
Rural Energy Development Model

REDP has developed a rural energy development model based on holistic approach to rural development. The model emphasizes multiple use of local resources, integration of renewable energy technologies, development of institutions and human resources for smooth operation and management of schemes, support for end-uses, electricity based micro enterprises and income generating activities.

The energy in itself of limited use, it is pre-condition for any development activities. In the past, it was held that access to electricity and other modern forms of energy was enough to usher the industrialization and development. However, it turned out that other infrastructure and human and social capital were also equally important for sustainable development. Realizing this, REDP has developed a rural energy development model based on holistic approach to rural development. The model emphasizes multiple use of local resources, integration of renewable energy technologies, development of institutions and human resources for smooth operation and management of schemes, support for end-uses, electricity based micro enterprises and income generating activities and development of efficient technologies.

Photo above : Aeradi Gad MHDS established in Kotila VDC, Baitadi

REDP's approach differs in principle from other similar energy promotion approaches that it sees the 'beneficiary' community as the implementers and itself only as a facilitator. The approach developed and practiced by REDP begins with the need identification by the community itself, then moves on to elaborated community mobilization process, human resource development at the local level and finally implementation, operation and management by the beneficiaries themselves.

The processes practiced for implementation of micro hydro and other rural energy systems are briefly described below.

Decentralized Energy Planning

To avoid the shortcomings of the previous experiences, REDP has developed an elaborate rural energy demonstration package with emphasis on genuine public participation from the planning stage to implementation, operation and management. The decentralized

energy planning procedures, where the communities identify their projects and local level elected representatives endorse them after much deliberation is the basis for identifying the VDCs for program implementation.

Community Mobilization

The 'beneficiary' community is sensitized and mobilized to undertake activities for common benefit before implementing micro hydro and other energy schemes. The villagers form community organizations (CO) to undertake these activities. This ensures group cohesiveness and the communities gain valuable experience in planning, implementing, and managing community development activities. To avoid conflicts among different interest groups, open discussions are mandatory and decisions are made on consensus basis. Utmost emphasis is laid on transparency and 'public audit' to discourage financial and other irregularities. After the COs have enough 'practice' of working in the COs, Functional Groups (FG) are formed from these matured COs to undertake 'bigger' activities like installation of micro hydro, operation of community forestry, etc.

MH Demonstration Schemes

REDP has supported communities in 70 VDC of 10 districts to install micro hydro schemes. When all schemes are commissioned 1000 kW electricity would be generated from micro hydro plants. This will add almost a third to national total of electricity generated from micro hydro. 25 MHDS generating 391 kW elec-



Solar Home System installed in Pokha Phant, Myagdi

trical power have already been installed with REDP support. Furthermore, in Baglung district, the communities with REDP's technical support have installed 4 peltric sets generating 16 kW benefiting 159 households. So far, 3331 households from 22 VDCs now have access to electricity.

Project Identification

The projects identified by Decentralized Energy Planning Process are prioritized on technical, financial and socio-economic grounds. Commitment of the VDC and the concerned communities are also taken into consideration With DDC's endorsement, DDC:REDS carries out pre-feasibility studies in the short-listed VDC and identifies best sites for immediate implementation.

A Technical Review Committee (TRC) has been set up at the central level to review technical as well as financial aspects of potential MHDS submitted by DDC:REDS. Besides REDP, the TRC includes representatives from Agricultural Development Bank (ADB/N), United Mission to Nepal (UMN) and Intermediate Technology Development Group (ITDG). All of these reputed organizations have been associated for long with the development and promotion of micro hydro in Nepal. The TRC reviews each and every scheme, recommends modifications if necessary and approves projects for execution. Thorough review done by TRC ensures that the projects are both technically and financially viable.

Resource Mobilization

The resources for constructing the MH



Cooking in ICS

schemes are mobilized by the Micro Hydro Functional Group (MHFG). Resources are mobilized not only from REDP and the local communities but also from the concerned VDC and DDC for the implementation of MHDS. Likewise, the government subsidy for electrical components is also mobilized. Furthermore, the community also takes loan from ADB/N to meet the substantial portion of total cost of the scheme.

Financial resources generated from REDP, DDC, VDC and the community, if any is deposited in a fund called Community Energy Fund (CEF). The CEF is handled by MHFG. All the purchases and payments related to the construction and installation of the schemes are made through CEF.

Once the scheme is operational, the revenue generated from sales of electricity and other services provided by the functional group is first deposited in CEF. The amount collected in CEF is primarily intended for sustainable operation, repair and maintenance of the plant. Based on the consensus decision the surplus amount accumulated in CEF can also be used for expansion of system and promotion of the end-uses and electricity based micro enterprises.

Implementation

The community through MHFG, is entirely responsible for all necessary activities for implementation of MHDS. MHFG either directly or through DDC:REDS calls for quotations for the supply and installation of electro-mechanical parts as approved by TRC. Together with the cost of implementation factors like the technical specifications, quality of service and product, past experience and timeframe are taken into consideration to identify suitable suppliers/manufacturers. MHFG and the selected company sign an agreement for supply and installation on the turnkey basis. MHFG is responsible for the construction of the civil components. It is also responsibility of MHDSs to acquire loan from the bank. They collect land of members as collateral for obtaining loan from the bank. REDP only provides technical support wherever essential.

Operation and Management

As MHFG are the owners as well as the implementers, there is no handing over of the micro hydro schemes after completion as in most other donor-funded projects. MHFG is solely responsible for proper operation and management of the plant and the distribution network. All the rules and regulations pertaining to the sales and consumption of electricity are made by the MHFG. Based on loan repayment, de-



A bio-gas plant

preciation, operation and maintenance costs, development fund, etc., MHFG decides the tariff. In addition, the CO is responsible to make sure that all its members pay the bills according to the rules and no malpractice takes place within its jurisdiction.

End-use Promotion

To increase the load factor of the MH plant and to ensure financial viability of the system, MHFG, with support from DDC:REDS prepares a comprehensive end-use promotion package. REDP supports the prospective entrepreneurs in adapting technologies to local conditions and establishing the enterprises.

The communities have either installed or are in the process of installing agro-processing mills like grinder, huller, cellar, oil expeller, saw mills, photo studio, rural bakery, etc. Poultry farming has emerged as another very popular profitable end-uses.

Solar and Biogas Plants

To expand its coverage to entire VDC, REDP supports promotion of other rural energy technologies like solar home system (SHS) and biogas. REDP provides Rs. 15,000 or half of the cost, whichever is less, as subsidy for promotion of SHS. For biogas plants, the communities use government subsidy. REDP supports is limited to Rs 2,500 for linking the biogas plant with toilet.

So far, 300 SHS and 300 biogas plants have been installed in different villages. It is planned that 1000 SHS and biogas plants will be installed in the program VDCs by the end of 2000.

The implementation of procedure for Solar Home Systems (SHS) and biogas plants in program VDCs is similar to MHDS. All concerned COs form respective

functional groups and set up Community Energy Fund for long term operation and management of the systems.

REDP arranges for the orientation on SHS by different suppliers in the village itself. This offers an unbiased opportunity to villagers to learn about the merits, costs and other services provided by each manufacturers and suppliers. After listening to the suppliers, the functional group make decision about the supplier. This is a transparent mechanism ever practiced for the SHS in Nepal. During the installation, the person selected by the functional group is trained by the supplier as the 'village' technician, who is responsible for minor repair works.

REDP also encourages the suppliers to use and train the Rural Energy Service Center (RESC) personnel so that repair works can be undertaken at the district itself. It is noteworthy that the RESC in Tanahun has not only been selected as an agent by a Kathmandu based supplier but has also been pre-qualified by AEPC as a SHS supplier.

Improved Cooking Stoves

It would be very difficult if not impossible to shift the overwhelming dependence of rural people from traditional biomass resources to other energy sources in a short period of time. Improved Cooking Stove with above 25 % efficiency as compare to 5 % for traditional stove is one of the simple technologies that could help reduce consumption of biomass in rural Nepal. Realizing this, REDP supports the communities to install improve cooking stoves through sensitization and human resource development. The community mobilization package and environment awareness campaigns urge the communities to conserve fuelwood



*A village with electricity
Gumlekh VDC, Tanahu*

First VDC Electrified only by Renewables

In Bhoksing VDC, Parbat all 227 households have access to electricity from different rural energy systems. 6 kW Chhahare and 9 kW Chharchhare MHDS are supplying electricity to 55 and 90 households respectively. Chhahare covers all households of Wards No. 7, 8 and 9 and Chharchhare covers all but 17 households of Wards No. 1, 3 and 4. The remaining 17 families of Ward No. 1 have installed solar home systems. Two peltrict-set generating 6 (3 + 3) kW are used for lighting 69 households of Wards No. 2, 5 and 6. Furthermore, there is one biogas plant in the VDC. In this way, Bhoksing is probably the first and the only VDC in the entire country to have electric lighting in all households from different renewable energy systems.

by adopting ICS. Persons identified by the communities are trained as ICS technician. These technicians act both as motivators and installers and charge fees for their service. Altogether, 1,000 households have adopted ICS so far and are very satisfied with the result. They expressed that has not only helped in energy conservation but also improved indoor air conditions in the kitchen. Women using pressure cooker in ICS have reported that they are very happy with more than 50 % fuelwood saving, which saves their time for fuelwood collection and they do not have to live in smoky rooms anymore.

The holistic rural energy development model adopted by REDP has already provided more than 2,500 households not only the opportunity to use modern energy technologies but also enabled them to smoothly operate and manage the systems. Promotion of electricity based and other micro enterprises have generated employment in the villages. Through income generating activities, people are making more money to pay not only for electricity but also for other household essentials. It is envisaged that the comprehensive rural energy package, which emphasizes the beneficiaries' active involvement from planning to implementation and operation and management will result in sustainable rural energy systems that will play a pivotal role in enhancing rural livelihood.