

# ANNUAL PROGRESS REPORT 2067/68 (2010/11)



**Alternative Energy Promotion Centre**  
Ministry of Environment, Science and Technology  
Nepal

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## ACKNOWLEDGEMENT

The Alternative Energy Promotion Centre was established in 1996 under the Development Board Act of 2013 BS as semi-autonomous institution to support and facilitate the promotion and development of alternative/renewable energy technologies in the country.

Since its establishment, the AEPC has become instrumental in promoting different alternative energy technologies that are decentralized and renewable resource-based to support the community's needs in meeting basic energy services. It has been supporting the private sector to effectively deliver the services as well as the beneficiary users to have increased access to the technologies and the maximization of the benefits. As the nodal agency of the GoN for the promotion of the renewable energy technologies (RETs), it has been formulating and implementing pragmatic and people-centered policies with the aim of ensuring wider access to the technologies, cost reduction, resource mobilization, and enhancing partnership with concerned stakeholders as well as striving towards contributing to the mitigation of the effects of climate change. AEPC has been giving utmost priority to the sustainable growth of the renewable energy sector and working on the CDM projects as well. It has been working in partnership with different donor agencies, private sectors, beneficiaries and government agencies and local bodies for the implementation of different programmes that have been generating impressive results in enhancing the livelihoods of the rural people. This annual report has been prepared in order to document and highlight the achievements made during the Nepali Fiscal Year 2067/68 (2010/2011) by AEPC and its programmes/projects and share the information to the wide range of stakeholders and other interested people.

I would like to acknowledge the efforts of Mr. Surya Kumar Sapkota, Sr. Planning Officer for his hard work for finalization of this **ANNUAL PROGRESS REPORT OF NFY 2067/68**. I am very much thankful to the Mrs. Parbata Bhatta, Planning Officer; Mr. Krishna Chandra Poudel, Information and Communication Officer and all the staff of AEPC and its programmes for providing the information/data and relevant materials while preparing this report.

On behalf of the AEPC, I would like to extend my heart-felt thanks to all staff of the Ministry, the Board Members, External Development Partners, Support Organizations, I/NGOs, and all the community people who have supported tremendously for the progress and up-scaling of AEPC's activities.

**Prof. Dr. Govind Raj Pokharel**  
Executive Director

# **1. INTRODUCTION**

## **1.1 BACKGROUND**

Nepal has very high potential to exploit the renewable energy resources. However, the potential has not been exploited to the fullest. The energy sector of Nepal is characterized by a very heavy reliance on traditional resources which contributes more than 85 percent of the total energy consumption. Use of Renewable Energy Technologies (RETs) can reduce the dependency on traditional energy and help to protect the environment and reduction of emission of greenhouse gases, contribute sustainable development, regional balance and increases the economic activities. It ultimately contributes to improve the health and educational status of the population as well. The positive role of RETs for the fulfillment of energy needs of rural people was recognized by the Government as early as 1980's in the Seventh Five Year Plan. Since then, the promotion and development of RETs has gain momentum by integrating them in development plans and programmes. Alternative Energy Promotion Centre (AEPC) was established on November 3, 1996 the Government of Nepal with the objective of developing and promoting renewable/alternative energy technologies in the country. AEPC is under the Ministry of Environment, Science and Technology (MoEST). It is working as a national focal agency of alternative/renewable energy in Nepal.

Nepal has diversified structure of land from plain to high Himalayas. The settlement pattern is scattered and sparse. Electricity from national grid is not feasible in some of the places and too expensive as well. Big projects need huge investment which can be the economic burden for the country. High potentiality of the renewable energy sources available in country is the most appropriate way to electrify those remote areas which also helps to reduce the dependence on biomass energy sources and fossil fuel and reduces energy crisis of the nation. That ultimately helps to minimize the degradation of the environment.

## **1.2 MANDATE, VISION, MISSION AND OBJECTIVE**

### **MANDATE**

The mandate of AEPC includes the promotion of micro/mini hydro up to 10 MW, solar energy, wind energy, biomass energy, biogenetic gas, sulfur spring including biogas.

## **VISION STATEMENT**

An institution recognized as a regional/international example of promoting large-scale use of renewable energy sustainable and a national focal point for resource mobilization. The focus is to make AEPC recognized as an active institution promoting RETs in the region.

## **MISSION STATEMENT**

To make renewable energy mainstream resource through increased access, knowledge and adaptability contributing for the improved living conditions of people in Nepal.

## **OBJECTIVE**

The main objectives of AEPC are:

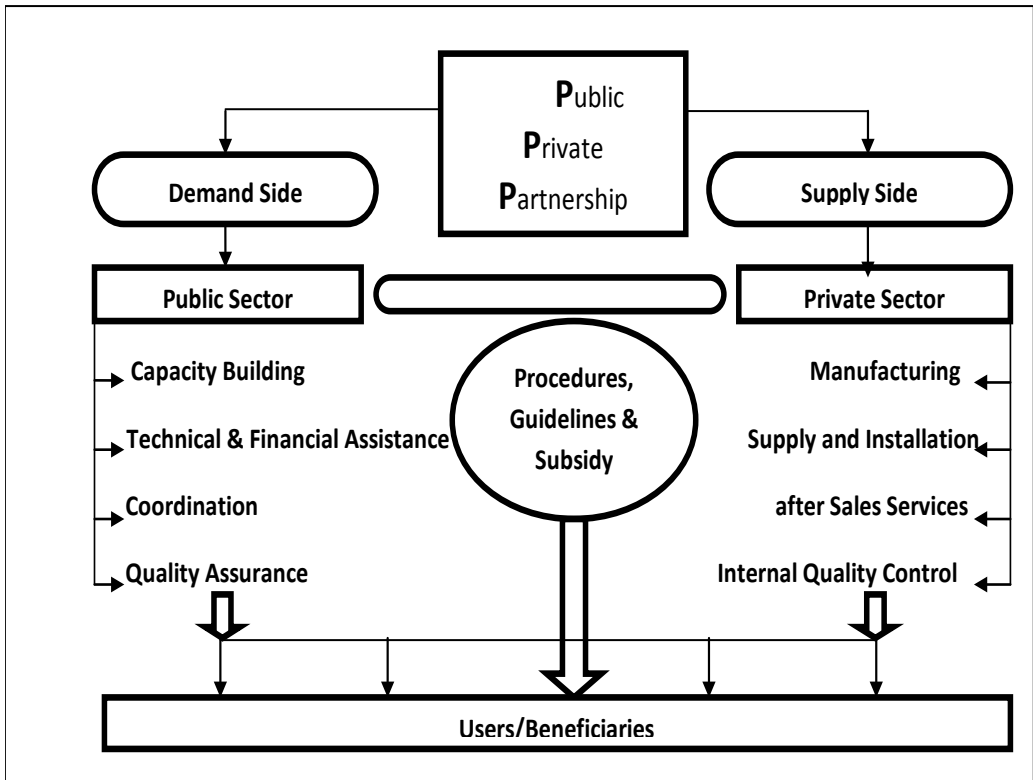
- ❖ To develop and promote the use of RETs and energy efficiency to raise the living standard of the rural people,
- ❖ To reduce the negative impacts on the environment due to the use of traditional sources of energy and
- ❖ To develop commercially viable alternative/renewable energy industries in the country.

## **1.3 WORKING/IMPLEMENTATION MODALITY**

### **Program Implementation Modality**

AEPC works collaborating with the various partners like ministries and its departments, non-governmental organizations, private sector, civil society and community/users groups for the development and promotion of RETs in the country. AEPC follows the Public Private Partnership Model and Demand Based Approach. Public sector works for the capacity building, technical and financial assistance, coordination, quality assurance etc. and private sector works for manufacturing, supply & installation, and after sales services. Capacity development of local government bodies has been emphasized by operationalizing District and Environment Unit/Section (DEEU/S) in all the 75 districts of the country for demand collection, implementation, monitoring and supervision of RETs and programs. Besides, programs have regional and district level partners working as outreach for collecting demands, implementation and monitoring. Pre-qualified (PQ) companies are involved in manufacturing, supply, installation and after sales services.

There are separate PQ companies for different RETs and the subsidy is channelized only through such companies. The overall program implementation modality can be seen as below:



As a leader in RE sector, AEPC believes on mainstreaming gender and social inclusion in this sector and sensitization of gender and social inclusion issues among energy institutions.

### **Promotion of Productive End use of RE**

Productive end use of the energy is crucial to make the renewable energy projects/system the financially sustainable, support to reduce poverty through the establishment of small and medium scale enterprises in the local level creating employment through income generating activities. It also improves the living standard of

people through household applications.



## 1.4 RENEWABLE ENERGY ACTIVITIES

Presently, AEPC is implementing several programs and projects to promote the following renewable energy systems in the country;

- ❖ Mini and Micro Hydropower, including Improved Water Mill;
- ❖ Solar Photovoltaic and Solar Thermal;
- ❖ Biogas;
- ❖ Biomass and Bio-fuels;
- ❖ Wind Energy, and
- ❖ Energy Efficiency

There are six major externally co-funded programs/projects within AEPC. These programs are making an important contribution not only in promoting the use of renewable energy in the country but also to mitigate greenhouse gas emissions, expand the off-grid rural electrification, improving the education and health. There is a potential of developing AEPC projects into carbon projects. Clean Development Mechanism (CDM) opportunities are being pursued in biogas, micro hydro, improved cooking stoves, improved water mills and solar home systems.

## 2. AEPC PROGRAMMES/PROJECTS IN BRIEF

### 2.1 ENERGY SECTOR ASSISTANCE PROGRAMME

Energy Sector Assistance Programme (ESAP) started with the support of DANIDA in



1999 with a view to achieving ongoing sustainability in the rural/renewable energy sector in Nepal within a 20 years' timeframe. The Government of Norway also joined in 2003 to support ESAP. The first phase of the programme built a strong foundation for future action and provided benefits to around 1.5 million people in rural Nepal.

ESAP II (2007-2012) aims to provide energy solutions to more than one million households in Nepal. It has been supported by DANIDA, NORAD, DFID/UK, and KfW/Germany including Government of Nepal. ESAP works through the Regional Renewable Energy Service Centers (RRESC) located in the different places of the country.

ESAP has five different components such as: Institutional Strengthening of Rural Energy Sector (ISRES), Rural Energy Fund (REF), Biomass Energy Component (BEC), Solar Energy Component (SEC) and Mini-Grid Rural Electrification Component (MGREC). Improved Water Mill (IWM) program has been integrated with in MGREC. These components work for different RETs like mini/micro hydro, solar, biomass including capacity building, managing funds for subsidy.

## **2.2 RENEWABLE ENERGY PROJECT**

Started in 2004, Renewable Energy Project (REP) is a joint project of the European Union (EU) and the Government of Nepal to create renewable energy infrastructure and service for the benefits of people in remote districts of Nepal. The overall objective of the project is to create a renewable energy infrastructure in rural areas, which facilitates income generation, sustainable growth and delivery of social services, thus alleviating poverty.

REP is building energy infrastructure in rural areas of Nepal through set-up of village energy cooperatives and provision of institutional photovoltaic systems as energy generators for schools, health posts, community communication centers, water pumping, community entertainment, community literacy and milling in its program area; around 300 VDCs in 21 hilly and mountainous districts of Nepal.

It has targeted to install 933 community-owned institutional solar photovoltaic systems equivalent to 1.023 MWp of electricity; 14 solar hot water systems and 24 solar dryers. As of present REP has established solar energy service provisions for 378 schools, 206 health posts, 29 computer literacy classes, 59 community entertainment centers and 124 community telecom centers. Similarly, installation of 107 agro-grind milling systems, 30

Solar water pumping systems, 14 solar hot water systems and 24 solar dryers are the other achievements of the project.

## **2.3 BIOGAS SUPPORT PROGRAMME**

Biogas programme was started since 1992 with the assistance of the Government of the Netherlands through the Netherlands Development Organization (SNV) with the aim of promoting the use of biogas in rural households instead of direct burning of fuel wood, animal wastes and agricultural residues. Later on the Government of Germany through Kreditanstalt für Wiederaufbau (KfW) started providing funding from 1997 and the World Bank through Global Partnership Output Based Aid (GPOBA) provided funding from 2006. The Overall objective of the BSP is 'to further develop and disseminate biogas plants as a mainstream renewable energy solution in Nepal, while better addressing poverty, social inclusion, and regional balance issues and at the same time ensuring enhanced commercialization and sustainability of the sector'.

So far, BSP has completed its four phases of implementation and currently it is in operation under an Interim Phase agreed till July 2012. AEPC is the executing agency and Biogas Sector Partnership-Nepal (BSP/N); Non-Governmental Organization is the principal implementing agency, while Nepal Biogas Promotion Association (NBPA), as an umbrella organization of the biogas companies also supports implementation.

## **2.4 RENEWABLE ENERGY FOR RURAL LIVELIHOOD**

The Renewable Energy for Rural Livelihood (RERL) has been implemented since April 2011. It is a joint programme of the Government of Nepal, the United Nations Development Programme (UNDP) and the World Bank (WB). RERL has been initiated upon the successful completion of the Rural Energy Development Programme (REDP) with main focus on enhancing rural livelihood. One of the intended outputs of the RERL is to use the lessons and best practices of REDP to design a new model linking renewable energy with livelihood promotion and poverty alleviation in Nepal. Currently it is being implemented in 26 districts of Nepal.

The main objective of RERL is to increase equitable access to energy services for the poor, women and other socially excluded groups by removing barriers that have hindered the wider use of renewable energy resources in rural Nepal. There are two Major projects implemented by RERL; Micro Hydro Village Electrification Programme

and Enhanced Rural Energy Services – Kabeli Transmission Project. Under the micro hydro project the program is developing micro hydro projects and promoting productive end use for income generating activities of the electricity which enhances the livelihood of rural people.

In Enhanced Rural Energy Services – Kabeli Transmission Project focuses on the community-driven implementation and management approach, conservation of the environment, community mobilization, productive end use development and income generation activities. This project has been designed for expansion of energy services to village communities in the Kabeli Transmission corridor (Panchthar and Ilam district). Community owned mini/micro hydro projects, solar energy system including institutional PV for schools and health posts and toilet connected biogas plants will be developed within project period.

## **2.5 NATIONAL BIO-FUEL PROGRAMME**

Government of Nepal has been implementing National Bio-fuel Program (NBP) since the fiscal year 2008/09 under AEPC by focusing particularly on promotion of *Jatropha Curcas* for the production of biodiesel in a country. AEPC has been working on research, field testing, and establishment of nursery and conduction of awareness activities on *Jatropha Curcas* in various locations of a country.

The term bio-fuel is referred to as liquid or gaseous fuels that are produced from biomass. Bio-fuel is generally considered as offering many priorities, including sustainability, reduction of greenhouse gas emissions, regional development, social structure, agriculture and security of supply. A variety of bio-fuel can be produced from biomass resources including liquid fuels, such as ethanol, methanol, biodiesel; and gaseous fuel, such as hydrogen and methane. Liquid bio-fuel is primarily used to fuel vehicles, fuel engine or fuel cell for electricity generation. It can also be used for lighting and cooking purposes by using lamps and cooking stoves.



*Jatropha Curcas tree with seeds Jatropha nursery*

*Biodiesel processing Plant*

Among the various types of bio-fuel, AEPC primarily focuses on promotion of *Jatropha Curcas* for the production of bio-diesel in order to reduce dependency on imported fossil diesel to some extent.

## **2.6 CLIMATE AND CARBON PROGRAMME**

The Climate and Carbon Unit (CCU) was established in AEPC in July 2010 in order to better address climate change issues. DFID, SNV Nepal including the Government of Nepal has provided financial support and the technical support respectively to establish and operate the unit. The objectives of the CCU are to develop AEPC as knowledge centre of climate change mitigation and adaptation, to establish institutional linkage of Climate Change activities of AEPC with Climate Change Management Division of the MoEST, further leverage the carbon mitigation and climate change adaptation potential of existing and future AEPC programmes/technologies, to institutionalize and mainstream carbon financing in the RET sector. It supports government to formulate climate change sensitive RE policy and plan, support Government of Nepal to develop a Guideline for Local Level Climate Change Initiatives and support District Development Committees to prepare climate and gender sensitive energy plans and to implement it. CCU is working on Development & management of RETs carbon projects possible in the country. It has successes in registering 5 Clean Development Mechanism (CDM) Projects; 4 biogas projects consisting about 60 thousands biogas plants, and one Micro hydro project with total 448 mini/micro hydro projects. CCU has developed the District Climate and Energy Plans preparation Guidelines and developed District Climate and Energy Plans (DCEPs) for three pilot districts namely; Ilam, Makawanpur and Mustang. Capacity building of DDC-DEEU/S to coordinate climate change activities at local level and ensure coordination and cooperation between the AEPC and the wider climate change sector are the other activities conducted by the program.

## **2.7 IMPROVED WATER MILL PROGRAMME**

An improved water mill is the necessary improvement made in the traditional water mill by improving its capacity and having multiple benefits. In Nepal, there are about 25,000 to 30,000 traditional water mills operating with low efficiency for the purpose of grinding grains. When improved, these water mills called Ghatta can easily double the grinding efficiency. The Improved Water Mill Program has been operational since 2003 with technical support from Center for Rural Technology/Nepal. The main objective of the program is to improve the livelihoods of traditional millers and to ensure sustainability of the IWM activities. Initially four districts were selected for piloting, and at present it covers 33 districts. Now planning to install 1,250 IWM with the total installed capacity of 2.5 MW up to 3.5 MW. It is expected that 1250 millers will have increased income from IWM by providing services to 62,500 households.

## **2.8 UJYALO NEPAL & SPECIAL MHP PROGRAMME**

The Government of Nepal has started to implement the Rukum Ujyalo Programme since FY 2065/66 initially in Rukum District for illuminating the whole district through the various RETs with focus on micro and mini hydro power. This programme has been expanded into other two more districts namely Jajarkot and Rolpa in FY 2067/68.

In order to implement the Nepal Ujyalo Programme and providing the electricity through the massive development of the micro/mini hydro, the Government approved the delivery mechanism of additional financial support to the micro/mini hydro power in the fiscal year 2067/68. As per this delivery mechanism, the additional support shall be used in the projects which are under construction in five districts of Karnali Zone (viz. Dolpa, Mugu, Kalikot, Humla and Jumla) including eight adjoining districts. These thirteen districts including some VDCs from other districts have been designated as remote and very remote districts by the government of Nepal. Altogether 170 requests have been received for additional financial support from various Users' committee and Functional groups. Among them, 77 projects have been approved by Technical Review Committee of Mini/Micro hydro and 50 of them have been approved from REF sub-committee. The 1st installment for 17 projects has already been released. GoN's additional support programme has played a great role for the accomplishment of the micro hydro projects.

The projects that are in the search of additional fund for their completion are now in the start of their construction.

## 2.9 WIND ENERGY

Wind energy generation is the process by which the wind is used to generate mechanical power or electricity. If the mechanical energy is used directly by machinery such as pumping water or grinding grains the machine is usually called wind mill. If the mechanical energy is then converted into electricity the machine is called wind generator.



*Wind mill*



*Wind Solar Hybrid System (Wind generators and Solar panels)*

### **3. OVERVIEW OF PROGRESS: NFY 2067/68 (2010/11)**

### 3.1 RURAL ENERGY FUND

The Governments of Denmark, Norway, Germany/KfW and Government of Nepal continued their support in providing subsidy fund through Rural Energy Fund (REF) responsible for providing the subsidy and facilitating the credit to the RE systems/projects. In March 2011, DFID/UK joined the ESAP II for providing financial support to around 34,000 SHSs. Through REF 60,501 rural households in 72 districts have received subsidy for SHSs. Further, 6,020 rural households have received subsidy for SSHSs of 47 districts. About 3,000 rural households have installed Metallic ICS of 30 districts.

The REF also provided conditional approval to 2,397 kW of micro hydro plants located in 24 districts. The committed subsidy to these projects is estimated to be NPR 328 million. Similarly, the MHPs with total capacity of 2,231 kW of 33 districts have given final approval. It is expected that around 21,276 rural HHs will be connected with electricity in near future. During this reporting period, 1,476 kW of electricity has been installed in 32 districts benefiting 14,683 households. One-year guarantee check has been completed and final payment was disbursed to 5,592 households of 17 districts with a total capacity of 592.5 kW. REF obtained ISO 9001:2008 Quality Management certificate with effective from April 2011.

The micro hydro economic end use activity has been initiated in this year with disbursement of NPR 0.5 million.

### 3.2 CLIMATE AND CARBON PROGRAMME

The Climate and Carbon Unit of the AEPC has undertaken a number of activities within a short period since its establishment. The major activities undertaken are given below.

SN	Activity	Outputs
1.	Installation of Energy meters in Micro-hydro Plants	-Energy meter installed in 227 MHPs bundled in CDM project Located in 48 districts
2.	Preparation of District Climate & Energy Plan Preparation Guidelines	-DCEP Guidelines



3.	Preparation of District Climate & Energy Plans	-DCEP report in three pilot district: Ilam, Makwanpur, Mustang
4.	Local Capacity Building activities for the implementation of DCEP	-selection of consultant as Local Capacity Builder for capacity building in Ilam & Makwanpur
5.	Promotion of the Improved Cooking Stove (ICS) – Nepal Program of Activities (PoA)	Validation of the ICS PoA performed. Onsite visit by the DOE from 14-19 November 2011.
6.	Nepal Improved Water Mill Programme (IWM) PoA – Nepal Program of Activities (PoA)	Validation of the IWM PoA performed. Onsite visit by the DOE from 21-26 November 2011.
7.	Biogas Support Program - Nepal (BSP-Nepal) Activity-3 and 20,254 Biogas plants installed between 7 April 2005 to 8 May 2006	Registration of BSP-Nepal Activity-3 as CDM Project by the UNFCCC CDM-EB (Ref. No. 5415)  Date of Registration : 13 Dec 2011
8.	Biogas Support Program - Nepal (BSP-Nepal) Activity-4 and 20,348 installed between 8 May 2006 to 21 June 2007	Registration of BSP-Nepal Activity-4 as CDM Project by the UNFCCC CDM-EB (Ref. No. 5416)
9.	Conduction of Baseline study of Improved Water Mills (IWM) as a CDM project	Final Report submitted on Feb 2012
10.	Determining Life of Metallic Improved Cooking Stoves Disseminated By AEPC	Final Report submitted on Mar 2012
11.	Improved Cooking Stove PoA Local Stakeholder Consultation Meeting	Meeting conducted in Chautara, Sindhupalchowk on 29 Jan 2012

### 3.3 BIOGAS

During the FY 2067/68, through the Biogas Support Programme (BSP), a total of 17,983 biogas plants were installed in the country. The installation is expected to have benefited about 98,910 people, mostly residing in rural areas. The major activities carried out

during the fiscal year are as follows:

## **TRAININGS**

During the FY 2067/68, the training for biogas supervisors, masons, users, slurry promotion orientation have been conducted through Nepal Biogas Promotion Association and Biogas Sector Partnership-Nepal. Furthermore, AEPC has conducted the best practices of credit in biogas as well as renewable energy with DEEU/S, support to MFIs (Micro Finance Institutions) to capacitate, manage and motivate for biogas installation and orientation to commercial poultry farmers and MFIs for biogas installation. Altogether 3,500 participants were benefited from these training and orientation activities.

## **ANNUAL SURVEY**

The study on annual cost survey for revising quotation amounts for installation of biogas plants and after sales services has been carried out during the period. It was found that the cost went up proportionate to the inflation compared to the previous year. It also conducted a survey to assess the partners' satisfactions. The regular Biogas Users' Survey was carried out for the Fiscal Year 2067/68. It was found that more than 95% of the plants were operational and the users in general were satisfied with the performance of their plants.

## **STUDIES AND RESEARCHES**

Study on parameters of increasing credit access to hills and remote hills, demo on the use of waste for biogas generation, study on the future prospects of REDD+ implementation and biogas NRB use and feasibility survey and study of institutional biogas plant have been carried out. Furthermore, Third party monitoring guideline is being prepared.

## **QUALITY CONTROL AND MONITORING**

During the period, a total of 20,056 household biogas plants including 2,137 plants supported by Gold Standard Programme have been installed in Nepal. Out of total installed plants, 5 per cent biogas plants have been monitored to verify out sales service of the biogas companies as well as for the quality control of the biogas plants.

## **CLEAN DEVELOPMENT MECHANISM**

Four projects totaling 59,998 biogas plants installed after 2003/04 have been registered with the UNFCCC as Project Activity 1, 2, 3 and 4. Additional projects are under the process for registration with the CDM as Program of Activities small scale projects. The revenue thus generated will be crucial in sustaining the Biogas Support Program in Nepal.

## **BIOGAS CREDIT FUND**

AEPC has established Biogas Credit Fund with the objective of providing loan for biogas installation through micro finance institutions, especially for low income groups from remote areas. A total of 3,343 biogas plants were installed through this fund in F/Y 2067/68.

## **PLANT REHABILITATION & EFFICIENCY AND IMPROVEMENT PROJECT**

In order to improve the efficiency of old biogas plant, a pilot project "Plant Rehabilitation and Efficiency and Improvement Project" (PREIP) has been successfully completed in Lekhnath Municipality, Kaski as part of the Biogas Support Program.

## **3.4 SOLAR ENERGY**

### **3.4.1 SOLAR PV SYSTEMS INSTALLED**

In the last fiscal year, 57,058 Solar Home Systems (10 Wp and above) were installed in 72 districts. Likewise, 6,308 Small Solar Home Systems (more than 5 Wp and less than 10 Wp) were installed in 46 districts. District wise installation of both these systems is provided below in Chapter 4. It is estimated that over 390,000 people have access to electricity from these systems.



### **3.4.2 SOLAR PV SYSTEMS INSTALLED WITH THE GON FUNDING**

A total number of 272 solar dryers/cookers and 21 PV systems to operate school computers were installed in the last fiscal year with the funding of the GoN. The district wise solar Dryers/Cookers, Solar PV for computer operation installed during the year is shown in chapter 4.

### **3.4.3 SOLAR PV SYSTEMS UNDER REP**

The Renewable Energy Project under AEPC is supporting the communities in remote areas where installation of micro hydropower plants is not feasible. The REP is supporting for installing over 900 PV systems in 21 districts. The systems include Solar PV for operating computers in schools and refrigerators in health centers, communication and entertainment centres, grain grinding mills and water pumps.

### **3.4.4 TRAININGS**

A number of training related to solar energy technologies was organized with support from AEPC/ESAP during this fiscal year. Capacity building of Nepalese Private Companies working in PV sector is one of the activities of solar energy component of AEPC/ESAP. With an objective to train the local technicians of the companies who are involved in installation and after-sales service of SHS, 5 batches of solar electric level I technicians training were carried in Mahendranagar, Nepalgunj, Chitwan, Pokhara and Itahari. The trainings were jointly organized by AEPC/ESAP and SEMAN and trained

200 participants in total.

### ***REPAIR & MAINTENANCE TRAINING***

Solar Energy Component (SEC) has been providing technical assistance especially, in capacity building of qualified solar PV companies. Trainings to the company's technicians involved in Solar Home System (SHS) installation has been an effective capacity building activity of SEC in the past years. The field monitoring visits of the SHS installed identified the need for equipped Repair and Maintenance (R&M) service centre in local level. SEC conducted 3 batches of R & M training in Kathmandu. In each batch, 20 technicians from 20 different districts were training. AEPC/ESAP provided tools required for R&M. these trained technicians have setup a repair and maintenance center in their respective districts and are now effectively providing service to SHS user.

### ***TRAINING TO QUALITY ASSURANCE & MONITORING CONSULTANTS***

Solar Energy Component (SEC) has been carrying out monitoring of 10% of SHS installed in the fiscal year. The monitoring is done through independent consultants. SEC carried out 11<sup>th</sup> round of monitoring for the SHS installed in the FY 2011/12. Seven organizations were qualified to carry out monitoring and in total 65 monitors were trained to carry out the monitoring activities.

### ***TRAINING FOR SCHOOL TEACHERS***

Solar Energy Component organized 7 training sessions for training of science teachers in basic operation and maintenance skills of Solar Home Systems (SHS). To make the training more effective, teachers from the high density SHS installed areas were invited. The teachers trained to train their secondary level students about the basic operation and maintenance of the SHS and the teachers and the students then are believed to use their knowledge and skill for the general take care and general maintenance of the SHS components and their installation in their homes and neighborhood. The training programme was organized in coordination with the RRESCs.

S N	Name of RRESC	Number of participants	Training venue
1	REMREC, Kavre	50	Dhulikhel

2	RESDTN, Tanahun	40	Damauli
3	REDA, Palpa	46	Palpa
4	DCRDC, Baglung	27	Baglung
5	BNA, Surkhet	35	Surkhet
6	RDSC, Doti	36	Doti
7	NCDC, Ilam	31	Dharan
<b>Total</b>		<b>265</b>	

### ***TRAINING TO RRESC OVERSEERS ON PV PUMPING SYSTEMS***

German Government through KfW in ESAP II has been supporting for installing 100 community based PV drinking water projects. As the support is a new concept AEPC/ESAP has hired 7 overseers in RRESCs to work for the projects. For giving the overseers a clear view on the Pumping projects under AEPC/ESAP, a weeklong training was organized from 13 to 18 March 2011.

### **3.4.5 STUDIES**

#### ***SOLAR ENERGY FACT BOOK***

Solar Energy Component is preparing a Fact book of its activities. SEC of AEPC/ESAP in its 11 years has carried out a number of activities. The programme is implemented in Private Public Partnership model based on demand driven approach for PV promotion. Activities supported by SEC have made positive impact in the several areas in the country. SEC has supported substantial work in sector capacity building, employment generation, framework for supply chain, industrial & economic activities, socio-economic impacts to the users, reduction in fossil fuel use and thus GHG emission reduction, development of monitoring and quality assurance system and other relevant impacts through the promotional activities of solar PV in Nepal. As ESAP II is closing after 15 July 2012, SEC is in the process of documenting all the achievements and lessons learnt in solar sector during the implementation of ESAP programme.

## ***USED LEAD ACID BATTERY MANAGEMENT IN NEPAL***

Some millstones are achieved in the return of the used battery management in Nepal. A regulation to manage lead acid battery used in Nepal has been drafted. Cash incentive Voucher scheme is designed and implemented to return the Used Lead Acid Battery (ULAB) used in the very remote area. A comprehensive ToR is prepared, in the technical support of KfW, to call proposals from private entrepreneurs to establish and operate ULAB recycling plant in Nepal.

### **3.4.6 PROMOTIONAL ACTIVITIES**

Various kinds of information and communicational materials were designed printed and distributed. Three Public Service Announcement (PSAs) were designed and broadcast through FM radio network to increase user awareness in subsidy, operation & maintenance and used battery management. SEC printed and distributed Solar Electricity Technicians Level I book, Solar Electricity Technicians Level II book, Solar Design Engineer's Book, brochures, posters, Subsidy application forms, battery voucher, NEPQA, Quality Assurance and Monitoring guidelines, Technical standard for Solar PV Pumping System.

## **3.5 IMPROVED WATER MILL**

### **IWM INSTALLED**



A total of 353 IWMs, out of which 294 short-shafted and 59 long-shafted were installed in 19 districts in this Fiscal Year. It is estimated that over 50,000 new households benefitted from this technology in the country.

## **RESEARCH AND DEVELOPMENT**

The major R and D in IWM are as follows:

- Development of 5kW IWM Runner
- The Assessment of Impact to the Mill Owner and Users after the Installation of IWM
- Study on possibilities for the legalization of IWM

## **TRAININGS AND WORKSHOPS**

The major trainings and workshops in IWM are as follows:

- IWM repair and maintenance training to technicians and Ghatta owners.
- IWM Networking Workshop
- Quality awareness meeting with manufacturer and service centre technician
- Interaction workshop with GOA, SCs and MFIs at district level
- Coordination meeting with DEES/DEEUs and RRESCs and their capacity building on programme modality
- Association Management training to GOA members
- Training on Account keeping system to the staffs of Service Centres
- Long Shaft IWM installation training with focus on end-use diversification to the technicians of new service centres

## **3.6 MINI/MICRO HYDROPOWER**

Among the renewable energy technologies promoted by AEPC in rural areas to provide electricity to meet the need of the people, micro hydropower is the most prominent one. Two main programs of AEPC have been actively working for the development of micro hydropower plants. The UNDP and the World Bank funded Renewable Energy for Rural Livelihood Programme (RERL) and the Denmark and Norway funded Mini Grid Support Programme under Energy Sector Assistance Programme (MGSP/ESAP) are the main vehicle through which AEPC promotes micro hydropower in Nepal. The RERL has been supporting installations of community managed micro hydro systems in the



selected VDCs of 40 districts with its holistic approach and the MGSP/ESAP has been supporting for the installations of both community managed and private entrepreneur developed and managed systems throughout the country. Moreover, to enhance rural livelihoods, both the RERL and the ESAP support end-uses of electricity. Beside agricultural produce processing, electricity from micro hydropower plants have been used to operate communication centers, computer training institutes, a FM Radio Station, saw mill, etc.

### **3.6.1 RERL SUPPORTED ACTIVITIES**

During FY 2067/68, the RERL supported the communities to install 31 MH plants in 19 districts with the total capacity of 871 kW benefitting 9,163 households. Similarly, the programme has supported the 15 end use promotion activities, carried out the detailed feasibility studies of the 81 community micro hydro power projects, supported the different kind of training activities, including operator and manager trainings, community mobilizations, account keeping etc.

### **3.6.2 ESAP SUPPORTED ACTIVITIES**

#### ***DETAIL FEASIBILITY STUDY OF MH***

The programme has identified micro hydropower schemes generating a total of 3.4 MW to provide access to electricity to some 33,465 households.

#### ***MH INSTALLED***

The ESAP supported the installation of 130 micro hydro power projects that generate a total of 1582 kW benefiting 15,485 rural households. Furthermore, construction works are at different stages of 68 micro hydropower schemes whose total capacity are 2,227 kW and will benefit 21,791 households.

**4. DISTRICTWISE INSTALLATION  
OF VARIOUS RETS  
NFY 2067/68 (2010/11)**

#### 4.1 DISTRICTWISE INSTALLATION OF BIOGAS PLANTS

SN	District	Plants Constructed	HHs Benefited	Population Benefited
1.	Arghakhanchi	10	10	50
2.	Baglung	59	59	295
3.	Bajhang	3	3	15
4.	Banke	391	391	1,955
5.	Bara	349	349	1,745
6.	Bardiya	752	752	3,760
7.	Bhaktapur	12	12	60
8.	Bhojpur	17	17	85
9.	Chitwan	838	838	4,190
10.	Dailekh	11	11	55
11.	Dang	1,091	1,091	5,455
12.	Darchula	7	7	35
13.	Dhading	1,005	1,005	5,025
14.	Dhankuta	82	82	410
15.	Dhanusa	29	29	145
16.	Dolakha	254	254	1,270
17.	Gorkha	413	413	2,065
18.	Gulmi	72	72	360
19.	Ilam	566	566	2,830
20.	Jajarkot	6	6	30
21.	Jhapa	917	917	4,585
22.	Jumla	1	1	5
23.	Kailali	1,384	1,384	6,920

<b>SN</b>	<b>District</b>	<b>Plants Constructed</b>	<b>HHs Benefited</b>	<b>Population Benefited</b>
24.	Kalikot	14	14	70
25.	Kanchanpur	798	798	3,990
26.	Kapilbastu	384	384	1,920
27.	Kaski	900	900	4,500
28.	Kathmandu	27	27	135
29.	Kavre	537	537	2,685
30.	Khotang	24	24	120
31.	Lalitpur	115	115	575
32.	Lamjung	556	556	2,780
33.	Mahottari	111	111	555
34.	Makwanpur	2,272	2,272	11,360
35.	Morang	515	515	2,575
36.	Mugu	4	4	20
37.	Mustang	1	1	5
38.	Myagdi	64	64	320
39.	Nawalparasi	521	521	2,605
40.	Nuwakot	185	185	925
41.	Palpa	419	419	2,095
42.	Panchthar	71	71	355
43.	Parbat	18	18	90
44.	Parsa	29	29	145
45.	Pyuthan	104	104	520
46.	Ramechhap	43	43	215
47.	Rasuwa	67	67	335
48.	Rautahat	101	101	505

<b>SN</b>	<b>District</b>	<b>Plants Constructed</b>	<b>HHs Benefited</b>	<b>Population Benefited</b>
49.	Rolpa	28	28	140
50.	Rupandehi	292	292	1,460
51.	Salyan	26	26	130
52.	Sankhuwasabha	40	40	200
53.	Saptari	16	16	80
54.	Sarlahi	322	322	1,610
55.	Sindhuli	543	543	2,715
56.	Sindhupalchowk	147	147	735
57.	Siraha	44	44	220
58.	Solukhumbu	8	8	40
59.	Sunsari	122	122	610
60.	Surkhet	205	205	1,025
61.	Syangja	516	516	2,580
62.	Tanahun	1,339	1,339	6,695
63.	Taplejung	11	11	55
64.	Tehrathum	33	33	165
65.	Udayapur	215	215	1,075
<b>Total</b>		<b>20,056</b>	<b>20,056</b>	<b>100,280</b>

## 4.2 DISTRICTWISE INSTALLATION OF MUD COOK STOVES

SN	District	ICS Installation	HH benefited	Population benefited
1.	Achham	268	268	1,608
2.	Arghakhanchi	1,797	1,797	10,782
3.	Baglung	4,195	4,195	25,170
4.	Baitadi	1,653	1,653	9,918
5.	Bajhang	135	135	810
6.	Bajura	417	417	2,502
7.	Bara	575	575	3,450
8.	Bhaktapur	132	132	792
9.	Bhojpur	1,396	1,396	8,376
10.	Dadeldhura	603	603	3,618
11.	Dailekh	1,644	1,644	9,864
12.	Dang	2,767	2,767	16,560
13.	Darchula	828	828	4,968
14.	Dhading	2,801	2,801	16,806
15.	Dhankuta	3,807	3,807	22,842
16.	Dolakha	1,809	1,809	10,854
17.	Doti	1,321	1,321	7,926
18.	Gorkha	1,406	1,406	8,436
19.	Gulmi	1,409	1,409	8,454
20.	Ilam	2,586	2,586	15,516
21.	Jajarkot	1,510	1,510	9,060
22.	Jhapa	779	779	4,674

<b>SN</b>	<b>District</b>	<b>ICS Installation</b>	<b>HH benefited</b>	<b>Population benefited</b>
23.	Kailali	1,873	1,873	11,238
24.	Kanchanpur	189	189	1,134
25.	Kapilvastu	1,089	1,089	6,534
26.	Kaski	566	566	3,396
27.	Kathmandu	286	286	1716
28.	Kavre	1,770	1,770	10,620
29.	Khotang	1,671	1,671	10,026
30.	Lalitpur	117	117	702
31.	Lamjung	981	981	5,886
32.	Makawanpur	1,474	1,474	8,844
33.	Myagdi	1,901	1,901	11,406
34.	Nawalparasi	1,011	1,011	6,066
35.	Nuwakot	2,026	2,026	12,156
36.	Okhaldhunga	2,013	2,013	12,078
37.	Palpa	1,268	1,268	7,608
38.	Panchthar	1,237	1,237	7,422
39.	Parbat	3,328	3,328	19,968
40.	Parsa	416	416	2,496
41.	Pyuthan	2,711	2,711	16,266
42.	Ramechhap	2,951	2,951	17,706
43.	Rasuwa	230	230	1380
44.	Rautahat	1515	1515	9,090
45.	Rolpa	1,974	1,974	11,844
46.	Rukum	1,609	1,609	9,654
47.	Rupandehi	725	725	4,350

SN	District	ICS Installation	HH benefited	Population benefited
48.	Salyan	2,342	2,342	14,052
49.	Sankhuwasabha	760	760	4,560
50.	Sindhuli	2,583	2,583	15,498
51.	Sindhupalchowk	3,049	3,049	18,294
52.	Siraha	827	827	4,962
53.	Solukhumbu	999	999	5,994
54.	Sunsari	603	603	3,618
55.	Surkhet	2,050	2,050	12,300
56.	Syangja	989	989	5,934
57.	Tanahun	881	881	5,286
58.	Taplejung	1,842	1,842	11,052
59.	Tehrathum	2,358	2,358	14,148
60.	Udayapur	1,460	1,460	8,760
	<b>Total</b>	<b>89,512</b>	<b>89,512</b>	<b>537,030</b>

#### 4.3 DISTRICTWISE INSTALLATION OF METALLIC COOK STOVES

SN	District	ICS Installation	HH benefited	Population benefited
1.	Baglung	63	63	315
2.	Bhojpur	86	86	430
3.	Dhading	73	73	365
4.	Dolakha	210	210	1050
5.	Gulmi	9	9	45
6.	Humla	30	30	150
7.	Ilam	5	5	25
8.	Jajarkot	35	35	175



SN	District	ICS Installation	HH benefited	Population benefited
9.	Jumla	208	208	1040
10.	Kaski	178	178	890
11.	Kathmandu	17	17	85
12.	Kavre	30	30	150
13.	Lalitpur	42	42	210
14.	Lamjung	39	39	195
15.	Makawanpur	50	50	250
16.	Mugu	479	479	2395
17.	Mustang	188	188	940
18.	Myagdi	84	84	420
19.	Nuwakot	89	89	445
20.	Okhaldhunga	65	65	325
21.	Panchthar	7	7	35
22.	Ramechhap	104	104	520
23.	Rasuwa	31	31	155
24.	Rolpa	52	52	260
25.	Rukum	118	118	590
26.	Sindhuli	8	8	40
27.	Sindhupalchowk	572	572	2860
28.	Syangja	96	96	480
29.	Taplejung	34	34	170
30.	Terhathum	29	29	145
	<b>Total</b>	<b>3,031</b>	<b>3,031</b>	<b>15,155</b>

#### 4.4 DISTRICTWISE INSTALLATION OF IMPROVED WATER MILLS

SN	District	Installation			Benefited HHs
		Short Shaft	Long Shaft	Total	
1.	Achham	27	2	29	1071
2.	Bajura	20	0	20	691
3.	Darchula	13	6	19	846
4.	Dhading	11	14	25	1500
5.	Jajarkot	32	2	34	3495
6.	Jumla	44	1	45	2579
7.	Kalikot	8	3	11	423
8.	Kavre	3	0	3	144
9.	Lalitpur	33	3	36	1758
10.	Makawanpur	4	1	5	531
11.	Mugu	19	4	23	912
12.	Pyuthan	9	4	13	661
13.	Ramechhap	2	0	2	98
14.	Salyan	31	9	40	1690
15.	Sindhuli	15	3	18	435
16.	Sindhupalchowk	23	7	30	1187
	<b>Total</b>	<b>294</b>	<b>59</b>	<b>353</b>	<b>18,021</b>

#### 4.5 DISTRICTWISE INSTALLATION OF SOLAR PV HOME SYSTEMS

SN	District	No of SHSs	Capacity in KWp	HH benefited
1.	Achham	1,483	30.20	1,483
2.	Arghakhanchi	797	18.16	797
3.	Baglung	211	4.75	211
4.	Baitadi	995	20.75	995
5.	Bajhang	1,924	40.20	1,924

<b>SN</b>	<b>District</b>	<b>No of SHSs</b>	<b>Capacity in KWp</b>	<b>HH benefited</b>
6.	Bajura	506	10.42	506
7.	Banke	589	13.30	589
8.	Bara	213	4.96	213
9.	Bardiya	104	2.08	104
10.	Bhojpur	898	25.09	898
11.	Chitwan	422	12.87	422
12.	Dadeldhura	421	8.86	421
13.	Dailekh	3,060	61.83	3,060
14.	Dang	1,349	26.30	1,349
15.	Darchula	1,163	23.69	1,163
16.	Dhading	1,362	33.27	1,362
17.	Dhankuta	104	2.69	104
18.	Dhanusa	84	1.89	84
19.	Dolakha	167	2.87	167
20.	Dolpa	32	0.65	32
21.	Doti	862	17.65	862
22.	Gorkha	609	12.91	609
23.	Gulmi	1,006	23.66	1,006
24.	Humla	104	2.10	104
25.	Ilam	155	6.74	155
26.	Jajarkot	2,177	44.89	2,177
27.	Jhapa	25	1.07	25
28.	Jumla	736	14.70	736
29.	Kailali	1,234	26.78	1,234

<b>SN</b>	<b>District</b>	<b>No of SHSs</b>	<b>Capacity in KWp</b>	<b>HH benefited</b>
30.	Kalikot	814	16.35	814
31.	Kanchanpur	88	2.26	88
32.	Kapilbastu	44	0.98	44
33.	Kaski	89	1.94	89
34.	Kavre	382	11.17	382
35.	Khotang	1,156	25.32	1,156
36.	Lalitpur	116	2.64	116
37.	Lamjung	307	7.19	307
38.	Mahottari	63	2.23	63
39.	Makawanpur	1,505	30.45	1,505
40.	Morang	106	3.27	106
41.	Mugu	739	14.80	739
42.	Mustang	22	0.70	22
43.	Myagdi	332	8.50	332
44.	Nawalparasi	700	19.56	700
45.	Nuwakot	95	2.38	95
46.	Okhaldhunga	1,182	27.22	1,182
47.	Palpa	739	17.27	739
48.	Panchthar	868	33.35	868
49.	Parbat	207	4.54	207
50.	Parsa	137	4.46	137
51.	Pyuthan	420	8.99	420
52.	Ramechhap	1,901	46.35	1,901
53.	Rasuwa	35	0.60	35
54.	Rautahat	109	3.01	109
55.	Rolpa	3,896	78.63	3,896
56.	Rukum	3,452	70.09	3,452
57.	Rupandehi	2	0.06	2
58.	Salyan	3,158	62.54	3,158
59.	Sankhuwasabha	729	17.01	729
60.	Saptari	94	2.35	94
61.	Sarlahi	349	9.68	349
62.	Sindhuli	3,570	91.46	3,570
63.	Sindhupalchowk	177	3.27	177
64.	Siraha	64	1.44	64

SN	District	No of SHSs	Capacity in KWp	HH benefited
65.	Solukhumbu	530	12.63	530
66.	Sunsari	3	0.08	3
67.	Surkhet	1,718	37.60	1,718
68.	Syangja	154	3.76	154
69.	Tanahun	1,322	34.65	1,322
70.	Taplejung	620	16.95	620
71.	Terhathum	96	3.48	96
72.	Udayapur	2,177	49.02	2,177
	<b>Total</b>	<b>57,059</b>	<b>1285.52</b>	<b>57,059</b>

#### 4.6 DISTRICTWISE INSTALLATION OF SMALL SOLAR PV HOME SYSTEMS

SN	District	No of SSHs	Capacity in KWp	HH benefited
1.	Arghakhanchi	227	1.14	227
2.	Baglung	10	0.05	10
3.	Baitadi	449	2.25	449
4.	Bajhang	82	0.41	82
5.	Bajura	591	2.96	591
6.	Bardiya	344	1.72	344
7.	Bhojpur	204	1.02	204
8.	Chitwan	349	1.75	349
9.	Dadeldhura	75	0.38	75
10.	Dailekh	96	0.48	96
11.	Dang	154	0.77	154
12.	Darchula	35	0.18	35
13.	Dhading	81	0.41	81

<b>SN</b>	<b>District</b>	<b>No of SSHs</b>	<b>Capacity in KWp</b>	<b>HH benefited</b>
14.	Dhankuta	15	0.08	15
15.	Doti	319	1.60	319
16.	Gorkha	32	0.16	32
17.	Gulmi	67	0.34	67
18.	Ilam	43	0.22	43
19.	Jajarkot	382	1.91	382
20.	Jhapa	97	0.49	97
21.	Jumla	47	0.24	47
22.	Kailali	84	0.42	84
23.	Kanchanpur	18	0.09	18
24.	Kaski	16	0.08	16
25.	Kavre	52	0.26	52
26.	Khotang	154	0.77	154
27.	Lamjung	21	0.11	21
28.	Makawanpur	104	0.52	104
29.	Morang	120	0.60	120
30.	Mugu	79	0.40	79
31.	Nawalparasi	801	4.01	801
32.	Nuwakot	111	0.56	111
33.	Panchthar	73	0.37	73
34.	Parbat	41	0.21	41
35.	Pyuthan	80	0.40	80
36.	Ramechhap	78	0.39	78
37.	Rasuwa	4	0.02	4

SN	District	No of SSHs	Capacity in KWp	HH benefited
38.	Rukum	17	0.09	17
39.	Salyan	161	0.81	161
40.	Sarlahi	117	0.59	117
41.	Sindhuli	21	0.11	21
42.	Siraha	13	0.07	13
43.	Surkhet	121	0.61	121
44.	Syangja	40	0.20	40
45.	Tanahun	114	0.57	114
46.	Terhathum	169	0.85	169
	<b>Total</b>	<b>6,308</b>	<b>31.54</b>	<b>6,308</b>

#### 4.7 DISTRICTWISE INSTALLATION OF SOLAR PV SYSTEMS SUPPORTED BY REP

SN	District	Use of Institutional Solar PV			
		Mill	School/Health Post/Communication	Water Pumping	Total
1.	Achham	8	47	0	55
2.	Baitadi	4	30	8	42
3.	Bajhang	5	54	1	60
4.	Bajura	6	31	4	41
5.	Darchula	3	39	3	45
6.	Dhading	3	17	0	20
7.	Dolakha	7	43	0	50
8.	Dolpa	10	28	0	38
9.	Doti	5	33	1	39
10.	Gorakha	2	31	3	36

11.	Humla	12	30	0	42
12.	Jumla	12	44	0	56
13.	Mugu	11	20	0	31
14.	Mustang	2	26	0	28
15.	Myagdi	3	24	1	28
16.	Okhaldhunga	2	59	0	61
17.	Panchathar	0	67	2	69
18.	Ramechhap	5	52	0	57
19.	Salyan	5	34	7	46
20.	Shankhuwasabha	0	48	0	48
21.	Taplejung	2	39	0	41
	<b>Total</b>	<b>107</b>	<b>796</b>	<b>30</b>	<b>933</b>

#### 4.8 DISTRICTWISE INSTALLATION OF SOLAR WATER HEATING SYSTEMS SUPPORTED BY REP

SN	District	No. of Systems
1.	Gorakha	1
2.	Mustang	5
3.	Myagdi	2
4.	Solukhumbu	6
	<b>Total</b>	<b>14</b>

#### 4.9 DISTRICTWISE INSTALLATION OF INSTITUTIONAL SOLAR DRYERS SUPPORTED BY REP

SN	District	No. of systems
1.	Ilam	7
2.	Jumla	7



3.	Kailali	2
4.	Mustang	2
5.	Myagdi	1
6.	Ramechhap	3
7.	Rasuwa	1
8.	Solukhumbu	1
	<b>Total</b>	<b>24</b>

#### 4.10 DISTRICTWISE INSTALLATION OF SOLAR PV- COMPUTERS IN SCHOOLS

SN	District	No. of Systems
1.	Achham	1
2.	Bajura	1
3.	Dailekh	2
4.	Dhading	1
5.	Kailali	1
6.	Panchthar	1
7.	Parsa	1
8.	Rolpa	4
9.	Rukum	1
10.	Sankhuwasabha	1
11.	Sindhuli	1
12.	Sindhupalchowk	2
13.	Surkhet	3
14.	Taplejung	1
	<b>Total</b>	<b>21</b>

*Note: With GoN Fund only*

#### 4.11 DISTRICTWISE INSTALLATION OF SOLAR DRYERS/COOKERS

SN	District	Types	No. of Solar Dryers/Cookers	HHs benefited
1.	Baitadi	SD	1	1
2.	Bhaktapur	SD	3	3
3.	Bharatpur	SD	13	13
4.	Dhading	SK14Koe	25	25
5.	Dolpa	SD	1	1
6.	Gorkha	SD	1	1
7.	Jumla	SD	5	5
8.	Kailali	SD	1	1
9.	Kathmandu	SD	113	113
10.	Kavre	SD	3	3
11.	Lalitpur	SD	20	20
12.	Makwanpur	SD	11	11
13.	Morang	SD	1	1
14.	Myagdi	SD	1	1
15.	Nawalparasi	SD	3	3
16.	Nuwakot	SD	3	3
17.	Palpa	SD	5	5
18.	Panchthar	SD	6	6
19.	Parbat	SD	3	3
20.	Parsa	SD	1	1
21.	Pyuthan	SD	1	1
22.	Rupandehi	SD	1	1
23.	Sindhuli	SD	3	3
24.	Sindhupalchwok	SD	5	5
25.	Siraha	SK14Koe	1	1
26.	Solukhumbu	SK14Koe	6	6
27.	Surkhet	SK14Koe	15	15
28.	Syangja	SK14Koe	20	20
	<b>Total</b>		<b>272</b>	<b>272</b>

*Note: With GoN Fund only*

#### 4.12 DISTRICTWISE INSTALLATION OF MHP PROJECTS

<b>SN</b>	<b>Districts</b>	<b>Installed Capacity, KW</b>	<b>No. of HHs Electrified</b>
1.	Achham	30	358
2.	Baglung	359	3,512
3.	Bajhang	158	1,622
4.	Bajura	122	1,252
5.	Bhojpur	13	123
6.	Chitwan	5	91
7.	Dailekha	23	273
8.	Darchula	43	533
9.	Dhading	86	891
10.	Dolakha	90	753
11.	Doti	110	1,155
12.	Gorkha	185	1,534
13.	Gulmi	1	18
14.	Humla	26	180
15.	Ilam	125	1,251
16.	Jumla	42	379
17.	Kaski	88	625
18.	Kavre	122	1,201
19.	Khotang	7	100
20.	Lalitpur	3	32
21.	Lamjung	21	194
22.	Makwanpur	10	118
23.	Nawalparasi	10	150
24.	Okhaldhunga	84	1,232
25.	Palpa	30	494
26.	Panchthar	21	204
27.	Pyuthan	10	90
28.	Ramechhap	47	427
29.	Rolpa	27	251
30.	Sankhuwasabha	42	429
31.	Sindhuli	34	354
32.	Sindhupalchowk	33	443
33.	Solukhumbu	132	1,460

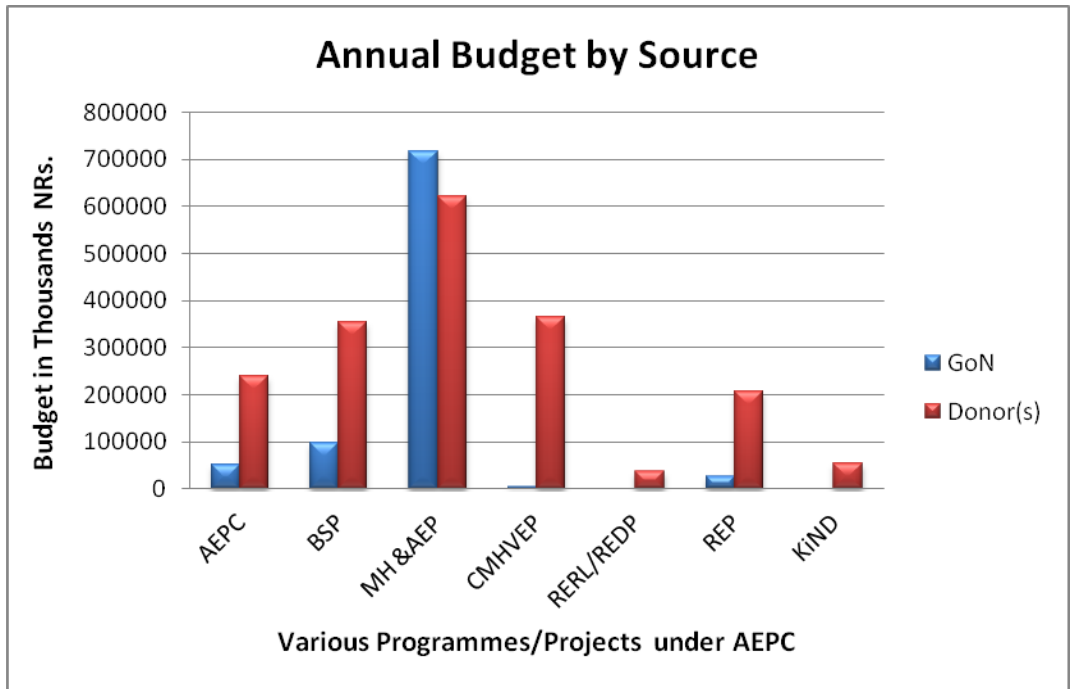
34.	Syangja	98	817
35.	Taplejung	94	888
36.	Tehrathum	73	630
37.	Udayapur	52	544
	<b>Total</b>	<b>2452</b>	<b>24,608</b>

## 5. ANNUAL BUDGET AND EXPENDITURE

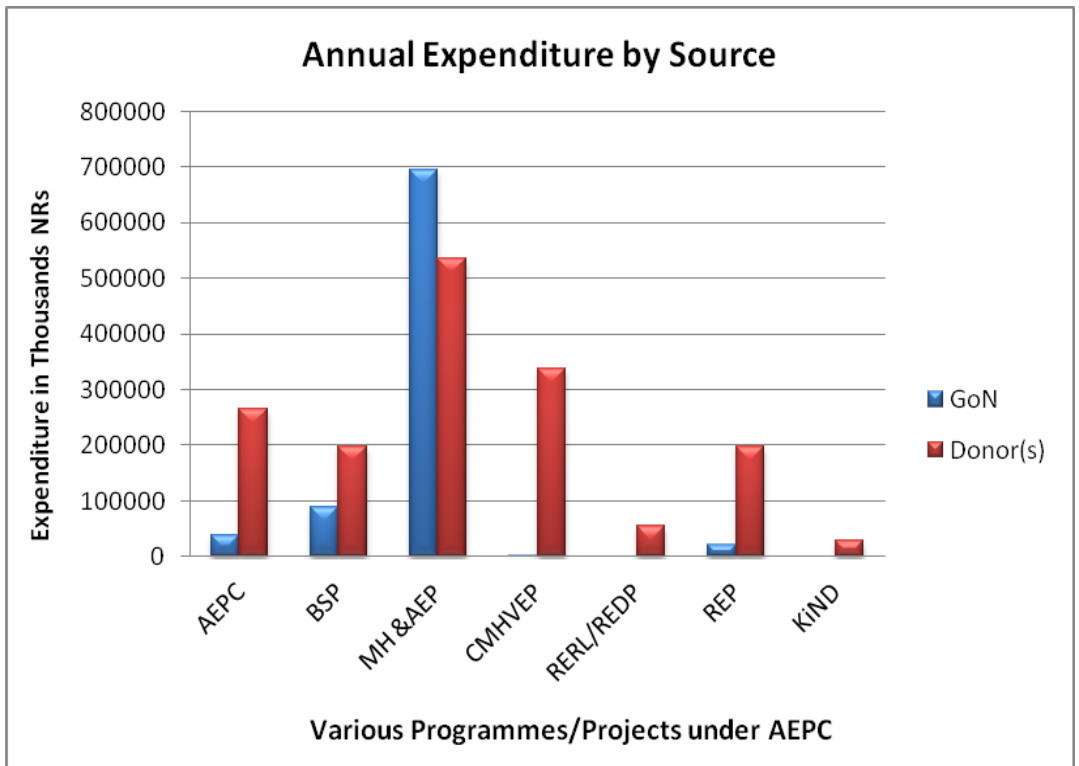
(Fig. in NRs.x1000)

SN	Programme	Budget			Expenditure			Donors
		GoN	Donors	Total	GoN	Donors	Total	
1.	Alternative Energy Promotion Centre	50733	241080	291813	39035	265197	304232	Denmark /Norway/ KfW
2.	Biogas Production Programme	97020	355152	452172	88184	197031	285215	KfW/ IDA - WB/ SNV
3.	Micro Hydro and Alternative Energy Programme	716173	620654	1336827	694989	536210	1231199	Denmark /Norway/ KfW/ DFID
4.	Community Micro Hydro Village Electrification Programme	4263	365924	370187	1671	338339	340010	IDA-WB
5.	Renewable Energy for Rural Livelihood Programme/REDP	0	37234	37234	0	54353	54353	UNDP
6.	Renewable Energy Development Programme (Inc. Bio-fuel)	25963	207564	233527	21634	196434	218068	EC
7.	Khimti Neighborhood Development Project	0	55120	55120	0	29608	29608	UNDP/ Norway
	<b>Total</b>	<b>894152</b>	<b>1882728</b>	<b>2776880</b>	<b>845513</b>	<b>1617173</b>	<b>2462686</b>	

## 5.1 ANNUAL BUDGET BY SOURCE



## 5.2 ANNUAL EXPENDITURE BY SOURCE



## 6. ANNEXES

### ANNEX 6.1: SUMMARY OF ACTIVITIES IN BIOGAS

**Table 1: Biogas related Studies/Researches**

<b>Topic</b>	<b>Objectives</b>	<b>Completion Period</b>
Biogas users' survey 2010/11	Comprehensive assessment of the impacts of the biogas	4 Months
ASS monitoring 2.5 per cent	To facilitate the (DEEU/S) to carry out the after sales service monitoring of biogas plants.	2 Months
Third party monitoring guideline	To prepare a monitoring and evaluation guideline that can be used by independent third parties which are not involved directly with the biogas support programme.	2.5 Months
Study on parameters of increasing credit access to hills and remote hills	To suggest possible ways to increase the credit access to the hills and mountains for the installation of biogas plants.	2 Months
Feasibility study of main gas valve (07 September, 2011)	Rejected the Main gas ball Valve production feasibility study research to be done by AEPC Meeting no. CST-56 (AOB)	
Proposal for Multi Feeding Process & Source analysis (23 <sup>rd</sup> May, 2011)	To identify the appropriate biogas plant design for co-digestion of the poultry & pig excreta and other suitable organic waste in biogas plants for renewable energy production intertwined with environmental and agricultural benefits. This research will focus on the development of different kind of feeding materials (pig, poultry,	Ongoing



	<p>vegetable, cattle dung, Kitchen waste and food waste) and their combination for their treatment in the anaerobic digester chamber using new design, which later can be included in the government subsidy stream.</p> <p>The specific objectives of this research are:</p> <ul style="list-style-type: none"> <li>-To select efficient model to completely digest pig and poultry excreta and the combination of the other feeding materials.</li> <li>-Less greenhouse gas emission,</li> <li>-Cheap and environmentally sound waste recycling,</li> <li>- Reduced nuisance from odors and flies,</li> <li>-Possibilities of pathogen reduction through sanitation, all this connected to renewable energy production.</li> </ul>	
<p>Proposal for Study of Life Span of Biogas Appliance (23<sup>rd</sup> May, 2011)</p>	<p>To identify the appliances durability as well as quality:</p> <ul style="list-style-type: none"> <li>• Quality of main Valve and its performance and durability. The period of time used in biogas plant and the cost of return for investment. To give feedback for modification and improvement for the main gas valve quality.</li> <li>• Quality assurance for the production of biogas appliances and possibility for modification and feedback from this research activity.</li> <li>• Which brand or quality of pipe line &amp; fittings will be better for biogas technology? This research will indicate and give real scenario/condition to support quality standard.</li> </ul>	<p>Ongoing</p>

Feasibility survey and study of institutional biogas plant	To carry out the feasibility study of institutional biogas in Rupandehi and Sindhupalchok.	Completed
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**Table 2: Biogas related Trainings**

Topic	No. of Participants	Duration (days)	Target Group
Commercial poultry farmers and FIs orientation – Centre level	100	1	Poultry farmers + FIs
Shearing of credit unit best practices with DEEU/Ss – in 5 regions	150	1	DEEU/Ss
Support to MFIs to capacitate/manage and motive them	100	1	MFIs
2 Mason training	62	6	Unskilled mason
Mason refresher training	460	1	Exiting masons
Supervisor refresher training	8	1	Existing supervisors
Female users Training	20,097		Female Biogas Users

## ANNEX 6.2 : SUMMARY OF ACTIVITIES IN BIOMASS ENERGY

**Table 3: Biomass Energy related Trainings under Biomass Energy Component - ESAP II**

Topics	No. of Trainings	Duration in Days	Target Group	No. of Participants		
				Male	Female	Total
New Promoters Training	52	8	ICS promoter	632	225	857
Promoter Refresher	29	8	Old promoters	253	198	451

training						
Short Orientation and Training to MICS Manufacturers	1	2	MICS Manufacturers and RRESCs	97	3	100
FTC Upgrading Training	1	4	Field Staff	42	5	47
Specific Monitoring Training	1	2	Monitoring Team	5	4	9
Short Training Course and Exposure Visit	1	7	BEC, PO RC/BEEs	11	-	11

**Table 4: Seminars/Workshops/Conferences related to Biomass Energy**

Topics	Duration in Days	No. of Participants
Midterm review and planning workshop with RRESCs and SPs	2	33
Annual review and planning Workshop with RRESCs/SPs	2	23
Orientation to new PQ companies and contract signing workshop	½	23
Stakeholders consultation meeting for revising MICS subsidy delivery Mechanism	½	38

## ANNEX 6.3 : MICRO HYDRO ACTIVITIES

**Table1 5: List of MH Projects under Construction**

Districts	Schemes	Location	Output KW	HHs
<b>Achham</b>			<b>150</b>	<b>1665</b>
	Kailash Khola IV	Bhatakatiya	35	349
	Jijadi Gad	Devasthan	27	319
	Chaira Khola II	Ghodasen	18	205
	Kuika Khola	Kalikaasthan	10	110
	Upper Kailash Khola	Ramaroshan	60	682
<b>Baglung</b>			<b>255</b>	<b>2544</b>
	Bunga Khola	Gangadovan	50	497
	Syaule Khola	Bongadovan	30	382
	Taman Khola II	Taman	40	445
	Lower Saune Khola	Riga	50	420
	Mid Bhimghat	Bhimgithi	85	800
<b>Baitadi</b>			<b>67</b>	<b>1013</b>
	Sat Gad	Malladevi, 1,4,6-9	16	249
	Surnaya Gad IV	Melauli	51	764
<b>Bajhang</b>			<b>95</b>	<b>937</b>
	Juil Gad	Bhairabnath, 1-4	36	343
	Khori Gad	Lekhgaon	42	420
	Bhyagute Gad	Matela	17	174
<b>Bajura</b>			<b>166</b>	<b>2126</b>

	Airedi Gad	Jayabageswori	30	456
	Mana Gad I	Budiganga/ Kailashmandu	35	405
	Kordali Gad	Budiganga	50	496
	Gudu Gad		15	270
	Nari Ghat Khola II	Pandusen	22	300
	Bhujan Gad		14	199
<b>Bhojpur</b>			<b>22</b>	<b>220</b>
	Behere khola	Baikunthe	22	220
<b>Dailekh</b>			<b>70</b>	<b>745</b>
	Chhadi Khola	Tilepata	18	216
	Takuri Donav Khola	Kashikad	36	379
	Deutisthan	Bislla	16	150
<b>Darchula</b>			<b>25</b>	<b>270</b>
	Ghatte Gad	Latinath, 2-4	25	270
<b>Dhading</b>			<b>82</b>	<b>809</b>
	Kheste Khola II	Baireni	12	107
	Kalsyong Khola	Ri	20	250
	Manpang Khola VI	Mulpani/ Phulkharka	10	102
	Kintang Khola	Darkha / Gumdi / Marpak	40	350
<b>Dolakha</b>			<b>50</b>	<b>598</b>
	Kolung Khola	Suri	50	598
<b>Doti</b>			<b>21</b>	<b>182</b>
	Gadseri Gad II	Gadsera	21	182
<b>Gorkha</b>			<b>196</b>	<b>1668</b>
	Nauli Khola III	Lapu	30	251

	Bhut Khola	Gumda	45	376
	Maglung Khola		25	225
	Stull Khola	Swara	70	586
	Nauli Khola I	Lapu	10	84
	Nauli Khola II	Lapu	16	146
<b>Humla</b>			<b>14</b>	<b>137</b>
	Rip Gad	Sarkideu	14	137
<b>Jajarkot</b>			<b>76</b>	<b>705</b>
	Sangta Bheri	Dandagaon	16	187
	Hipka Khola	Garkhakot	60	518
<b>Jumla</b>			<b>78</b>	<b>837</b>
	Odi Gad	Badki	30	320
	Babila Khola	Guthichaur	28	238
	Huri Gad	Chhumchaur	20	279
<b>Kalikot</b>			<b>112</b>	<b>1164</b>
	Lamari Khola	Lalu	10	134
	Jatad Khola	Rupsa	32	330
	Lafa Gad	Ramnakot	70	700
<b>Kavre</b>			<b>65</b>	<b>643</b>
	Banakhu Khola II	Banakhu	25	259
	Durlung Khola II	Milche	20	179
	Chau Khola IV	Dandagaun	20	205
<b>Khotang</b>			<b>31</b>	<b>300</b>
	Nurkhuwa Khola	Sawakatare	31	300
<b>Mugu</b>			<b>37</b>	<b>417</b>
	Darkha Khola	Kotdanda	19	223
	Ghatte Khola	Kotdanda	18	194

<b>Myagdi</b>			<b>11</b>	<b>140</b>
	Chherbang Khola	Ruma	11	140
<b>Okhaldhunga</b>			<b>72</b>	<b>678</b>
	Thotne Khola II	Diyale	57	528
	Dhurseni Khola	Madhavpur	15	150
<b>Panchthar</b>			<b>25</b>	<b>270</b>
	Major Chingma Rabi Khola	Phalicha	25	270
<b>Ramechhap</b>			67	849
	Phedi Khola	Daduwa	22	226
	Pokudovan Khola	Bijulikot	45	623
<b>Rasuwa</b>			<b>21</b>	<b>225</b>
	Machete Khola	Yarsa	11	104
	Maour Khola	Yarsa	10	121
<b>Rolpa</b>			<b>42</b>	<b>366</b>
	Ghusbang Khola	Seram	22	155
	Bafu Khola	Jinabang	20	211
<b>Sankhuwasabha</b>			<b>127</b>	<b>869</b>
	Sisuwa Khola	Bala	60	600
	Khangluwa Khola	Tamku	17	175
	Monjo Khola	Chaurikharka	50	94
<b>Sindhuli</b>			<b>12</b>	<b>158</b>
	Sou Khola		12	158
<b>Sindhupalchowk</b>			<b>41</b>	<b>409</b>
	Yangri Khola	Baruwa	28	265
	Bedang Khola	Gumba	13	144
<b>Taplejung</b>			<b>45</b>	<b>450</b>
	Methem Khola	Khejenim	45	450

<b>Tehrathum</b>			<b>29</b>	<b>256</b>
	Koya Khola III	Khamlalung	29	256
	Total		2104	21427

**Table 6: List of End Users (Enterprises) promoted with RERL's support**

S.N	Particulars	Numbers	Remarks
1	Agro Processing Enterprises	103	Huller, Grinding, oil expelling, Chiura Processing
2	Information Technology Based Enterprises	73	Computer Institute, Rural Telecom Center, Home TV, Cable TV Networks, F.M Station, Rural Recreation Center
3	Saw Mill/ Furniture	21	Carpentry
4	Poultry Farming	16	
5	Other Enterprises	28	Grill Industry, Meat Shop with Defreeze, Coffee processing, Handi craft shop, Sewing Machine, Bakery, Lokta Processing, Cold Centre, Dairy Production , Paper production, Photo Studio, Bakery, Sewing Machine, Beauty Parlor and Tailoring Centre.
	<b>Total</b>	<b>241</b>	

**Table 7: Studies and Researches supported AEPC/ RERL**

S.N	Study	Objective	Remarks
1.	Study on "Micro Hydropower in Nepal: Enhancing prospects for long-term Sustainability"	To assess the sustainability of micro hydropower systems in Nepal that has been in operation for five years.	The World Bank
2.	Inauguration 100 Kw Bom Khola Micro Hydro Plant at Lukla, Solukhumbu	Inaugurated by Honorable Minister of Environment Mr. Thakur Sharma and UN Assistant Secretary General and Director of the Regional Bureau for Asia and the Pacific Mr. Ajay Chhibber	AECP/ UNDP/ REDP



3..	Study on "Effect of Climate Change on Micro Hydro "	To identify the possible effects of climate change on the micro hydro system development in the future and suggestion possible measures for adaptation	AECP/ UNDP/ REDP
4.	Study on "Capacity Development for Scaling up Decentralized Energy Access Programme: Lessons from Nepal on its role, costs and financing"	Focusing to the importance of capacity development in scaling up energy access initiatives for reducing poverty and accelerating the achievement of MDGs.	UNDP New York/REDP
5.	Study on "Assessing the Social Impacts of Rural Energy Services"	To establish a baseline survey of current users and expenditure of electricity at both a baseline and commercial enterprises and link with development outcomes	The World Bank/REDP
6.	Book Launching Ceremony	Honorable Minister of Environment Mr. Thakur Sharma and Country Director of UNDP Ms. Anne-Isabelle Degrye-Blateau jointly launched the report "Capacity Development for Scaling up Decentralized Energy Access Programme: Lessons from Nepal on its role, costs and financing"	AEPC/ UNDP/ REDP
7.	Study on "Capacity Development for Scaling up Decentralized Energy Access Programme: Lessons from Nepal on its role, costs and financing"	Focusing to the importance of capacity development in scaling up energy access initiatives for reducing poverty and accelerating the achievement of MDGs.	UNDP New York/REDP
8.	Study on "Accelerating the Achievement of the Millennium Development Goals (MDGs) through	To assess the potential development benefits of expanding access to electricity as an entry point for rural development. To focus on micro-hydropower (MHP) in rural Nepal	UNDP New York/REDP

	Decentralized Energy Access Programme: An analysis of development benefits of MH power in rural Nepal"	and highlight the critical role of expanded access to electricity in reducing poverty and achieving the (MDGs). To emphasize the importance of demonstrating the benefits of investment.	
9.	Consultative Meeting on Benefits Analysis of Micro Hydro	To seek comment and suggestions on the report from the participants in order to forward them to the authors based at UNDP New York.	UNDP New York/REDP
10.	Inauguration of Rumdu Khola Power Plant at Mane Bhanjyang VDC , Okhaldhunga	Honorable Minister of Energy Mr. Prakash Saran Mahat inaugurated the Rumdu Khola Micro Hydro Power Plant at Mane Bhanjyang VDC, Okhaldhunga	Community/ DEES
11.	Towards an "Energy Plus" approach for the poor: A review of good practices and lessons learned from Asia and the Pacific"	To capture the best practices of different country	Central Region Bangkok, UNDP/ REDP
12.	Workshop on operational Modality of Mini-Grid Project	To ensure the sound operation and management including financial aspect.	AEPC/REDP
13.	Study on "Technical Assessments of Available RE systems and Best practice examples"	To document technical assessments of available RE systems and best practice	RERL/ UNDP/ Winrock International
14.	Study on connection of Mini-Grid into National Grid	To conduct detailed feasibility study on the integration of mini-grid into the national grid at Kushmi Shera bazaar. To address the current and prospective plan of NEA to the site and incorporate NEA standards for distribution system and grid connection, wherever applicable. To consider the socio-economic aspects	RERL/ UNDP

		of interconnection, such as the right of way for the transmission line and the location of substation.	
15.	Workshop on sharing, strategy, lessons learnt way forward from REDP and sharing about RERL launching	To share the achievements and lesson learnt from the experience of 14 years of REDP in devising and implementing successful community owned manages energy systems. To support for the improvement and enhancement of the strategy and modality of RERL.	RERL/ UNDP
16.	Data Analysis and Report for Baseline Survey of Programme	To identify the overall livelihood of population within the programme districts such as technologies, house structure, education, drinking water etc.	RERL/ UNDP