of REDS and Area Center	REDP, MGSP	Same as indicator	Detailed Feasibility Study Report	No compliance value of its own but its compliance depends on the compliance of the above benefits (A & B)
6	Reduced Kerosene, Diesel and Battery consumption	Liter of kerosene/diesel replaced Number of battery replaced	Annual impact assessment Annual progress report of REDS and Area Center	REDP and MGSP	Same as indicator	Detailed Feasibility Study Report	As indicated in Detailed Feasibility Study Report
7	Reduction in indoor	Percentage of respondents reporting	Annual impact	REDP and	Same as		No compliance value

	Smoke	a drastic reduction, some reduction, or no reduction in indoor smoke and respondents reporting recent cases of common illnesses such as eye infection, respiratory disease, cough, etc.	assessment	MGSP	indicator	Detailed Feasibility Study Report	of its own but its compliance depends on the compliance of the above benefits (A & B)
8	Reduction in woman/girl's workload	Percentage of women reporting reduced time on activities in the home and outside the home and its utilization	Annual impact assessment	REDP and MGSP	Same as indicator	To be determined	No compliance value of its own but its compliance depends on the compliance of the above benefits (A & B)
9	Increased social capital	Formal/informal social groups, other development/social activities and involvement of HHs	Annual impact assessment	REDP, MGSP	Same as indicator	Detailed Feasibility Study Report	Detailed Feasibility Study Report

* The following formula applies for the compliance value:

Compliance Value = 80% * Maximum Target Value

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

Regular (i.e. at least once a month) monitoring of the schemes are carried out during and after construction by the district staff of REDP and staff of area centres promoted by ESAP to ensure flawless construction and sustainable operation of the schemes. Power output verification is done in each scheme to check the power output as designed. Based on the successful result, the District Energy Fund - DEF then the Community Energy Fund - CEF (in case of REDP promoted schemes) or the Internal Rural Energy Fund (in case of ESAP supported schemes) release the second instalment of subsidy to the manufacturer/installer. The supplier can be penalized for providing reduced amount based on the reduced kW. An allowable margin of ±10% is acceptable. Upon successful operation of the schemes for one year after the date of power output verification, the remaining instalment is released to the manufacturer/installer.

Moreover, AEPC implements a quality assurance system to enhance the quality of the implemented micro-hydro schemes. A separate set of standards is prepared and implemented for the micro- (3 to 100 kW) projects. Procedural guidelines for carrying out preliminary and feasibility studies are available for practical use. The guidelines include standard design aids with a built-in expert system. Furthermore, guidelines on tariff setting and social mobilization, and standard bidding and contract agreement formats are also prepared as part of the quality assurance system.

A system is in place to qualify manufacturers, installers and surveying companies based on their performance indicators. A pool of quality inspectors is maintained for supervising and assisting the construction works by AEPC.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

>>

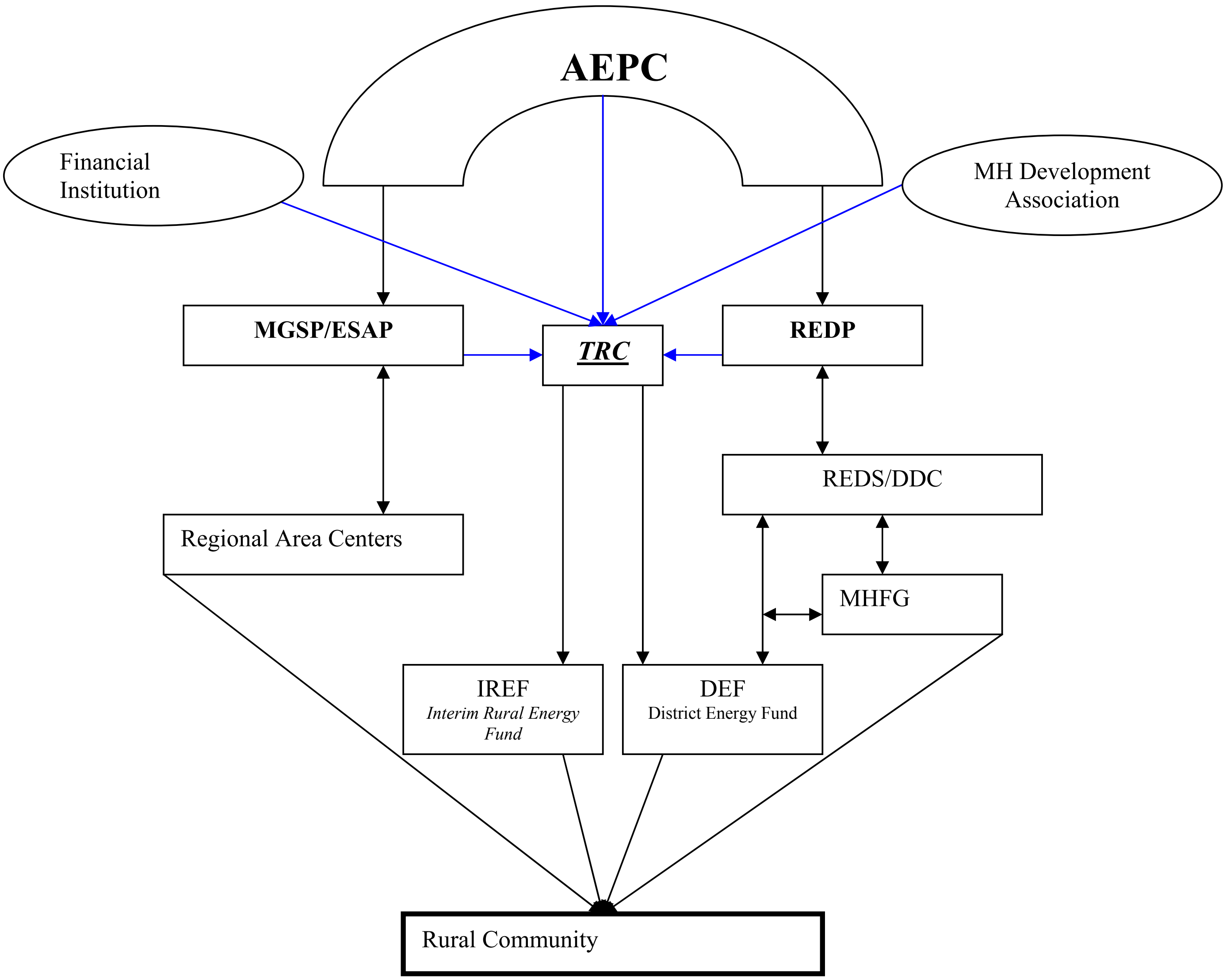
Project Implementation:

AEPC is responsible for ensuring the overall implementation of the proposed project activity. Under the supervision of the Technical Review Committee of AEPC, ESAP and REDP will ensure the management and operation of the MHPs installed as part of the proposed project activity.

Execution of Monitoring Plan

AEPC will carry out the above mentioned monitoring quality control and quality assurance procedures through ESAP and REDP.

The figure below illustrates the management structure for REDP and ESAP under AEPC for the dissemination of the MHPs targeted for the proposed project activity.



TRC: Technical Review Committee
MHFG: Micro Hydro Functional Group
REDS: Rural Energy Development Section
DDC: District Development Committee

Figure 5: Management Structure of AEPC for the Micro-Hydro Support Programs

D.6. Name of person/entity determining the monitoring methodology:

>> The monitoring methodology is determined by Winrock International, Nepal. Contact information is given below.

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Winrock International Nepal.
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Fax: 977-1-4476109
bpandey@winrock.org.np

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

>>

E.1.1 Selected formulae as provided in appendix B:

>> The formulae given in Appendix B to calculate energy baseline has been used as explained in Sections B.2 and B.5 above. The calculation of GHG emissions reduction has been presented below.

$E_B = \Sigma_i O_i / (1-l)$

Where

E_B = annual energy baseline in kWh per year
Σ_i = the sum over the group of "i" renewable energy technologies (e.g. solar home systems, solar pumps) implemented as part of the project
O_i = the estimated annual output of the renewable energy technologies of the group of "i" renewable energy technologies installed (in kWh per year)
l = average technical distribution losses that would have been observed in diesel powered mini-grids installed by public programs or distribution companies in isolated areas, expressed as a fraction

The total CO_2 reductions can be calculated after obtaining the annual kWh meter reading of the micro-hydro systems and multiplying by a CO_2 emission coefficient. A default value of 0.9 kg CO_2eq/kWh has been assumed for calculations. The energy meter reading obtained will have incorporated transmission losses in the mini-grid.

Based on the monitoring figures, the annual baseline emissions are calculated as shown below:

Baseline Emissions (tCO_2/yr) = E_B (kWh) * 0.9 kg CO_2eq/kWh * 1/1000

The following table provides information on the kW installed each year between 2003 and 2009.

Year	Total kW installed REDP+ESAP	Cumulative Total kW REDP+ESAP
2003	287	287
2004	121	408
2005	181	589
2006	378	967
2007	2,000	2,967
2008	3,500	6,467
2009	4,033	10,500
2010	2,000	12,500
2011	2,500	15,000

E.1.2 Description of formulae when not provided in appendix B:

>> NA

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

There are no project emissions.

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

According to project category I. A. Electricity generation by the user in Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities, leakage is to be considered "if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity".

Since this is not the case for the proposed project activity, there is no leakage.

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

>> The sum of E.1.2.1 and E.1.2.2 is zero. Thus project activity emissions for the proposed project are zero.

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

>> See Section E.1.1.

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

>> Since project activity emissions are considered to be zero, baseline emission calculations as provided in Section E.1.1 represents the emission reductions due to the project activity. Also, see table in Section E.2 below.

E.2 Table providing values obtained when applying formulae above:

>> The following table summarizes the values obtained:

Year	Baseline Emissions in tCO_2eq	Project Emissions in tCO_2eq	Emission Reductions due to the Project Activity in tCO_2eq
2006	3,106	0	3,106
2007	9,262	0	9,262
2008	20116	0	20116
2009	32,697	0	32,697
2010	38,529	0	38,529
2011	45,819	0	45,819
2012	45,819	0	45,819
2013	45,819	0	45,819
2014	45,819	0	45,819
2015	45,819	0	45,819
Total in the 10-year crediting period			**332,803**

SECTION F.: Environmental impacts:

F.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>>

The penetration of micro-hydro power reduces the consumption of kerosene for lighting and dry-cell batteries at the household level. This reduces GHG emissions and improves air quality indoors and reduces health and odour problems associated with indoor air pollution. The negative impacts of micro-hydro power on the local environment are negligible. The small run-of-river systems do not involve storage other than very small amounts required to meet variations in demand. River bank erosion at the sites is a natural feature of the river system. The dry stone masonry weirs at the intake sites are frequently washed away by floods and need to be continually rebuilt in the dry season. There are no significant environmental effects downstream of the weirs. The projects are too small to warrant investment in watershed management. Significant forest clearing is also not required for construction because of the small size of the developments. The visual impact of the penstock pipes is small. In order to avoid the risk of accidents from potential electrical hazards, safety standards have been established and agreement is reached by the owner to abide by these standards. All micro-hydro plants fall under category A of Water and Energy Commission Secretariat/Ministry of Water Resources Guidelines for which a Preliminary Environmental Impact Statement (EIS) would suffice just to ensure that any adverse environmental problems have not been overlooked. Initial Environmental Examination and Environmental Impact Assessment are not required. The environmental impact of specific projects to be financed is evaluated in connection with the appraisal of such project proposals.

However, AEPC has recognized the importance of Environmental Assessment to identify possible impacts due to the implementation of micro-hydro and recommend appropriate mitigation measures to make the project more sustainable and improve the environment of the surroundings. Under REDP, an Environmental Assessment (EA) is undertaken for all micro hydro projects that are proposed for implementation in its program areas. For this purpose, AEPC/REDP has developed Environment Assessment Guidelines for MH Schemes. This study is integrated in the pre-feasibility/feasibility study.

The use of MHP will also replace the use of dry-cell batteries reducing the health impacts by the disposal of these batteries and thus to an improvement in the environment.

SECTION G. Stakeholders' comments:

G.1. Brief description of how comments by local stakeholders have been invited and compiled:

>> REDP and ESAP conduct regular users' survey, field visits, and training by which comments by local stakeholders have been invited and compiled.

G.2. Summary of the comments received:

>> According to the Micro-hydro Users' Survey 1999/00[9], 87% of the MHP surveyed were operating in a good condition (20 out of 23 plants surveyed). About 62% of the respondents mentioned that the power supply is regular from the MHP. Regarding users' satisfaction on the plant services, 13% ranked as very good (quality and regularity of the power); 47.8% as good (smoothly functioning); 21.7% as satisfactory whereas remaining 17.3% ranked as poor (because of the non functional plants or closing down of plants, etc.). The benefits derived from the plants as perceived by the users include improvement in children's education and health situation, awareness creation in various aspects, industrial promotion (poultry farming, bakery, furniture, soap making, photo studio etc.), initiation of social activities, monthly savings for the cost of kerosene, etc.

G.3. Report on how due account was taken of any comments received:

>> Comments received during the Users' Survey and during community mobilization and stakeholder consultation processes have been given due account by AEPC. Comments from the community have been built into the working modality of both ESAP and REDP. The community mobilization aspect of the micro-hydro sector is an ongoing process.

The quality control and assurance program of AEPC has been designed to continuously acquire comments from users and feed back into the micro-hydro sector through a number of mechanisms:

Eligibility of micro-hydro companies:
AEPC pre-qualifies companies that can participate in the micro-hydro program based on the company's experience, skill and business plan. Participating companies are made to follow the technical specification guidelines that are formulated tailoring the needs of communities in order to ensure uniform design of the plants and to maintain quality. The AEPC recommends individual plants for subsidy approval only after review of the feasibility studies prepared by the companies by the Technical Review Committee (TRC).

After sales services:
AEPC provides after sales services for participating MHPs in order to ensure that plants operate smoothly. Through after sales service, AEPC gets direct feedback on the quality of systems delivered, which feed into training and capacity building of local operators.

Power output verification:
Power output verification is conducted post-construction in the interest of communities and to ensure the quality of the design and construction of participating companies. A second installment of the subsidy for

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[9] A Report on Micro-hydro Users' Survey 2056/57 - Final report submitted to Alternative Energy Promotion Center, Lalitpur, Nepal by Universal Consultancy Services (P) Ltd., June 2000.

the plant is released only after receipt of a satisfactory result of the power output verification. Companies are liable to be penalized in the event that power output is not at the rated capacity with some margin for error. Commissioned plants have to run successfully for one year from the date of the power output verification in order for release of the last installment of the subsidy.

Quality assurance system:
AEPC implements a quality assurance system in order to maintain the quality of the plants implemented under the programs. A set of standards are prepared and implemented for the micro-hydro projects. Procedural guidelines for carrying out preliminary and feasibility studies are available for practical use. Guidelines on tariff setting and social mobilization, and standard bidding and contract agreement formats are also prepared as part of the quality assurance system. This system is in place to qualify manufacturers, installers and surveying companies based on their performance indicators. A pool of quality inspectors is maintained for supervising and assisting the construction works.

End-use enterprise development:
To ensure that communities maximize their benefits through micro-hydr, AEPC undertakes social mobilizations and helps communities identify electrical end-use enterprises suited for their localities. Development of such enterprises creates employment at the local level and provides alternative livelihoods for local people especially women increasing the income of rural households.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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E-Mail:	IBRD-carbonfinance@worldbank.org
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Salutation:	
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Personal E-Mail:	Ferry.vanhagen@minvrom.nl

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Sources of finance identified	Financing Plan (other than the CFB) including names of sources of debt and equity to be sought or already identified, contribution of each, and status of commitment (please provide any letters of intent or any other evidence of interest from financiers):		
Source	US$	%	Status of Commitment
EQUITY			
Sponsor			
The World Bank UNDP Government DANIDA & NORAD Total	5,512,842 1,573,117 2,265,189 14,314,395 23,665,543	39.10	Committed
Other Shareholders			
Farmers DDC VDC Total	25,056,631 938,380 938,380 26,933,391	44.50	Committed
Total Equity	50,598,934	83.60	Committed
DEBT			
Foreign bank loan			
Export credit			
Local bank (local currency) loan			Note: 40-50% of the farmers' contributions would come from the Agricultural Development Bank. The ADB-Nepal loan has 16% interest rate with a grace period of 5 years.
Total Debt			
TOTAL FINANCING	50,598,934	83.60	Committed
Financing Gap (Project cost minus total financing)	9,919,449	16.40	

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