

TERMINAL REVIEW REPORT

Rural Energy Development Programme

United Nations Development Programme, Nepal

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Review Team

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List of Acronyms

ADB/N	Agricultural Development Bank of Nepal	NAVIN	Network of VDCs in Nepal
ADDC/N	Association of District Development Councils of Nepal	NEA	Nepal Electricity Authority
AEPC	Alternative Energy Promotion Centre	NEA	National Executive Agency
CDCF	Community Development Carbon Fund	NGO	Non Governmental Organization
CDM	Clean Development Mechanism	NMHDA	Nepal Micro Hydro development Association
CEF	Community Energy Fund	NORAD	Norwegian Aid and Development
CM	Community Mobilizer	NPC	National Planning Commission
CO	Community Organization	NRS	Nepalese Rupees
DANIDA	Danish International Development Agency	NTFP	Non-Timber Forest Products
DDC	District Development Council	PAF	Poverty Alleviation Fund
DEA	District Energy Advisor	PDDP	Participatory District Development Project
DEC	District Energy Committee	PDP	Power Development Project
DEF	District Energy Fund	PMC	Project Management Committee
DFO	District Forest Officer	PSU	Project Support Unit
DREMC	District Rural Energy Management Committee	REDP	Rural Energy Development Programme
EDO	Energy Development Officer	REDS	Rural Energy Development Section
ENRM	Environment and Natural Resource Management	RESC	Rural Energy Service Centre
ESAP	Energy Sector Assistance Programme	RET	Rural Energy Technologies
EU	European Union	SO	Support Organization
FG	Functional Group	TRC	Technical Review Committee
HDI	Human Development Index	TTF	Thematic Trust Fund
ICIMOD	International Centre for Integrated Mountain Development	UNDP	United Nations Development Programme
ICS	Improved Cooking Stoves	USAID	United States Agency for International Development
IPP	Independent Power Producers	VC	Vulnerable Community
IRDP	Integrated Rural Development Programmes	VCDP	Vulnerable Community Development Plan
LDO	Local Development Officer	VCDSR	Vulnerable Community Development Study Report
LFA	Logical Framework Analysis	VDC	Village Development Council
LoI	Letter of Interest	WB	World Bank
MDG	Millennium Development Goal	WSSD	World Summit on Sustainable Development
MEDEP	Micro-Enterprise Development Programme		
MHS	Micro-Hydro Scheme		
MHVEC	Micro- Hydro Village Electrification Component		
MHVEP	Micro-Hydro Village Electrification Programme		
MoEST	Ministry of Environment, Science and Technology		
MoLD	Ministry of Local Development		

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Soma Dutta, Rana Pratap Singh and Homa Thakali.

Executive Summary

The Rural Energy Development Programme (REDP) is a joint initiative of the Government of Nepal (GoN), United Nations Development Programme (UNDP) and the World Bank (WB), currently operational in more than 300 remote rural communities in 25 hilly districts of Nepal.

The end of project review of REDP was undertaken during Nov 06 - Jan 07 by a team of an international and two national consultants.

Key findings of the Review

Project evaluated as highly satisfactory, with scope for further fine tuning, with the following ratings:

	HS	S	MS	MU	U	HU	Comments
Development objective: To enhance rural livelihoods through the promotion of rural energy systems, specifically micro hydro, for sustainable development and poverty alleviation	✓						REDP has successfully demonstrated a community managed model of rural energy service delivery. In doing so, it has gone beyond traditional micro hydro programmes, and utilized energy as a 'service' that works for the communities, helping them to generate incomes and move out of poverty.
Output 1: Policy and regulatory framework for Rural Energy developed	✓						REDP was instrumental in the development and promulgation of a comprehensive rural energy policy, which draws extensively from the REDP experience and provides a comprehensive framework for future activities in the sector.
Output 2: Institutional structure and operating procedures in support for Rural Energy established.		✓					REDP infrastructure including REDS, DEF and CEF established in 10 new districts, taking the total to 25. Institutional structures are anchored within the national governance system and suited to the local context. The level of internalization within the district mechanism however has not materialized to the extent envisaged.
Output 3: Joint program of HMG with funding from the WB and UNDP implemented for up-scaling rural energy systems.	✓						REDP, with World Bank support, expanded to cover 25 districts, as planned. The achievement on MHSs fell 20% short of the planned 3 MW at the end of 2006. The progress made, especially in light of the insurgency problems, is highly satisfactory.
Output 4: Capacity of community, district and central level institutions developed for rural energy systems development and implementation.		✓					At the community level, capacity building has been most effective in skill building on MH operation and management; organizational development and group management and in providing an exposure to rural communities to new livelihood options. The effectiveness has been limited, when it comes to translating these skills into businesses/enterprises, and increasing incomes. At the district level, REDP has created widespread awareness about REDP. However the capacity of the DDCs to deliver rural energy services effectively has to be built further, as also their ownership of and stake in REDP.
Output 5: Rural energy support services established with the involvement of private sectors.			✓				A total of 22 RESCs set up covering 17 districts. Barring some, most do not have the necessary skills or the wherewithal to deal with technical problems of MHSs.
Output 6: Lessons learnt on efficiency of the rural energy technology and impacts.	✓						REDP, through modern energy services, provides wide ranging benefits to the communities, contributing to all MDGs, especially to women and children.

Note: * HS = Highly satisfactory; S = Satisfactory; MS = Marginally satisfactory; MU= Marginally unsatisfactory; U = Unsatisfactory; HU = Highly unsatisfactory

Specific findings on achievements, relevance and impacts are as follows:

- The targets REDP set for itself during phase II were met satisfactorily. As planned, the programme was expanded to 25 districts, covering 150 VDCs, with programme infrastructure set up in all of these. 185 micro hydro plants (2.47 MW capacity), 2119 solar home systems, 4022 biogas plants and 9795 improved cookstoves are providing energy services to more than 23,000 households.
- The achievement in terms of MHS installation has been on the low side, totaling to an installed capacity of 2.47 MW, almost 20% short of the planned 3 MW. Works are underway on more than 100 schemes, and it is expected that the target will be achieved within June 2007.
- The programme has a high relevance in the current Nepalese context, particularly in the remote, mountainous locations, which are unlikely to be covered by the national grid in the foreseeable future.

- REDP is well synchronized within the government priorities and policies, and well in line with its priority areas of energy, poverty and decentralized governance.
- REDP, through modern energy services, provides benefits to the communities, in a wide range of areas, contributing to all MDGs, especially to women and children.
- The impact of income generation activities within REDP on income levels is relatively less significant.
- REDP's influence on the national policy has been significant. REDP led a consultative process of development of a rural energy policy for Nepal, promulgated in November 2006.
- Strategically selecting its partners, REDP has established the project processes within the national governance systems. In the districts, REDP is anchored within the DDC.
- The project processes, planning and governance systems are streamlined, and suited to the local contexts.
- The micro hydro schemes set up in villages rank high on sustainability. The level of ownership for the micro hydro schemes is extremely high among the community members, and the users are able to tackle most of the day to day problems.
- The momentum of the community processes drops considerably once the regular interaction of the Community Mobilizers with the community reduces, after the two year project cycle. Sustainability of the COs in 'internalized' sites is an area for concern.
- It was envisaged that as the project progresses, the DDCs would take over the responsibility for many of the project functions. In the present scenario and for valid reasons however, it cannot be expected that REDP will be fully internalized within the DDCs in the short run.

Issues faced by the programme

The review indicates that REDP's most important contribution is that it has demonstrated a community managed model of rural energy service delivery. Poor, rural communities have come together; planned; raised resources (partially); learned to operate and manage energy systems; and set in place management systems for its sustainability. However, there are a large number of secondary and tertiary level issues that REDP is still grappling with. These include:

- how to increase the stake of the government functionaries in REDP, especially at the district level;
- how to increase the effectiveness of income generation and enterprise development activities within limited resources and inherent local constraints of poverty, lack of capital and access to markets;
- how to ensure that the momentum of the community organizations is maintained after the project;
- how to ensure that women and other disadvantaged communities move up the empowerment ladder, and graduate from being project participants to change agents;
- how to bring about a spiraling process of holistic development in programme communities; and
- How to operationalize the rural energy policy.

Key recommendations

Directions for UNDP

In spite of UNDP's long standing engagement with the programme, its involvement should continue in the immediate future, for the following reasons:

- REDP has been successful in developing the basic model of community managed rural energy systems, but this needs to be fine-tuned significantly, for which UNDP's support would be vital.
- The government system, esp. at the district level, is simply not in a position to take over the programme.
- The Nepalese economy is in a reconstruction mode, and there are high expectations from REDP.
- The promulgation of the rural energy policy is only the first step, and UNDP can play a critical role in the operationalization of this on the ground.

The following broad areas of priorities have been identified for UNDP's involvement in the immediate future:

- Provide technical assistance in programme expansion in new districts, subject to an increased financial commitment from the government
- Assist the Nepal government and other stakeholders in implementing the Rural Energy Policy
- Assist REDP in consolidation and fine-tuning of the programme, including defining programme goals, and developing monitoring systems to reflect outputs, outcomes and indicators at all levels.

- Step up capacity building for AEPC, in decentralized project management in pilot districts; for DDCs, in technical monitoring / building linkages; and for SOs, in vision building/ enterprise development.
- Strengthen partnerships with donor agencies, and coordinate field level modalities.

REDP Programme level recommendations

Strategy 1: Capacity building of the DDCs in the following areas:

- Technical capabilities to monitor and provide back up support during and after project completion
- The REDS:DDC, which currently functions more as a UNDP/REDP unit, should take the onus of assisting the DDCs to raise resources from other sources including other donors and development programmes operating in the district.
- REDS:DDC must coordinate/ tie up with other line departments within the DDC for integration with other development activities of DDC.

Strategy 2: Intensify support to SOs/ field level functionaries

- Provide capacity building support for Community Mobilizers, in the areas of enterprise development, vision building and exposure to new ideas.
- Improve the motivation level of Community Mobilizers, through providing individual growth opportunities within the project.
- Strengthen SOs in areas of organizational development, periodic infrastructure development support, vision building and exposure trips for SO heads.

Strategy 3: Increase sustainability of community processes

- Pilot test the concept of Assistant Community Mobilizer (ACM) in sample districts.
- Undertake a review of the cooperative model that was initiated in a few districts.

Strategy 4: Fine-tune technical aspects of the programme

- Increase attention on electrical aspects of MHP operations.
- Ensure balance in staff in terms of skill in civil, electrical and mechanical engineering.
- Ensure technical backstopping to the MHPs in the design and planning process, and post installation.
- Expand TRC's role to include on-site technical supervision through periodic field visits
- Hire a full-time Technical Advisor at the central level to provide technical guidance and back-stopping.

Strategy 5: Sharpen gender and social inclusion strategies

- Revisit REDP gender and social inclusion goals, define them within the context of existing realities.
- Ensure a critical minimum mass of women within the programme staff, both at the field level as well as at the programme management level.
- A gender review of management and procedural manuals, to ensure that women's and men's different perceptions and priorities are reflected.
- Support women's family and parenting responsibilities in HR procedures.
- Enhance the usefulness of the VCD reports, by focusing them sharply on recommendations, in line with the specifics of the particular community.
- Provide investment/ marketing/quality control support to deserving VCs for enterprise development.

Strategy 6: Reorient enterprise development training to be needs-, local resource-, skill- and opportunity- based

- For each district, develop an Enterprise Development Plan, and develop the necessary institutional arrangements to facilitate and maintain strategic marketing linkages.
- Identify potential entrepreneurs from communities through a rigorous screening process.
- Provide intensive and continued hand holding support to these in terms of credit, product pricing, product selection and positioning, marketing, etc.

1. Introduction

1.1 Background and Review Objectives

The Rural Energy Development Programme (REDP) is a joint initiative of the Government of Nepal (GoN), United Nations Development Programme (UNDP) and the World Bank (WB), operational in more than 300 remote rural communities in 25 hilly districts of Nepal. The programme provides support at community, district and central levels for the *enhancement of rural livelihoods through promotion of rural energy systems*, particularly community managed micro hydro systems, which serve as an entry point for social, economic and environmental development.

With the current phase of the programme coming to an end in December 2006 (with an extension until June 2007), UNDP is carrying out a review of the programme, in order to draw out lessons from the decade-long experience of REDP. Notwithstanding the fact that there is ample, well-documented evidence of the programme's successes in diverse areas, there is a need to establish a clear linkage (or the lack of it) between the programme deliverables to community development and poverty reduction, the main mandates of UNDP support. In particular, to what extent the programme components have been able to respond to the aspirations of the poor and the marginalized communities; to what extent the target beneficiaries have been able to benefit from improved access to energy services in terms of income generation and other ancillary benefits; whether the programme contributed to the empowerment of women, vulnerable groups and marginalized communities; are not quite apparent.

Specific objectives of this review are to (Refer Annex 1 for Terms of Reference of the Review):

- Look into whether the project and its practices contributed to build upon synergistic partnership at the national and local level for expansion of rural energy services to the poorest of the poor households and sustainability of those services in future,
- Analyze the relevance of the programme components in targeting the disadvantaged groups, the indigenous communities and the women for their role in decision making; benefit sharing; access to resources; and capacity building for enhanced livelihood, and
- Take stock of the overall impact of the achievements made so far both at the level of creating an enabling policy environment and implementing the policies on the ground.

1.2 Approach and Methodology

Conceptual framework

The overall approach for the review essentially involved two interlinked, but distinct, tasks: (a) A scrutiny of REDP, as a programme and its activities over the period since inception, focusing more on the period pf 2003-06, so as to assess their immediate impacts, and (b) A broader examination of the programme in the overall national context, with a view to coming up with a forward looking strategy for the future.

The review objectives were deconstructed into four major performance areas that were examined in depth (specific issues that were examined are elaborated in annex 2):

- Relevance and achievement of project goals
- Project impacts
- Project processes and efficiency of operations
- Sustainability of effort

For each of the performance area, the review team started by identifying the specific REDP goal for that area, followed by an examination of the strategy adopted and activities undertaken for that area, effectiveness of the strategy in terms of its impact and contribution towards achieving the goal and its strengths and weaknesses. This was done within the overall framework of the local and the national context. In some cases, the context and strategy analysis led to a redefinition or further refining of the goal itself. The above analysis fed into developing a future outlook for the programme, based on the following elements:

- What major changes, external, institutional, political, or economic have occurred, since the activity was planned and will have a substantial impact on results?
- What are the principal constraints being faced currently?
- What are the prospects for REDP in the future (niche/strategic areas)?
- What should be the nature, extent and duration of UNDP's involvement?
- What changes are being sought? What should REDP now be doing more or less of?

- What are the immediate, medium and long term requirements according to levels of assistance foreseen, numbers of beneficiaries and priority of needs?

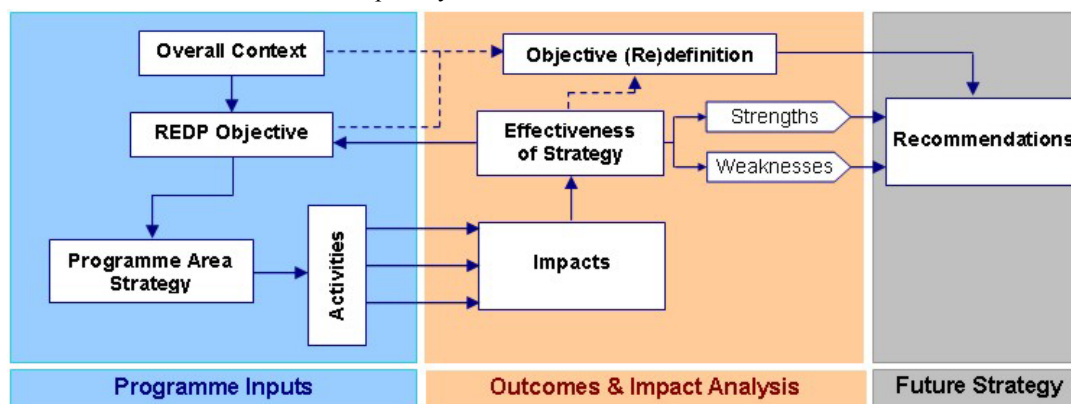


Figure 1: Conceptual framework for REDP review

Review plan and team

The review has tried to combine quantifiable indicators with qualitative assessments to arrive at a credible picture of what REDP has achieved and how it is perceived by various stakeholders. The review was undertaken during Nov 06 - Jan 07. The methodology pursued consists of the following:

- Developing a review framework and sharing with UNDP and REDP for their feedback;
- Review of key programme documents, publications and other relevant literature made available by REDP, UNDP and other stakeholders¹;
- Personal interviews with stakeholders at national, district and community levels²³;
- Field visits to interact with the project communities and physical verification of project activities;
- A presentation on the preliminary findings for the stakeholders, for their feedback and suggestions; and
- Finalization of the report.

The review was carried out in a collaborative manner, with close involvement of REDP staff from the central and field offices, throughout the process. For the field visits, five sites were selected in four districts. District selection was done in a manner that was representative of level of economic development (indicated by percentage of population above poverty line; HDI; average land holding size), remoteness, grid coverage (%) and agro climatic zones. Within selected districts, sites selected for field visits were representative of plant size, age of project, power applications, and ethnic groups (Refer Table 1). The site selection was also governed by the time available for the study, and the remoteness and time required to reach them.

Table 1: REDP sites covered in field visits

Project	District	Plant Size (kW)	Number of households covered	Year of commissioning
Gairigaon	Dadeldhura	6	36	1998
Bulung Khola	Dholakha	10	74	2006
Bhim Khori	Kavre	12	85	2003
Sela Khola	Dadeldhura	12	105	2006
Kyandi (Firfire)	Tanahu	15	138	2003

A field guide was developed, and used for collecting and commenting information from the field, which is included in Annex 6.

The review has been carried out by a team of three consultants:

- Ms. Soma Dutta (International consultant and team leader), responsible for the overall coordination and report finalization,
- Mr. Rana Pratap Singh (National Consultant), responsible for technical and policy related issues,
- Ms. Homa Thakali (National Consultant), responsible for gender and social inclusion aspects.

¹ A list of documents perused is included in Annex 3.

² A list of persons/ institutions met is included in Annex 4.

³ A checklist of questions was developed for discussions, which is included in Annex 5.

2. REDP: Project concept and design

2.1 The Origin and Evolution of the Programme

The Rural Energy Development Programme (REDP), a joint initiative of the Government of Nepal (GoN) and the UNDP, was initiated in August 1996. UNDP's involvement in the micro-hydro sector in Nepal dates back to early 1990s. REDP builds on the basic principle of decentralized governance, which UNDP has been supporting since 1982 in Nepal, initially supporting the formulation of the Decentralization Act. It was in late eighties that the potential of community-based participatory planning process began to gain recognition in Nepal. When it was launched, REDP took advantage of the enabling environment that the country and the energy sector provided (Gurung 2004) in the Nineties. The Eighth Five Year Plan (1992–1997) provided an opening for the involvement of non-government organizations (NGOs) in the delivery of services to local people. Further, the Electricity Act (1992) created an environment conducive to community and private-sector participation in hydropower development through de-licensing of up to 1,000 kW capacity.

REDP-phase I (1996–2000) was launched as a pilot initiative in five remote hill districts of Nepal, and was extended to 10 districts in 1998 and then to 15 districts in 2000. REDP phase II envisaged replication of program successes in more districts with additional support from World Bank. Initially, it was envisaged that the joint UNDP-World Bank project would be initiated from 2002. This however got delayed due to the time taken in working out the operational modalities and formalizing institutional arrangements. The agreement for the Micro Hydro Village Electrification Component (MHVEC), one of the three components of Power Development Project (PDP) of the World Bank, was signed on 9 July 2003 and the agreement between GoN and UNDP on 25 September 2003. To accommodate this delay, a bridging period from 1 April 2002–31 December 2003 was designed to ensure continuity of field level activities.

REDP-phase II runs until the end of 2006, with an extension until June 2007, and focuses on expanding project activities to cover 150 VDCs of 25 districts. UNDP Technical Assistance focuses on capacity building of local level institutions to plan, implement and manage rural energy systems, operationalisation of a central level Project Support Unit (PSU) and providing policy inputs to the government. Important change in institutional arrangements was that until 2000, the REDP was under the purview of the Ministry of Local development, after which it was brought under the MoEST, with AEPC made the national executive agency in 2002.

2.2 Programme Activities

REDP promotes an integrated approach to sustainable rural energy development to bring about an improved quality of life and a restoration of the natural environment, which is expected to lead to the overall development of rural communities. To achieve this, REDP promotes indigenous human capacity building, supports institution development at the central, district and community levels, promotes technology development, and adopts a multi- sectoral approach to rural energy development. The programme uses community based micro hydro systems as an entry point activity to catalyze a process of holistic development in remote, hilly village communities, emphasizing community mobilization as an essential vehicle for self-governance. The REDP adopts a three pronged strategy, which involves:

- Promotion of rural energy systems: Providing assistance for the identification, survey, design, construction and operation of community managed MHSs, toilet attached biogas plants, solar PV home systems, and improved cooking stoves (ICS);
- Institutionalization of rural energy systems development: Strengthening and building capacity of government organizations, local NGOs, private sector and civic societies for (i) policy and regulatory framework development, (ii) decentralized planning, management, resources mobilization, support services and networking at the district level and (iii) planning, implementation, operation and maintenance of rural energy technologies, primarily community managed MHSs; and
- Holistic Development Initiatives: Mobilizing programme communities for the enhancement of rural livelihoods through various activities for the economic growth, natural resources conservation and social capital formation.

REDP's community mobilization process is based on the establishment of two specific organizations:

Community Organization (CO), as organizations of people living in close proximity, sharing common interests, and willing to work together for a common goal. Members constitute at least one male and one female member from each beneficiary household.

Functional Group (FG), which is a collaboration between two or more community organizations to achieve a certain objective. A working committee and a management committee responsible for decisions about electricity distribution, electricity tariff, employee management, operation and maintenance of the MH schemes.

2.3 Institutional Arrangements

REDP is a collaborative project with multiple partners, working in tandem at various levels, with a strong focus on decentralized project management. The role of the various partners is outlined below in brief:

<p><u>CENTRAL LEVEL</u></p> <p>MoEST/AEPC (National Executive Agency)</p> <p>PM/SU (Professional and support staff: responsible for implementation)</p> <p>PMC (AEPC Chair, MoLD - Vice Chair, NPC, MOF, DENET, ADDCN, NAVIN, UNDP, REDP-Member Sec., one NGO as observer: responsible for guidance, planning and management of REDP)</p> <p>Working Committee (NPD, NPM and PO: Day-to-day decisions making in support of the implementation of programme activities)</p> <p>TRC (Technical and financial evaluation and endorsement of MH Schemes)</p> <p>ADB/N (Provides community loans for micro-hydro schemes)</p>	<p><u>DISTRICT LEVEL</u></p> <p>DDC:REDS (Planning, management and implementation of activities)</p> <p>DEC (Related line agencies: Coordination and Resources mobilization)</p> <p>DREMC (DDC Chair, LDO and EDO: day-to-day Implementation)</p> <p>Support Organization (SO) (Local NGOs for implementation of community mobilization process)</p> <p>RESC (Private sector organization for providing repair and maintenance support for the technologies)</p>	<p><u>COMMUNITY LEVEL</u></p> <p>Community Organization (CO) (Broad-based grassroots organization of community people, separate for men and women)</p> <p>Functional Group (FG) (Users group for planning and management of</p> <ul style="list-style-type: none"> • micro-hydro • Forest • Solar • Toilet attached biogas • ICS • Others)
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Figure 2: Role of key actors

3. Relevance of REDP

3.1 A Perspective of the Rural Energy Sector in Nepal

More than 90% of the Nepalese population lives in rural areas, depending primarily on traditional (biomass) resources for meeting their energy needs. About 87% of the total final energy consumption in Nepal is met from biomass - firewood (77%), agricultural residues (4%) and animal waste (6%) and the rest (14%) is met by commercial sources - petroleum products (8%), coal (3%), electricity (2%) and others (1%). Nepal accounts for the lowest share of commercial energy (around 500 kWh per capita per year) among all South Asian countries. Roughly 40% of the total population (mainly in the urban areas and the Terai region) use electricity out of which 7% use renewable energy sources like solar power, biogas, micro-hydro etc. Renewable energy technologies (RETs) are being promoted in Nepal since early nineties and the success of these initiatives are noteworthy: As of 2005, 7.6 MW of micro hydropower has been developed, covering 76,000 households; 64,000 solar home systems have been installed; 160,000 households are using improved cook stoves, and 140,000 biogas plants have been installed.

Rural electrification in Nepal is dominated by funding from donors and development banks. Rural electrification is divided into two sub-sectors, largely defined as grid-based (on-grid) and isolated (off-grid). On-grid rural electrification is under the mandate of the Ministry of Water Resources, implemented through the Nepal Electricity Authority (NEA). Off-grid electrification is under the purview of Ministry of Environment, Science and Technology (MoEST), and is implemented through Alternate Energy Promotion Centre (AEPC); including Energy Sector Assistance Programme (ESAP), assisted by Danida and more recently, NORAD; the Rural Energy Development Programme (REDP) jointly supported by UNDP and the World Bank; EU supported for micro hydro and solar energy programmes and the Improved Water Mills Programme assisted by SNV. Several Independent Power Producers (IPPs) are engaged in rural electrification with assistance from bi-lateral donors, particularly USAID and NORAD.

Nepal has an immense hydropower resource, which is largely untapped and contributes a little more than 1% to the total energy consumption of the country. Though there is potential of developing economically about 40,000MW from big hydropower and up to 50 MW from micro hydro plants from numerous rivers and rivulets, only about 533 MW have been developed so far, (527 MW from big and 6 MW from micro hydropower). In the near future, the planned development of medium sized hydropower projects can be expected to meet the power needs of the urban areas and the Terai. As such, there is little prospect of electricity from the national grid reaching most of the hilly areas in the foreseeable future. The best alternative source of energy for isolated and dispersed hill communities is the decentralized development of locally owned and managed micro hydropower systems.

3.2 The Context of REDP Project Districts

REDP, by design, operates in remote, hilly locations, where the challenges involved in providing access to energy service are immense, and far more deep-rooted than those in the plains. Some of the challenges faced in implementing the programme in these areas are as follows:

- *Poverty and level of development:* The first challenge is the pervasive problem of poverty. Enhancing access to energy is an extremely challenging task in Nepal where around one third of the population lives below USD1 per day threshold. Poverty is widespread across the country and communities with varying degrees of intensity. It is deeper in remote parts of the high hills, which are the target areas for REDP. The Nepal Human Development Report 2004 estimated HDI for Nepal at 0.471. Among different ecological regions, the HDI in mountain scores lowest (0.386), followed by the Terai (0.478) and hills (0.512) (UNDP 2004).
- *Low status of women:* The situation is worse for women, who fare the lowest in human development and empowerment index. The literacy levels in the hill districts, especially for women is very poor (less than 10%) in these districts. They also face additional constraints of high workload, near total absence of exposure to the outside world, isolation and poor social infrastructure.
- *Inaccessibility:* Another constraint faced in the mountain areas is that of inaccessibility, which obstructs mobility; leads to higher costs of transportation and other logistics for development interventions, imposes isolation; and restricts the scope for higher productivity of resources, which crucially depend upon mobility and external linkages.
- *Low demand for electricity:* The initial demand for electricity by low-income households in remote areas tends to be small, which has the effect of making the average cost per unit consumed high. As the fixed costs of transmission and distribution depend in part on peak demand (which is concentrated in early mornings and evenings), this demand pattern results in still higher costs for poor rural populations. Even when access to electricity is provided, the demand for electricity in remote locations increases, if at all, at a rather slow pace, as the other 'complementary' inputs required to promote economic growth such as roads, access to markets etc. are often missing.

Hence, whether it is health, education or infrastructure, the hill districts of Nepal are at a disadvantage, and the above points highlight the immensity of the problem that REDP is trying to address. For REDP, this means that the challenges involved in triggering a sustainable and spiraling process of development and ushering in social transformation with energy as an entry point is an extremely daunting task.

3.3 Relevance of REDP

This section examines to what extent the project is in line with the needs of the target group. The review team's assessment is that REDP, with its focus on

.....promoting holistic development
..... through improving energy access
.....in remote rural areas
..... with community managed micro hydro schemes as an entry point
..is highly relevant in the Nepalese context for several reasons.

First, 82% of the total land area of Nepal is mountainous, of which 14% is characterized as remote. It is clear that grid electrification, which has been the primary rural electrification programme in the past, is unlikely to make inroads into these locations. At present, there are close to 2.5 million non-electrified households in the country. If USD1/day is used as the poverty threshold, about 38% of population lives below the poverty line, and the number of total un-electrified poor households living in dark in Nepal would be 951,766, equivalent, roughly to a population of 4,758,830 people. A good part of these live in the mountainous regions, and are unlikely to be covered by grid expansion in the foreseeable future. Given this scenario, it is evident that decentralized electrification options such as micro hydro, are the only ones feasible for these communities.

Secondly, the country has a huge economically feasible hydro-power generation potential (more than 40,000 MW). In particular, the mountainous regions have numerous rivers and rivulets, an ideal resource for generating power, which is largely unutilized. REDP, through its focus on micro-hydro, taps this underutilized resource.

Finally, the communities in the hill districts rank extremely low, not just in terms of access to electricity, but on overall Human Development Index (HDI, a composite index of education, health, and income, is an indicator of overall social well being of a population). A most pressing need for these communities is securing sustainable livelihoods and food security.

REDP, through village based micro hydro systems (and other RETs) addresses, all the above concerns.

- It provides access to energy services for communities, who could, in the absence of this programme, never have aspired to get electricity.
- Through its focus on productive uses of electricity, income generation and enterprise development, REDP helps the communities living in poverty to remedy two of the pervasive problems that keep them in poverty - their low productivity and their limited range of productive options. As such, when communities gain access to energy services, it can have a marked effect on their lives, particularly with respect to freeing up their time by relieving some of the unending drudgery that characterizes the daily lives of poor families - hauling water, milling grain; and opening up opportunities by increasing availability of information sources such as radio and television. Many rural enterprises become viable once there is access to a modern energy source. In this respect, REDP has gone beyond most traditional micro hydro programmes, which restrict themselves to providing household lighting, and not really utilize energy as a 'service' that works for the communities, helping them to generate incomes and move out of poverty.
- At a higher level, by providing inputs in areas of community mobilization, women's empowerment and inclusion of disadvantaged sections, REDP unleashes a spiral of social transformation process, critically lacking in these communities. By doing so, REDP reaches segments of the population that past development efforts have bypassed.

3.4 Relevance of REDP in the Emerging Policy Context

The government of Nepal is currently in the process of drafting the 3 year Interim Plan, through a consultative process led by the National Planning Commission. Among the various thematic areas, high priority is being accorded to rural infrastructure, of which energy has been identified as a critical component. REDP is well synchronized with the priorities of the Nepalese government, addressing three critical issues: poverty, increasing access to energy and decentralization.

- *Poverty*: The overarching goal of the 10th plan of GoN is poverty alleviation. The 10th Plan identified energy as a 'priority category I' sector in the Poverty Reduction Strategy (PRS). The plan intends to promote renewable energy to reduce consumption of fossil fuels and firewood on the one hand and to provide improved forms of energy to rural population for poverty alleviation.
- *Increasing access to energy*: The 10th Plan (2002-07) aims to increase access to electricity from 40% (39.3%) of the population to 55% during the plan period. Out of this, 12% (existing 7%) will be met through alternative energy. This translates into about 1,000,000 households (including backlogs from 2000/01-2001/02), out of which 1/3 is expected to be electrified by off-grid electrification and 2/3 through grid electrification. Considering the fact that most urban areas are already electrified, the implications of this target are that: a) a major part of the expansion of electricity provisions should take place in the rural areas and practically all off-grid electrification will be rural; and b) there remains considerable scope for improvement of other energy provisions. REDP complements the 10th Plan goal of increasing hydroelectricity generation capacity to 800 MW by 2008 and of increasing access to rural electrification.
- *Decentralized governance*: REDP's emphasis on recentralized governance is well in line with the government's focus. The 10th Plan has adopted a number of strategies with regard to decentralization, which are key principles of REDP as well. These are: autonomy to the local bodies for performing duties of the Local self Governance Act, 1999; enhancing the institutional capacity of local bodies for enabling them to deliver services to the people, and enabling them to function responsibly; enhancing the people's participation in the local development process extensively; and making local bodies capable of mobilizing internal and external resources.

4. Impact Assessment

4.1 Achievement of Results

Starting with a pilot experiment in 5 sites, REDP grew over the years to cover a total of more than 23,000 households through micro hydro and a number of other renewable energy technologies, in remote locations that are not likely to be connected by the national grid in the next five years. In 2006, the programme supported the commissioning of 36 MHSs with the total power output of 589 kW. The key quantitative achievements of the programme are listed in table 2.

Table 2: REDP: Progress at a glance (Updated as of January 3, 2006)

Particulars	NEP/95/016	NEP/02/001	Total
<i>Rural Energy Systems</i>	REDP - I	REDP - II	Total
Micro Hydro	149 (1888.2)	36 (589kW)	185 (2477.2kW)

Toilet Attached Bio-gas Plant	3,505	517	4,022
Solar Home Systems	1,736	383	2,119
Improved Cooking Stoves	8,325	1470	9,795
Environment Initiatives			
Nursery Establishment	96	16	112
Community Managed Forests	180	34	214
Plantation	2,714,873	131,347	2,826,824
Toilet Construction	12,111	6,554	18665
Environment Classes/Campaigns	322	690	1012
Trail Road Construction	619	209.8	828.8
Tap / Pond Construction	415	16	431
Human Resource Development			
Training on Technical Subjects	1,497	390	1,887
Training on Income Generation and Micro enterprise	4,646	347	4,993
Environment Management	2,077	55	2,132
Institution Development	6,746	1691	8,437
Orientation/Visit/Consultative etc.	1,766	439	2,205
Others	4,498	325	4,823
Community Organization			
Community Organization (Nos.)	3,269	2,148	5,417
Community Members (Nos.)	71,488	46,149	117,637
Weekly Saving (Rs.)	23,478,151	10,649,855	34,128,006
Cumulative Investments (Rs.)	51,887,411	21,882,383	73,769,794

A comparison with the target set out for phase II shows a satisfactory achievement of targets. A more detailed discussion on the LFA is included in section 5.2. As planned, the programme has been expanded to 25 districts, covering 150 VDCs, with REDP programme infrastructure set up in all of these. A key achievement has been the promulgation of the rural energy policy by the government, a process which REDP has steered over the years.

Table 3: Comparison of programme achievements with output targets in REDP phase II: Summary sheet4

	HS	S	MS	MU	U	HU	Comments
Development objective: To enhance rural livelihoods through the promotion of rural energy systems, specifically micro hydro, for sustainable development and poverty alleviation	✓						REDP has successfully demonstrated a community managed model of rural energy service delivery. In doing so, it has gone beyond traditional micro hydro programmes, and utilized energy as a 'service' that works for the communities, helping them to generate incomes and move out of poverty.
Output 1: Policy and regulatory framework for Rural Energy developed	✓						REDP was instrumental in the development and promulgation of a comprehensive rural energy policy. The policy draws extensively from the REDP experience and provides a comprehensive framework for future activities in the sector.
Output 2: Institutional structure and operating procedures in support for Rural Energy established.		✓					REDP infrastructure including REDS, DEF and CEF established in 10 new districts, taking the total to 25. Institutional structures are anchored within the national governance system, appropriate, and suited to the local context. The level of internalization within the district mechanism however has not materialized to the extent envisaged.
Output 3: Joint program of HMG with funding from the WB and UNDP implemented for up-scaling rural energy systems.	✓						REDP, with World Bank support, expanded to cover 25 districts, as planned. The achievement on MHSs was relatively low with 14, 12 and 15 MHSs installed in 2003-04, 04-05 and 05-06, totaling to an installed capacity of 2.47 MW, 20% short of the planned 3 MW. Works are underway to achieve the target within June, 2007. The progress made, especially in light of the insurgency problems, is highly satisfactory.
Output 4: Capacity of community, district and		✓					At the community level, capacity building has been most effective in skill building on MH operation and management; organizational

⁴ A detailed reporting of the status of achievements for various outputs, as set out under the LFA (Logical Framework Analysis) for phase II is included as [Annex 6](#).

central level institutions developed for rural energy systems development and implementation.							development and group management training for CO and FG representatives and in providing an exposure to rural communities to new livelihood options and opportunities. The effectiveness has been limited, when it comes to translating these skills into profitable businesses/enterprises, and increasing incomes. At the district level, REDP has created widespread awareness about RETs in general and about REDP in particular. However the capacity of the DDCs to deliver rural energy services effectively has to be built further, as also its ownership of and stake in REDP.
Output 5: Rural energy support services established with the involvement of private sectors.			✓				A total of 22 RESCs set up covering 17 districts. Barring some, most do not have the necessary skills or the wherewithal to deal with technical problems of MHSs. They are small, village level units, and at best, can repair civil works, or provide basic services such as welding.
Output 6: Lessons learnt on efficiency of the rural energy technology and impacts on women and men.	✓						REDP, through modern energy services, provides wide ranging benefits to the communities, contributing to all MDGs, especially to women and children.

Note: * HS = Highly satisfactory; S = Satisfactory; MS = Marginally satisfactory; MU = Marginally unsatisfactory; U = Unsatisfactory; HU = Highly unsatisfactory.

The quantitative outputs are translating into positive outcomes at various levels (Adapted from Gurung 2004):

Increased capacity of all stakeholders

- Strengthening of local (district) level NGOs as Support Organizations.
- Promotion of local workshops as Rural Energy Service Centres (RESCs).
- Strengthening of local government bodies for undertaking decentralized rural energy planning.
- Building the capacities of local community to plan, implement and manage rural energy systems, and more importantly, to 'envision' a process of sustainable development for themselves.

Enhancement of rural livelihoods, through

- Increased income from off-farm and on-farm activities.
- End use promotion of energy produced from MHSs.
- Increased capital from savings and credit operations of the COs.

Improved quality of life through:

- Access to electricity.
- Improved health due to a reduction in drudgery, labour and smoke inhalation, and improved sanitation; better education of children due to the availability of light at night.
- Increased awareness among the rural people about via telecommunications and computers and resultant reduction in the feeling of 'isolation'
- Establishment of social infrastructure like electricity, schooling, potable drinking water.
- Improved environment in and around homes and communities.

The outcomes and impacts are discussed further in the following sections.

4.2 Poverty Reduction and other MDG Impacts

At the time of its launching in 1996, REDP was conceived as a 'rural energy' and 'holistic development' project. The concept of MDGs was not in place, which were adopted by the UN General Assembly at the Millennium Summit in 2000. Even though REDP did not start out with an MDG oriented agenda, the MDGs provide a useful framework for assessing its developmental impacts. In 2005, an in depth study was conducted by Winrock International, Nepal to analyze the contribution of REDP towards MDGs. This section examines the poverty reduction impact of REDP, along with its contribution to other MDGs, relying on the quantitative assessments made by the Winrock study⁵ and qualitative assessments made by the review team.

⁵ The Winrock study was constrained by several methodological limitations. The REDP baseline survey questionnaire, which was used to obtain pre-programme data, was not prepared with MDGs in mind, as a result of which comparisons were difficult. More importantly, there was a problem of attribution, i.e. specific REDP impacts on MDGs proved difficult to separate from other local and national influences.

4.2.1 Poverty reduction through income generation and enterprise development

With the overall goal of enhancing rural livelihoods, REDP's approach in this area emphasizes on increment of income levels of all households, through community mobilization and capacity building, for undertaking at least one income generating activity or micro-enterprise appropriate to their skills and resources. For this, rural people are encouraged, trained and supported to undertake activities with the motto of "one household- one enterprise" through multiple uses of the electricity and other local resources such as water, land, forests and traditional skills. Poverty reduction measures within REDP include:

- End use promotion through use of electricity for micro enterprises and small businesses;
- Use of land for cultivation of high value crops and multiple cropping with assured irrigation from headrace and tailrace canals of the micro hydro systems;
- Uses of water for irrigation, electricity generation and drinking water supply;
- Use of forests for fuelwood, timber, foods, fruits and non-timber forest products (NTFP) such as herbs and medicinal plants; and
- Use of traditional skills for production and marketing of traditional products.

These are achieved through the following mechanisms:

- For end use promotion, financial support in the form of soft loans is provided to entrepreneurs.
- The MHFG, with REDS support prepares a comprehensive end-use promotion package.
- Based on the needs of the communities, REDS coordinates with line agencies like District Agriculture Development Office, to identify training and other support.
- Savings of COs are used for providing small, start-up credit to members for productive activities.
- REDP promotes business activities in its natural resource management activities. For setting up of nurseries, REDP provides nursery naika training to interested persons and upon completion of the training, part funding for the initial plantation.

Table 4: End – use applications in REDP, 2006

End use types	Numbers
Agro- processing; huller, grinder and expeller	97
Saw mill	32
Rural Carpentry	13
Battery charging	29
Hotel	37
Grocery	37
Poultry	42
Photo Studio, video halls, cable TV	9
Water lifting	2
Cloth weaving, paper making	8
Workshops	5
Bakery, fruit processing	5
Total	316

4.2.2 Effectiveness of end use promotion strategy

End use promotion has been an effective strategy within REDP. At present, REDP has installed more than 170 micro hydro plants in its programme districts, all of which have claimed and received project support for end-use promotion. The most common end use is for agro processing mills, which are either run by the MHFG or leased out to private entrepreneurs. The community strategy to lease out the mill has proved to be an effective one: it is a lucrative source of income for any private entrepreneur, and typically there is quite a competition to obtain a lease. For the community and the MHFG, the business needs little oversight, is a sustainable source of income, and is useful to generate funds for any future repairs and maintenance of the MHS.

Table 5: End-uses in the communities visited

MHS	End-use
Sela khola	Proposed agro-processing mill within the power plant based on direct mechanical drive.
Bulung Khola	Proposed carpentry unit and saw mill
Kyandi (Firfire)	Communication center, huller and grinding mill
Bhimkhori	Agro-processing mill (1.5kW), oil expelling mill (3.5kW) and proposed furniture / carpentry mill (3 kW)
Gairigaon	Agro-processing mill for grinding and oil expelling based on direct mechanical drive in the power plant

4.2.3 Effectiveness of skill training for income generation

Skill enhancement for income generating activities typically include training on house wiring, animal husbandry, fruit and fodder plantation, fruit processing and handicrafts. In all, 4,939 community members have received one or the other type of training.

Table 6: Impact of income Generating activities/ skill training in the sites visited

MHS	Skill training conducted	Application of skills learnt
Sela khola	Nurseries, house wiring, radio maintenance, veg production, goat raising	House wiring of 5 households
Bulung Khola	Vegetable production, fruit cultivation and animal husbandry	Yak raising, one mobile shop
Kyandi (Firfire)	ICS, poultry farming, goat- rearing, vegetable production ICSs	Poultry and goat raising being used by households, who sell a few chickens and goat every year. No significant income increase
Bhimkhori	Goat raising, bee keeping, vegetable production, <i>masyuara</i> making, fruit cultivation, etc.	Goat rearing being practiced traditionally. The training has increased awareness on basic practices. Vegetable production being undertaken for household consumption.
Gairigaon	Bee keeping, poultry, soap making, pig raising, biscuit making	A few pigs are sold within the village but not at a significant scale

In all the sites visited, the training was found useful in terms of getting exposure to basic income livelihood options. However, when these activities are assessed from an income generation/enterprise point of view, the results are not very encouraging. While marginal improvements in output were experienced, almost none of the outputs were being sold in markets (local or otherwise) on a regular basis, and were, as such, far from the notion of an 'enterprise'.

4.2.4 Contribution to other MDGs

REDP's contribution to holistic development of the rural communities is immense. This has been documented in a large number of publications on the project and also recently demonstrated by the Winrock study. REDP's contributions to the various MDGs are summarized below (Winrock International 2006).

MDG 1. Poverty Reduction

- Between 1996 and 2005, there has been a 52% growth in household income, compared to the national average household income growth of 46% for the same period.
- Percentage of households below NRS 50,000 annual income decreased from 59% to 54%, and those below NRS 10,000 income reduced from 15% to 12%. Households with annual income over NRS 100,000 have increased considerably from 9% to 24%.

MDG 2. Primary Education

- Total number of illiterate people decreased from 37% in 1996 to 25% in 2005. Over 93% children in 2005 acquired primary education. For the same period, children of age group between 6-14 years without primary level education dropped from 25% to 7%.
- The educational status of girls has improved. The ratio of boys and girls enrolment in school changed from 1.20 in 1996, to 1.13 in 2005.

MDG 3. Gender Equity and Women's Empowerment

- There is a reduction in hours expended on fuelwood collection and agro processing for both men and women.
- Over the years, men's participation has improved in households chores like cleaning and agro-processing and cooking.
- Women involvement in small scale and cottage enterprises has increased. The number of such enterprises increased from 400 in 1996 to 700 in 2005.

MDGs 4, 5 and 6. Reducing child Mortality, improving maternal health and combating diseases

- The average annual child mortality rate decreased to 5.3 from 9.4. Similarly, annual maternal mortality rates decreased from 5.3 to 4.3.
- The number of households having toilets increased from 42% in 1996 to 70% in 2005.
- Households with access to tap water increased from 58% in 1996 to 82% in 2005 whereas the national statistics show an average increase from 32% to 42%.
- Average walking distance to fetch clean drinking water reduced from about 400 meters to 175 meters.

MDG: 7. Environmental Sustainability

- Average monthly demand of kerosene decreased from 3 to 1.4 liters per household, saving around 29,000 liters of kerosene per year (from the 1,503 surveyed households).

- Firewood consumption has reduced considerably. Monthly demand for firewood in 1996 reduced from 10 Bharis (1 Bhari ~ 35 Kg) to less than 7 Bharis per month in 2005.
- Communities have experienced more greenery in their surroundings.

The conclusion on poverty reduction is that REDP, through improving access to energy services, offers huge quality of life benefits (not all of which can be quantified). On the other hand, the impact of more 'direct' activities on income generation is relatively less significant. In general, these contribute to marginal improvements in family welfare, but are not making significant difference to incomes. REDP programme staff indicated that the minimum returns that is expected from income generation activities is that they should generate enough revenue to enable each household to pay the monthly electricity tariff. The review team's assessment is that while this is being achieved for majority of households, it is not really progressing much beyond that. This is a challenge for REDP, and can be attributed to several factors.

- Enterprise development is a complex and time consuming process. This is especially so in the REDP areas, which are remote and suffer from serious infrastructural bottlenecks. Additionally, the project is dealing with poor groups, who are further limited by their vulnerability and limited perspectives. As of now, many opportunities for expanded markets are being missed; most potential entrepreneurs in REDP sites simply do not understand the critical requirements of these markets; communication linkages are not in place allowing micro-entrepreneurs to respond to opportunities; and entrepreneurs do not have the necessary wherewithal to produce sufficient quantities, on a regular basis.
- Most of the REDP community members live from day to day, have no access to microfinance, and need assistance to start their businesses. The programme, except for providing some assistance for end-use promotion, does not have a provision for providing start-up loans for small entrepreneurs.
- The nature of training programmes under REDP is generalized, and not aligned to the specific needs or skills of a particular community. One comes across the standard package of livestock rearing, vegetable growing, bee-keeping and poultry in most sites, regardless of any locational specificities. Further, most training programmes are a one time event, and more in the nature of creating awareness about new enterprises, rather than any serious attempt at *developing* entrepreneurs.

It is encouraging to note that there has been some thinking on this issue within REDP recently, and the emerging enterprise development strategy is more focused. Starting with the establishment of a micro enterprise development section in central office, a comprehensive enterprise development strategy has been developed, which focuses on a principle of enterprise development including resource assessment, access to finance, market assessment and risk assessment.

4.3 Targeting Disadvantaged Groups: Gender Mainstreaming

The REDP' implementation modality on gender require equal participation of women in decision making at each phase of the project cycle at the grass root levels through the operationalization of appropriate institutional arrangement, discriminative rules and regulations and focused supports.

.....Annual Progress report, 2006 (draft)

Right from its inception, REDP has addressed gender issues through its operational modalities, institutional arrangement and community mobilization process. Specific measures adopted for gender mainstreaming include the following:

- Women have been identified as one of the vulnerable groups, and their empowerment has been highlighted as one of the six basic principles of REDP community mobilization process⁶.
- At the community level, REDP's operational modality requires one man and one woman from each household to participate in programme activities such as formation of COs and FGs, training, implementation and benefit sharing thereby ensuring gender balance.
- In programme communities, separate male and female COs are formed, which meet on a weekly basis and are provided targeted capacity building inputs.
- REDP's monitoring system collects and analyzes gender disaggregated data regularly.
- Women are accorded priority in human resources development initiatives.
- It is aimed that gender balance would be achieved not only in the COs, but also in the leadership positions in the FGs and Cooperatives that are formed from COs.

The effectiveness of the above strategies in the field has been assessed through examining the following issues:

⁶ Initially, women were highlighted separately. In 2004, this was broadened to Vulnerable Community Empowerment to include other equally marginalized indigenous people (IPs), Dalits and ethnic groups.

- What are the direct and immediate impacts of the project on women's lives? Are the project activities responsive to women's energy needs?
- Have the project strategies been successful in terms of eliciting a 'meaningful participation from women in project processes?
- To what extent, have the above led to women's empowerment at the community level? How sustainable are the women's institutions created under the project?
- To what extent, have the above contributed to women's empowerment at the individual level, within the communities and in their households?

4.3.1 REDP's direct impacts on women's lives

At the household level, the gender impacts of the activities carried out under REDP are tremendous, and span across all MDGs. These include:

- Direct impacts: Savings on expenditure on energy (kerosene/ batteries); convenience of having light around the house; health benefits from reduced burning of kerosene and biomass fuels for lighting and cooking respectively; time saving and reduction in drudgery involved in collecting fuelwood (from biogas plants and improved cookstoves); and opportunities for education/ leisure/ self development accorded made possible by home lighting.
- Indirect benefits of increased awareness and enhanced skills of the rural people.

The impact of the interventions can also be analyzed using the Gender Analysis Framework (GAM)⁷ which looks at four levels of impacts: on women, men, children and society / community. These appear horizontally on the matrix in table 7. On these categories, four kinds of impacts are studied: (a) Labour: This refers to changes in tasks and the level of skill required. (b) Time: This refers to changes in the amount of time availability. (c) Convenience: This refers to the changes in lifestyle or standard of living or the level of comfort. (d) Socio-cultural aspects: This refers to changes in social aspects of people's lives or their relationship with those outside the family.

Table 7: Gender Analysis Matrix: Impact of REDP activities

	Labour	Time	Resources	Health
Women	Reduced workload for agro-processing (rice hulling and grinding grains) Enhanced convenience with good quality lighting Easier to work at night and early morning hours, especially during festivals and other religious occasions	Time saving in rice hulling and grinding grains Time saving in filling and cleaning kerosene lamps Time saved in procuring wood for lamps (<i>Diyalo</i>) Increased time for rest and leisure.	Access to income generating and social activities, carried out under the project Extended working hours Access to adult literacy	Reduced blackening of nose and itching of eyes caused by kerosene lamps Reduced respiratory disorders caused by biomass smoke, through improved cookstoves and biogas plants Improved personal hygiene and sanitation through toilet linked biogas plants
Children	Increased convenience for children for home studies. Enhanced safety and reduced accidents caused by kerosene lamps	Flexibility in study hours and household work	Access to information through radios and TVs Freeing up girls time spent in fuelwood collection and enabling them to study	Blackening of nose and itching of eyes reduced, earlier caused by kerosene lamps
Men	Increased time for making handicrafts items such as <i>Nanglo, Doko</i> etc.	More time for socializing with electric lights.	Access to information through radios and televisions	
Household	Saved men and women's labour for other activities		Increased possibilities for income generation Possibility for irrigation	Positive attitudinal changes on women's mobility, girl's education

4.3.2 Gender mainstreaming: Involvement of women in project processes

The formation of separate COs for women at the grassroots guarantees their participation in project activities. Women attend weekly meeting regularly and like their male counterparts, discuss various socio-economic issues. Through weekly saving, they generate resources used for undertaking different income generating activities like off-season vegetable cultivation, poultry farming, goat farming and petty trading.

Representation of both male COs and female COs in all FGs provide them with equal opportunity to participate in community affairs and be involved in the decision making process. Experienced representatives

⁷ This framework was originally developed by Rani Parker and also reproduced later in an OXFAM publication called "A Guide to Gender Analysis Framework".

of women COs in the FGs have proved to be confident and capable, and ensured attention to gender issues and needs. Many women have come forward in to train as micro-hydro managers once considered a male's territory. In Tallo Debari of Jogbudha VDC of Dadeldhura, a woman was selected as the chairperson of Shan Khola MHFG. She performed efficiently for many years, before she had to give up the position because of her failing health.

In far western region, one of the most backward in Nepal, women rarely come out of their houses and participate in any activities in public function, due to strong cultural and traditional barriers. After the formation of their own COs and initiation of various social and economic activities under REDP, there has been a perceptible change in their confidence levels, both inside and outside the households. In general, members of women COs have been found to be more motivated, to be involved in social and environmental activities such as trail road construction, water taps maintenance, latrines construction, expansion of the village road and plantation of trees.

4.3.3 Effectiveness and sustainability of women's institutions

REDP has created a large number of community based institutions: 5059 COs including 2656 women and 2403 men COs. The total numbers of the women members are 58,058 and these COs have accumulated total savings of NRS 13,724,363. Interactions in the field revealed that in most project sites, when the project activities are in full swing, CO meetings (both men and women), generally facilitated by the Community Mobilizer (CM), are started off enthusiastically. Initially, the meetings are held regularly; savings collected; issues, especially those related to the MHS, are discussed in detail, and meticulously minuted. Over time, however, especially once the MHS is commissioned, the two year project period of active community mobilization is over, and the regular visits of the CM cease, the CO activities tend to stagnate (table 8). In two project sites visited where the CM is still active (Sela khola, Dadeldhura and Bulung Khola, Dholakha), the FG and CO meetings were found to be regular. In the other three sites however, the CO meeting are being held only sporadically. In village Gairigaon, most women were unaware that they were part of a CO, and it was only the CO President, who insisted that meeting were being held regularly. It was pointed out by many in Gairigaon and other locations, that during the last 2-3 years, conducting any public meetings in villages has been a challenge, because of the insurgency problems. Notwithstanding this fact, it is evident that the regularity of CO meetings is linked closely with the visits and the facilitation of the 'external inputs' provided by the Community Mobilizer.

Table 8: A glimpse of sample women COs in the project sites

MHS name	Year of MHS commissioning	Status of women COs
Sela Khola	2006	Savings and meeting regular, clear role division
Bulung Khola	2006	Savings and meeting regular, clear role division
Kyandi (Firfire)	2003	No meetings since last six months
Bhimkhori	2003	No meetings since last six months. Were earlier utilizing savings for inter-lending, but repayment was a problem. Undertook a number of community development activities like trail construction, school toilet construction etc.
Gairigaon	1998	No regular meetings since 2003.

It must be mentioned here that holding of meetings does not automatically translate into women's empowerment; it has to be reinforced with other complementary inputs. However, in the present context, holding regular meetings is certainly the critical minimum, essential for any upward movement on the empowerment ladder.

At another level, the review team examined the involvement of men and women in the higher order project institutions, the FGs. By design, the composition of FGs includes one representative from each CO, which ensures that at least 50% of the FG members are women. While this was found to be true in all cases, the team decided to look at the effectiveness of women's participation in this forum. In line with this, for each site in Dadeldhura district, data was collected on the composition of the FGs, which is presented in the table 9.

Table 9: Women's involvement in FGs in Dadeldhura district

Plant name	Number of households	Number of members in micro hydro FG	Number of women as office bearers
Sankhola (4 kW)	34	8	0
Chamagad (7 kW)	78	11	0
Makail (10 kW)	75	9	0
Sirsagad (22 kW)	129	11	0
Anakhola (12 kW)	80	11	0
Chalkatte (7 kW)	41	11	0
Selakhola (12 kW)	105	15	2 (Joint Secretary, Treasurer)
Relgad (15 kW)	205	13	1 (Treasurer)
Dahagad (30 kW)	290	21	0

The data shows clearly that even though many women are represented in the FGs, relatively few are in decision making positions. It must be mentioned that the review team came across exceptions to this general scenario, where women were heading Functional Groups, but such instances are rare, and oft-reported.

4.3.4 Impact of gender mainstreaming on rural community women

The extent to which REDP project processes and institutional development translates into empowerment of individual women is rather mixed. At the most basic level, it helps a large number of women in gaining awareness about REDP, its components and basic issues of development. Relatively fewer women graduate to the next and higher level, who are members of FGs, influence decisions occasionally, interact closely with external project staff and are the ‘gender face’ of REDP to visitors.



Figure 3: Women’s empowerment within REDP

What emerges from the above discussion is that while REDP helps a large number of rural women reach a basic level of awareness, not many women are moving to higher levels of empowerment (figure 3).

To conclude the assessment of gender mainstreaming, REDP project activities, directly through energy inputs, and indirectly through inputs in capacity building and income generation, are making positive impacts in the quality of life of poor women. At the policy level, a key achievement in this area is that the recently promulgated Rural Energy Policy has identified “women as prime users/ beneficiaries of the rural energy and has thus outlined the need to develop energy services to respond to their need and empowerment”. At the field level, in spite of the issues highlighted in the preceding discussion, what REDP has been able to demonstrate and achieve in this area is commendable for many reasons.

- The baseline situation that REDP is dealing with is daunting! The programme is targeting poor women, burdened with centuries of subjugation, low literacy, no exposure to the outside world, high workload, and extreme isolation and inaccessibility.
- It is unrealistic to expect that a project whose active engagement with a community is limited to two years, can bring about major social transformation, and a quantum leap in women’s empowerment.

In this context, it must be mentioned that while REDP has devised a number of strategies over the years to involve women in its project processes, there seems to be a lack of clarity in its gender goal. It is not clear whether REDP aims at ensuring that the energy needs of women in the project communities are met and that they have an equal opportunity to participate in the project processes (equity goal), or the community women achieving high levels of empowerment (empowerment goal), or any other. This is not defined clearly, neither within the programme documents, nor the minds of the project personnel. And in the absence of a definite goal, it is natural that monitoring gender outcomes of the programme, and tracking the effectiveness of strategies adopted becomes difficult.

Another lacuna in this area is the REDP organizational policy on gender mainstreaming. At the institutional level, while the project does have a provision for hiring women, this has not materialized very well. A gender tracking indicates (see table 10) that there are few women within REDP, and almost none in decision making positions. Many SOs and the district offices have few women staff members, but majority of these are in secretarial positions. Even at the central level, while a position was created for a gender specialist in phase II, REDP has not yet employed a person with a gender and development background, capable of providing concrete inputs in this direction.

Table 10: Gender tracking of REDP programme staff

Level of staff	Total numbers		Male		Female*	
	No.	%	No.	%	No.	%
Central	17	100	13	76.5	4	23.5
District	96	100	85	88.5	11	11.5
Community Mobilizers	115	100	77	66.9	38	33.04

* Includes secretarial staff

While trying to understand the reasons for such few women within a project which has women as a primary target group, we came across varied responses from different quarters. What was consistent in all was the intensive and field based nature of the job (for CMs) and a lack of women-friendly organizational policies, including negligible maternity benefits among others. REDP management including the SOs also pointed out that in many districts, especially in the remote ones, it is difficult to find women with qualifications necessary to be employed in REDP.

4.4 Targeting the Disadvantaged Groups: Social Inclusion

The REDP Programme Document clearly identifies Vulnerable Communities (VCs) as a target group, and places considerable emphasis on them in its six basic principles on community mobilization. Especially during the second phase, the project has instituted several measures to include the VCs in project processes:

- For each MHS, a Vulnerable Community Development Study Report (VCDSR) is prepared, as an integral component of the Detailed Project Report, in order to ensure that the issues concerning vulnerable communities (including women, indigenous people and dalits) are identified adequately.
- The baseline data collection, an integral step in all project sites, identifies the VCs clearly.
- There is a mandatory requirement to select a VC focal point in each community, SO and REDS to deal with VC issues including the handling of grievances. A register is also provided to the VC focal point, where grievances can be registered. This is a recently adopted measure and not fully operational.
- Qualified VC organizations get preference in the process of SO selection in new REDP districts. In districts where there are no qualified VC organizations, priority is given to NGOs with VC staff. If even this criterion cannot be met, the SO is encouraged to recruit personnel who can speak the VC language.
- To the extent feasible, the project involves VC organizations in the implementation of local level activities, e.g. non-formal education and income generation training.
- All capacity building activities target to include at least 25% participants from VCs.
- Project staff at all levels receive awareness training and orientation on VC issues.

In addition to the above, the communities themselves are encouraged to institute social inclusive strategies (table 11). Commonly adopted strategies include the following:

- The VCs participate in the project through contribution of labor 'sweat equity' (and less monetary contribution). In Selakhola in Dadeldhura, a number of households were permitted to make additional labour contributions in lieu of cash contributions, which enabled them to access electricity.
- Electricity tariffs are linked to connected wattage which makes it possible for a poor household to go in for fewer connection points (often two light points), at a lesser monthly fee. Additionally, the tariff is often less than NRS 100 per month (less than the NEA tariff and less than the cost of 2 litres of kerosene, average monthly consumption).
- In some villages, higher income families have contributed higher amounts than the poorer households in the MHS, however this is rare.
- In some sites, communities have introduced innovative ways of collecting electricity tariff. In Parbatikhola scheme of Kavre, tariff is accepted in terms of labor or food-grains from economically weak households who cannot pay in cash.

Table 11: Measures for VC inclusion in the field sites visited

Site	Social inclusion measures adopted
Bulungkhola, Dholakha	A settlement of Khadka Chetri and Sherpa communities. The Sherpas are ethnic <i>Janajati</i> but economically well off, hence no special measures were required.
Firfire, Tanahu	5 VC households. The contributions for the project were the same for everyone.
Bhimkhori, Kavre	5 VC (Dalit) households. They get preference while inter - loaning , other contributions were the same
Selakhola, Dadeldhura	The contributions (both cash and labour) of a poor woman and a handicapped person were waived off by the community.
Gairigaun, Dadeldhura	A VC (Dalit) has been appointed as the manager of the micro hydro.

As such, the schemes do not have any additional incentives to support VCs. It was planned that ".....priority will be given to support for the instillation and operation of MH schemes in remote areas. These schemes will

be provided with additional incentives to support VCs and other very poor backward groups” (VCDP framework REDP), but this has not materialized yet. There are a few MHSs where the project provided focused support such as product value addition, market linkage, to VCs, which enabled them to augment their livelihoods in a sustainable manner, such instances however are few.

The assessment on this issue is that REDP has made good progress in clearly identifying VC issues. At the most basic level, the selection of locations for REDP implementation itself is socially inclusive. The MHSs are developed in remote locations which are not likely to be connected by the national grid at least in next five years, representing isolated areas where most development initiatives have not reached. Within the REDP sites, the project clearly identifies VC households, and targets them specifically in various capacity building and income generation activities. There are however several issues in this area, which deserve attention.

- A large number of sites are such where the entire communities are extremely poor, which makes it impossible for the community to institute any special mechanism to include the poorest households. And this, at times, results in the inevitable exclusion of some. In Makail and Sirsa sites in Dadeldhura, 16 and 23 poor households respectively could not be provided electricity through the MHSs as they were too poor to pay cash contributions, or even make any additional labour contributions. A more recent case in point is the 30 kW proposed MHS at Ganket, where the feasibility studies have been completed, and the TRC approval has been obtained. The 275 households of Ganket community have so far been unable to raise the necessary cash contribution of approximately NRS 7000 per household.
- The social inclusion tracking shows that within REDP, the representation from the VC is on the low side, especially at the higher, decision making levels. There are several Community Mobilizers who belong to VCs, and this is primarily because of the VCDP framework developed in 2004, which put in a VC-sensitive selection process of SOs.

Table 12: Social inclusion tracking of REDP staff

Level of staff	Others (Brahmin, Chhetri, Newar)		Indigenous people		Dalits	
	No.	%	No.	%	No.	%
Central	17	100	0	0	0	0
District	85	88.5	10	10.4	1	1.04
Community Mobilizers	95	82.6	11	9.6	9	7.8

- While the introduction of the VCDs reports is a welcome step towards addressing VC issues, the quality and effectiveness of the reports themselves can be questioned. A desk review of the VCD studies showed that most are too general in nature, to be of much value, except for ensuring that no negative impacts are envisaged on the vulnerable communities. To illustrate the point, few excerpts from recommendations from one of the VCDP reports (Sela Khola) are presented below:
 -awareness training on VC issues to community members.
 -Selection of VC Focal persons.
 -All including the VCs will be encouraged to make latrines, waste disposal site, toilet attached bio-gas plant etc.
 -a grievance redressal mechanism.
 -poor groups identified will be allowed to contribute minimum percentage of project capital cost, but strictly sticking to the decision made by the community itself.
 -efforts will be made to mobilize additional resources to support these households.

It can be seen that most of the above recommendations are actually project provisions made within REDP itself, not specific to the site itself, and adding little value to what is already known, understood and accepted. This issue is especially relevant when it come to (a) the selection of activities for income generation and enterprise development, which need to be sharply focused, and (b) identification of site specific constraints and opportunities in involving VCs.

4.5 Influencing National Policy

When REDP was launched in 1996, the interest in the energy sector, specifically renewables, was only emerging. Sporadic and independent activities had started on RET development and AEPC was established to coordinate the activities in the renewables sector. REDP’s first phase focused on micro hydro demonstration schemes, which was instrumental in demonstrating the model and creating awareness in this area. Starting with 2001, a number of studies (Rural Electrification in Nepal and Possibilities for a Sector-wide Approach 2003; Status of rural energy 2002; Status and inventory of RETs in Nepal, 2005; Scaling up of rural technologies in Nepal, 2005 and Functional status of MHS in Nepal, 2005) reviewed the government policies related to water resources, electrification and RETs, and made a strong case for integrated rural energy policy.

It was in this backdrop that REDP took the lead role in the formulation of a rural energy policy, under the UNDP-TTF (Thematic Trust Fund) supported project "Strengthening National Policy Frameworks on Rural

Energy for Sustainable Development and Poverty Reduction in Nepal - NEP/02/M03". The project envisaged the formulation of a rural energy policy and legal framework suitable in the context of Nepalese rural energy scenario, through a consultative process and with due consideration to the suggestions forwarded by the different studies. The project was executed by the National Planning Commission (NPC), government of Nepal.

The rural energy policy was prepared following a series of extensive discussions and consultations with stakeholders at all levels. More than 450 experts, implementers, academicians and local people actively participated in four regional and one national consultative meetings organized by the NPC and provided comments and suggestions. It must be mentioned that the process was severely hampered by the frequent changes in government bureaucracy and after a long wait, the policy got approved by the Cabinet on 27th November 2006.

REDP's experience is well reflected and integrated within the present rural energy policy-2063, Nepal. REDP's experiences helped to formulate the policy specifically in terms of goal setting; strategies; subsidy; resource management; program integration; monitoring and evaluation and institutional arrangements. Key features of the rural energy policy, based directly on the REDP experience are:

- Pro-poor focus
- Decentralized planning, institutions and operations
- Focus of holistic development and poverty reduction
- Mechanism for the mobilization of internal resources
- Capacity building at all levels
- Multiple uses of energy resources and electricity and R&D for the same
- Mainstreaming gender concerns and vulnerable communities
- Continuing assessment for improvement based on emerging needs of the sector

REDP has played an important role in defining the subsidy policy for renewables in Nepal. GoN had brought out a subsidy policy "Subsidy for Renewable Energy, 2000", the subsidy level initially provided proved to be inadequate for the remote areas which have a difficult terrain and poor economies and REDP conducted several discussions on this issue. Eventually, after a complete understanding of the sector was developed specifically in terms of market, services and reliability of RETs, a new subsidy mechanism was approved, with two key modifications: (a) The subsidy for MHSs which was initially linked to plant capacity (and often led to over-sizing) has been reworked and is now linked to the number of households connected. (b) MHS projects are now eligible for a transport subsidy, based on remoteness of the location and difficulty of terrain.

REDP is working towards making carbon trading facility available for MHSs in Nepal. So far biogas has been accepted for such benefit and MHS is still in the process. REDP's initiative on carbon trading could eventually lead to financial sustainability of the MHS sector.

Many of the bilateral and multilateral donors involved in the renewable energy sector in Nepal have formed linkages with REDP where initiation for program integration with others has been taken by REDP. In fact, this development has been instrumental in launching of the Rural Energy Fund (REF), an important provision under the rural energy policy. Through joint initiatives with donors like WFP and FINNIDA, this has also led to a positive trend of integrating renewable energy with other developmental activities in Nepal.

4.6 Partnerships and Capacity Building

The REDP programme strategy in developing partnerships has involved establishing project processes within the national governance system: through AEPC and MoEST at the central government level; through DDCs at the district level; through VDCs at the settlement level and through the community at the local level.

The most visible impacts of these partnerships are reflected in way REDP principles and programme elements have gained popularity and incorporated in other programmes, both within the country, and internationally. Needless to say, the communication is backed by years of sound experience and constant fine-tuning of approaches. Recently, the Rural Village Water Resources Management Project funded by the Republic of Finland has adopted REDP's community mobilization and institutional mechanism in its programme in the Far and Mid Western Region.

The ESAP programmes being coordinated by AEPC, are also planning to adopt the concept of energy fund for subsidy disbursement, directly at the district levels, on the lines of the DEF and the CEF under REDP.

4.6.1 Building Capacities of Project Partners

REDP's capacity building activities can be classified into two broad categories: (i) awareness creation and skill enhancement through sensitization, orientation and observation study tours, and (ii) human resources development through training and workshop seminars.

REDP contributes to capacity building at three levels - center, district and grassroots.

- At the central level, REDP provides support to private sector organizations to build their capacities to undertake energy related activities. Specific activities include training for engineers on design of MH schemes and involvement of engineering students in R&D projects in collaboration with Kathmandu University.
- At the district level, activities are focused on building the capacity of DDC to plan and manage rural energy development programs. DDC are being supported to integrate decentralized energy planning with overall development strategy. For this, orientations on decentralized energy planning for DDC and VDC officials have been organized. Similarly, local leaders are given technical support for the preparation of annual energy plans. The capacity of DDC to handle the DEF is being enhanced through the preparation of its constitution and operational guidelines. Besides, an NGO in each district has been supported to develop as a SO to implement community mobilization activities. REDP has supported potential entrepreneurs to establish RESCs. REDP also organizes awareness generation campaigns on RETs for other stakeholders, including VDCs/DDCs, in-country study tours for CO/FG members and DDC/VDC/DEC personnel and workshops to review the program every quarter at the regional level and yearly at the national level.
- At the community level, REDP supports skill development in three broad areas:
 - Skills to run community organizations and functional groups (organizational development, leadership, group dynamics, book keeping, credit operation, etc)
 - Skills to implement, operate and manage MHSs and other technologies (MH Operators, MH managers, agro-processing mill operator, MH manufacturer, improved cooking stove, Rural Energy Service Center personnel)
 - Skills to carry out income generation activities like agriculture, livestock etc.

Capacity development is however not confined to the implementation of training courses, workshops and other one-time events. At the community level, capabilities are also enhanced as a result of the REDP project processes, which involve the community at every stage, revolving around participation, transparency, consensus decision making, benefit sharing and self evaluation. Additionally, the project strives to strengthen the community based organizations (COs, FGs) by vesting considerable power in them by making them signatories to various contractual arrangements within the project, i.e. the contracts between the community and manufacturer, contracts between the community and REDP etc. A CO, for example, is formed after it has fully understood and signed 28-point Terms of Partnership (ToP) between the community and the programme.

4.6.2 Impact of Capacity Building Initiatives on Empowerment of Partners

REDP's single-most important contribution has been to empower individuals and institutions at all level. Through an impressive range of actions, including direct training programmes, workshops, consultations, etc, REDP has engaged a wide range of stakeholders at all levels.

Capacity building at individual levels

- Working within the limitations of low literacy and non-existent technical background within REDP communities, the skill training on MH operation and management have been extremely effective. It is heartening to note that the review team did not come across or even hear of a single MHS, which is

Key partnerships forged

- Local NGOs: Partnership with 26 local NGOs for implementation of community mobilization for social capital formation and MHS installation and maintenance.
- Private Sector Organizations: Partnership with 22 RESCs for trouble free operation of MHSs through provision of technical support services
- Associations: Partnership with NMHDA, ADDCN, NAAVIN, FREE-Nepal for advocacy, dissemination, guidelines and supports to their members for capacity building, rules and regulations and mobilization of resources.
- UN Agencies: Partnership with WFP for the provision of hygienic and nutritious snacks prepared in clean and environment friendly kitchens to students of rural primary schools through the construction of Institutional Improved Cooking Stoves.
- Partnership with the World Bank for the expansion of REDP to 25 districts
- Bilateral Donors: Partnerships with the Republic of Finland for promotion of MHSs under the RVWRMP project, DANIDA under ESAP and EU under REP.
- Consulting Firms: Partnership with FSD, Winrock International, ICIMOD etc. for conducting training, undertaking studies, formulating frameworks and sharing experiences at regional and international workshops/ seminars.

non-functional, except for a few that had been washed away in floods. Within MH operation however, there are certain areas such as the electro-magnetic system, in which the skills need to be built further.

- The skill training imparted have been quite effective in terms of providing exposure to a large number of rural communities to new livelihood options and opportunities, and raising the level of family welfare marginally. The effectiveness however has been limited, when it comes to translating these newly acquired skills into profitable businesses/enterprises, which is dependent on many factors like infrastructure, access to finance, 'external' to REDP (for more discussion on this, refer to chapter 3).
- The impact of organizational development and group management training has been satisfactory. The office bearers of the COs and FGs are well trained. Meetings, when conducted, are minuted, records maintained, systems are in place for collection of savings, collection of tariff, and other decision making. There are however larger issues related to the sustainability of these institutions themselves, which need attention, and are discussed in chapter 7.
- REDP has been instrumental in developing a pool of trained personnel and building the capacities of a large number of individuals who have been the staff of REDP, at some point or the other. Because of REDP's image which is associated with terms like "internationally acclaimed project", 'sustainable development initiative', etc, it attracts quality professionals, many of whom go on to join other donors, national level institutions and for higher studies. In fact, the review team came across a large number of ex-REDP professionals at many of the meetings with other stakeholders, during the review. These professionals, carry with them the ethos of REDP, become 'REDP ambassadors' and are often instrumental in transferring the REDP values of sustainable development, community mobilization, etc. into their new institutions.

Capacity building at institutional levels

Institutional capacities are built when individuals take back lessons from a capacity building event or a process into their institutions, and these are translated into improved organizational commitment towards the project, reflected in changes in systems and procedures. Organizational capacity building is far more challenging, as it is dependent on a variety of factors outside the control of the project. Within the current Nepalese context, organizational capacity building has also been influenced by factors like insurgency, political instability, absence of elected representatives in the district, and a lack of financial resources at all levels. That said, REDP's successes in this area are commendable. Some of the notable outputs and outcomes in building the capacities of REDP partners are as follows:

- Empowering Community Level partners
 - Developed and strengthened community institutions, a total of 5,061 COs, 761 FGs and 195 CEFs for planning, implementation, operation, repair and maintenance of MHSs in integration with various social, economic and environmental activities.
 - Developed the capacity of a total of 25,295 people for undertaking various income generating activities, micro enterprises, plantation, resources mobilization, and operation and management of MHSs.
 - Increased the awareness of a large number of project communities on issues of energy and development.
- Empowering District Level Institutions
 - Strengthened the operation of institutions (25 REDSs, 25 DEFs, 25 DECAs and 25 DREMCs) for analysis, survey, preparation of Detailed Projects Reports, decentralized planning, resources mobilization on the promotion of RETs
 - Enhanced the capability of local NGOs as SOs.
- Building the capacity of the private sector
 - Enhanced the capacity of private sector organizations as RESCs.
 - Enhanced the capacity of a large number of manufacturers in the micro hydro sector in Nepal, who largely owe their existence to REDP.
- Building institutional capacities at the Central Level
 - Supported NPC and AEPC in the promulgation of the pro-poor Rural Energy Policy
 - Supported AEPC for the implementation of the WB funded MHVEP/ PDP in 25 districts following the REDP implementation modality
 - Provided feedback to AEPC in the revision of the subsidy policy to make responsive and realistic to market situations and demand.
 - Assisted AEPC in developing the MHS into Clean Development Mechanism (CDM).
 - Assisted AEPC in the internalization of the Technical Review Committee (TRC), which is the REDP's innovative mechanism implemented for the approval of MHSs for implementation through the appraisal of viability from the social, economical, financial and environmental considerations.

4.7 Resource Mobilization

REDP has been extremely successful in terms of resource mobilization from outside the project. This has been evident at all levels. At the programme level, UNDP has been instrumental in leveraging substantial co-financing from the World Bank, to the tune of USD 5.5 million under the component on Micro-Hydro Village Electrification Programme (MHVEP) within the Power Development Project (PDP).

At the community level, resource mobilization is taking place in several forms.

- Community contribution, in the form of cash and voluntary labour forms upto 20% of the project cost (see table 13).

Table 13: Cost sharing of sample MHSs

	Kyandi Khola II, Tanahun (12 kW)	Relgad, Dadeldhura (15 kW)	Sela Khola, Dadeldhura (12 kW)
Total project cost	1,667,760	309,7291	199,5480
Subsidy	840,000	1,275,000	840,000
DDC contribution	64,763	150,000	90,986
VDC contribution	129,526	150,000	90,986
Community contribution (labour)	372,494	627,243	283,943
Others	328,097	895,048	454,017
	(ADB/N loan)	(from PAF)	(from ASHA/ CARE Nepal)

It is a common practice for the communities to take a loan from ADB/N to meet the cash contribution for the MHS. ADB/N has, so far, supported 51 micro hydro projects, including REDP, totaling to 970 kW installed capacity, and a loan amount of NRS 16 million. The repayment status for the loans taken by the communities has been exceptionally good, and barring a few schemes where the loans have not been repaid because of external factors such as the MHS being washed away by floods etc., the communities have paid back the loans in time. There are a number of occasions in which the community members have had to take loans from relatives and friends to make these payments, but it is only in extremely rare cases that they have defaulted on loan repayment. The status of ADB/N loans given for REDP projects in the western region shows a repayment of 94%.

- Many of the communities, with active support from the project staff have managed to obtain additional financial support from other donors and projects. Examples include a contribution of NRS 454,017 by ASHA/CARE Nepal in the Sela Khola MHS, and an investment of NRS 895,048 by the Poverty Alleviation Fund (PAF), Nepal in the Relgad MHS, both in the far western region.
- Once REDP is functional in a village, the project staff are in regular touch with the district authorities. With their support, the communities succeed in channelizing resources (both financial and non-financial) to their villages. Common developmental activities initiated with external support in REDP villages include trail construction, improvements in school building, water supply, among others. A glimpse of the resource mobilization efforts in Kavre districts are presented in Annex 8.

5. Project processes and Efficiency of Operations

5.1 Institutional Structure and Governance

The current institutional structure within REDP has evolved over time. As such, the strong emphasis on building linkages with government, non governmental institutions and the private sector has been in place right from the beginning. Significant changes made from phase I include introduction of two decision making layers at the central level: a deputy national programme manager, essentially to support the National Programme Manager (NPM); and advisors on thematic areas (Sustainable Development Advisor, HRD Advisor, and Rural Energy Development Advisor), to develop the strategy on and provide focused inputs to specific areas within REDP. At the regional level, the position of Regional Energy Advisors was created, who are responsible for ensuring the achievement of all outputs at the district level. In the following sections, the effectiveness of the REDP management structure is examined.

5.1.1 Effectiveness of the REDP internal management structure

At the central level, the management structure is well- streamlined. The advisors play a constructive role in developing thematic area strategies, and contributing to qualitative improvements in the programme. There are however two areas where the review team feels that the effectiveness can be increased. The first of these is technical supervision. Even though the DPM has a technical background and is responsible for technical matters, it was felt that largely because of the high demands of project management functions, which the DPM is performing, technical aspects are not receiving the due attention that they receive (discussed in detail in the subsequent sections). The second area of improvement is the gender expertise at management level. Given that

gender issues are so central to the project, the review team feels that the attention and the strategic thinking that this theme deserves is currently lacking at the top level.

5.1.2 Effectiveness of the central level governance structures

At the central level, the Programme Management Committee, which has representation from the PSU as well as a number of other national level stakeholders, including NAVIN and ADDCN, is an important forum, responsible for guidance, planning, management and implementation of REDP. Minutes of the PMC meetings indicate that the discussions are focused at reviewing progress, approving work plans and budgets, and troubleshooting, and have been instrumental in influencing key decisions. The other committee, Working Committee is responsible day-to-day decisions making. An important forum is the Technical Review Committee (TRC), which is responsible for the evaluation and approval of all MHSs. As of now, the TRC meets as and when required, when REDP puts up the technical survey reports for approval.

5.1.3 Central level management issues faced by the national executing agency

One of the management issues that came up in several discussions is that while AEPC, which falls under the Ministry of Environment, Science and technology, is the project executing agency at the central level, the district level project implementation system, the DDC is however directly under the MoLD. The review team however did not hear of any serious problems in this arrangement, and this actually reflects optimum use of manpower resources, and a synergistic functioning between two parallel government systems. This however has another implication. AEPC, which is a central body, does not have any presence at the district level, which rules out any effective field level monitoring by AEPC. This is somewhat ironical, as on the one hand, AEPC is responsible for funds disbursement, while on the other, it has no mechanism to monitor the quality of work at the field level.

5.1.4 Effectiveness of the district level governance structures

As outlined in section 2, a number of forums have been created to ensure effective coordination between the various stakeholders. The review team's assessment of these is as follows:

- The DDC: REDSs, the implementing arm of REDP at the district and situated within the DDC, are in general functioning well. However, it is perceived as a "UNDP/REDP cell", and to that extent not internalized within the district governance, as visualized.
- The DREMCs, a forum constituting of the DDC Chairperson, LDO and EDO are functioning well. This is primarily because DREMC has a critical role of funds disbursement and subsidy approval within the project.
- The DEC⁸, a forum of the EDO and representatives from line agencies of the DDC, has not been effective. In fact, the review team came across several districts where the DEC meetings have not been held at all. There are several pertinent reasons for this. First, at the district level, REDP has not been able to convince the other line agencies of the importance of a symbiotic relationship of REDP and the other government programmes. As a result other line agencies do not really see a direct relevance of REDP into their programmes. While the visibility of REDP is extremely high at the district level, it is known almost entirely as a micro-hydro programme and less as a holistic development programme. The other problem in operationalizing the DEC has been the lack of funds at the REDS level to conduct DEC meetings.

Another issue at the district level is related to the monitoring function expected of the DDC. Within REDP, there is an implicit expectation that the DDC/LDO will monitor the performance of REDP, and provide constructive feedback towards its improvement. In reality however, this is not taking place, primarily because there are no funds attached to this expected function.

5.1.5 Community mobilization role of the SOs

At the district level, apart from the REDS team, which is responsible primarily for the technical aspects, an important role is being played by the Community Mobilizers of the Support Organizations. In fact, given that their engagement with the communities is most intensive, they are really the 'face' of REDP to the communities. While the performance and motivation levels of the CMs were found to be exceptionally high, there are several issues here that deserve urgent attention. Firstly, given REDP's emphasis on community development, the project outcomes that the CMs are expected to contribute towards are substantial. The CMs are local youth dedicated to the improvement of their societies, spend upto 22-25 days every month in the field, and live and work in extremely remote and challenging environments. They perform several critical functions including liaising with the district authorities, steering the community processes, facilitating

⁸ It was envisaged that the DEC would guide the programme activities at the district level, provide critical linkages and coordination in preparation and implementation of integrated rural energy development package at the community level and decentralized district energy plans and programs.

meetings, assisting the communities in designing site specific intervention packages, and can potentially play an extremely visionary role. In comparison, the investment that REDP makes in these persons, in terms of capacity building, incentives, growth opportunities etc. is on the low side. They receive one time training from the project, have low salaries and little career growth opportunities. The review team came across CMs who started 7-8 years ago as Community Mobilizers have remained at the same level ever since. More importantly the capacity building inputs that they receive from the programme (one time community mobilization training and periodic training inputs on specific issues) are quite inadequate to expose them to new ideas and build a vision that is suited to the demands from this position.

5.1.6 Field level coordination issues

One of the issues frequently encountered by the field staff is the multiplicity of donor programmes, and their divergent operational modalities in the field. This has at least two serious implications. First, most villages have a number of developmental programmes running, each with its own way of mobilizing the community, of forming groups, of building their capacities and so on. In general, if a new programme is introduced in a REDP village, there is an implicit expectation that the REDP COs will be used. And this is so, in most cases. At the same time however, if there are existing groups in a new REDP village, REDP does not deviate from its modus operandi. For the field staff and the communities, this means finding time for participating in numerous meetings, wastage of resources, and duplication of effort. This clearly calls for a minimum common understanding between donors on their operational modalities on the ground. Secondly, at the level of the Support Organization implementing a number of programmes simultaneously, this means divergent salary and benefits package for the staff working under different donor driven projects, often leading to an unnecessary competition among the staff to be hired under the better-paying projects.

5.2 Project Design and Planning

Within REDP, the planning systems for the community based projects, which have evolved over the years, are very well streamlined. They are deeply rooted in the local setting and the socio-cultural milieu. Currently, the average penetration rate of REDP is 4 schemes per year in each district, generating at least 65 kW. This is in line with the target of 3 MW planned for phase II.

The planning systems have been well laid out in the various guidelines: Environment Management Guidelines; Community Mobilization Guidelines; Tariff Determination Guidelines; District Energy Planning and Implementation Guidelines; Micro Hydro Implementation Guidelines; and Technical Guidelines for installation of MH Schemes. Apart from these guidelines, there are two basic documents, which guide the project planning and implementation. These are:

- The Programme Document, which outlines the project objectives, strategy, its components, work plans, budgets and the LFA (logical framework analysis).
- The Vulnerable Community Development Plan (VCDP) Framework, which was prepared in 2004 and is meant to guide the project strategy on inclusion of vulnerable communities, and more specifically to assist the preparation of the VCDSR, mandatory for each MHS, along with the technical feasibility report and the environment assessment report.

An important component of the Programme Document is the LFA. In principle, the LFA is a management tool which can be used to monitor the project at activities, outputs, outcomes and impact levels. A brief review of the LFA REDP phase II (enclosed in Annex 7) is as follows:

- While the LFA effectively deals with practical aspects of timeliness of deliverables and quantifiable indicators (number of meetings/workshops/ training courses held etc., quality aspects are conspicuous by their absence.
- Some of the items listed under Intended outputs (for example, output 1: Policy and regulatory framework for rural energy developed) are dependent on factors external to the project, and not strictly within its control. These qualify more as higher order outcomes, rather than outputs, or even objectives. In general, an output can be defined as the direct result of a project activity. While other outputs such as output 2: Institutional structure and operating procedures in support of rural energy established, and output 3: Joint programme of GoN with funding from WB and UNDP implemented in upscaling rural energy systems) indeed qualify as outputs. Essentially, outputs and outcomes seem to be placed together under 'intended outputs'.
- For many of the outputs, the causal relationship between activities and outputs that seems to be implicitly assumed is not always true, atleast not in totality. For example, the intended output 4: Capacities of Community, district and national level institutions developed for rural energy development and implementations, cannot be achieved only by developing training manuals to produce master trainers, and by organizing training events. There is a whole process of translating individual capacities into institutional capacities, ensuring organizational commitments to the REDP cause and

sustaining individual capacities, which are equally important elements in the capacity building process, if not more.

- The single most important shortcoming of the LFA is that it is completely silent on the important objective of enhancing rural livelihoods through rural energy systems. As a result, there are no indicators on aspects related to community processes (gender, social inclusion, empowerment), livelihood improvements (increase in incomes, food security), or quality of life improvements. In fact, the word income features but twice in the whole LFA, and in the context of training programmes.

The overall assessment of the LFA is that largely because of the way it is designed, the current LFA is being used to track activities and activity targets, rather than the higher order aspects of outcomes and indicators. While the end term evaluation is perhaps not expected to go into the details of the LFA, what needs to be highlighted here is an LFA can potentially serve as an effective tool for project management and tracking of both qualitative and quantitative results, and deserves greater attention during the project formulation stage.

5.3 Technical Supervision

Among the various technological options, REDP has focused on micro hydro and to a limited extent, biogas and improved cookstoves for cooking and solar home systems for lighting. The MHS technology is well proven, and has a long history in Nepal. For the purpose of this review, five MHS sites were visited during the field visits. Specific observations on their technical performance are summarized in the following table.

Table 14: Technical Performance - Site Observations

MHS	Details	Status	Remarks
Bulung Khola, Dholakha	10 kW, installed in August 2006	Functioning well	Power output verification not completed yet. Maintenance catalogues not provided
Bhimkhori Kavre	12 kW, 2003	Functioning well	Major problem 2 years ago, shut down for 20 days Frequent problem arising in ELC Turbine shaft broke two years back, replaced by supplier
Sela khola	12 kW, 2006	Functioning	ELC and some of the panel board meters not functioning Water leakage in canal, fore-bay not placed at the designed place. Spillway is under capacity and the water disposed in unsafe manner. There are differences between design document and the actual installation by the manufacturer.
Gairi gaon	6 kW, 1998	Functioning. In- sufficient power to cover 36 HHs.	Very low voltage at present. Lime deposition in penstock reduced the power production capacity. Ballast and control unit not functioning well. Induction generator had to be replaced (synchronous generator) within one month. The MHS is closed for around 3 months every year, because of shortage of water.
Kyandi, Firfire	15 kW, 2003	Functioning	Frequent problem in ELC Major break down due to high flood ELC bypassed and direct supply. Bearing Shaft replaced soon after installation. Water spilling at fore-bay is along with penstock: can cause damage to power house in future.

The following paragraphs present an overview of the technical performance of the technologies promoted under REDP.

- *Functional status of MHSs*: It is encouraging to note that barring a few⁹, all REDP MHSs are functional, albeit at varying degrees of functionality. Discussions indicated that even though the MHSs do face problems occasionally, the communities manage to get the problems rectified, which clearly shows the faith of the people on the MHS and the success of the management system set in place for its operation. A recent study conducted by Hydro consult on the functional status of MHSs in Nepal¹⁰ showed that around 60% of the plants were basically successful projects and fulfilled most expectations. 15% were either failing or defunct projects and the remaining 25% were reported as partially successful projects¹¹. Salient features of all the MHSs installed so far are included in Annex 9.

⁹ These MHSs were washed away in floods.

¹⁰ Even though the study does not specifically identify the REDP MHSs, many covered were constructed under REDP. The study covered 64 sites in all.

¹¹ An earlier study conducted by Earth consult in 1995 showed that 64% of the MHSs in Nepal were running well, 13% had various degrees of problems, 18% were not operating and 5% had completely stopped. The major problems identified were in site selection, survey, sizing of plant design, poor installation and equipment. Major problems were identified in electrical components specifically in voltage regulation and ELC.

- *Quality of MHS works:* In MHS civil works, the materials used were found to be of good quality. However, some of the MHSs had design defects with respect to civil works, especially with the fore-bay, spill water disposition, canal alignment and intake with river training at the mouth. In the mechanical components, the most recurrent problem area seemed to be the turbine shaft and bearings. Out of the civil, electrical and mechanical components of the MHSs, most problems seen were in the handling of electrical components. In the plants visited, it was observed that safety precautions are not given due attention; earthing was carried out in a wrong way; lightening arresters were not checked and repaired properly for healthy functioning; and several electronic control units were found either not functioning or bypassed by a direct supply system.
- *End use promotion of MHSs:* End use promotion has been promoted quite strongly in REDP, and the programme requires 30% of the plant capacity to be used for end use connection. 100% of the MHSs in REDP are connected with atleast minimum end uses and are in running condition. The MHSs in Bhimkhori, Kavre and Gairigaon, Dadeldhura are well connected with end uses while the recently commissioned MHSs of Bulung Khola in Dolakha and Shela Khola in Dadeldhura are awaiting end use connection. Kyandi I in Tanahu is connected with a grinding mill, utilizing 20% of plant capacity. In general, the plants with mechanical end uses, directly connected to the MHS are performing better than those using electricity for end uses at a distance.
- *Technical monitoring of MHSs:* The Technical Review Committee, instituted in phase II, has been a good development. The primary role of the TRC is to provide approval for proposed MHSs, based on technical, economic and environmental considerations. The TRC consists of experts from several organizations, with AEPC as the Coordinator and meets frequently, even 3-4 times a month, depending on the number of proposals pending for approval. A look at the status of the projects that are at various stages of execution, shows that 21 of these at the TRC approval stage. The progress made, especially in light of the insurgency problems is commendable, and it is expected that all of these would be completed by June 2007. A review of the minutes of the TRC reports shows that the discussions focus more on the civil aspects, and relatively less on the electro-mechanical aspects. This is significant in light of the fact that majority of the faults causing MHS failures in Nepal are in electromechanical (57%) components.

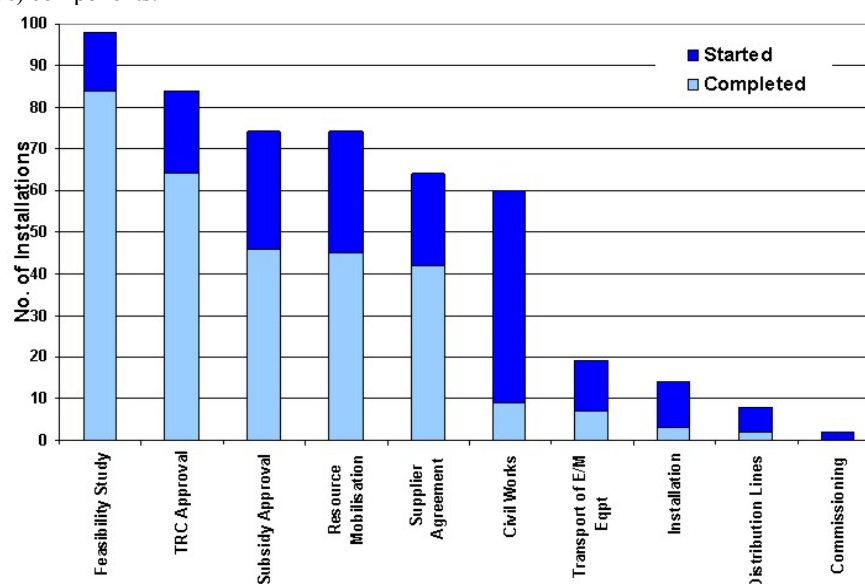


Figure 4: Status of MHSs under execution

- The quality of ICS constructed in REDP sites was found satisfactory. However ICS dissemination has been sustainable only in places where continued support and training has been provided, mostly through other programmes.
- The toilet-linked biogas plants have been found extremely useful by the households.
- The solar home systems promoted have been functioning well, adopted primarily by the relatively well-off households.

The following sections discuss some of the issues with respect to technical performance that need attention.

- *Repair and maintenance support:* For sustained repair, maintenance and technical support of installed RETs, REDP has promoted 22 small-scale private sector rural energy service centers (RESCs). On an

average, an RESC in a new district covers 4 MHSs, while in the old ones, upto 9 MHSs. It was seen that in most cases, the effectiveness of the RESCs to address problems on MHSs, especially those in the electrical components, is limited. The team learnt that the RESC in Baglung district is very effective, and starting from an RESC, has diversified into assembling of MHS components and installations as well. During the field visits though, it was observed that the communities in Dadeldhura prefer to approach service centres in India, across the border, rather than rely on the local RESC. Similarly in Kavre, the communities tend to approach the manufacturer in Kathmandu directly. The team's limited interaction with RESCs indicates that (a) these are small, village level units, whose primary business is in areas of welding, repair of agricultural implements, and house jobs like grill-making; (b) they do not have the necessary skills or the wherewithal to deal with technical problems of MHSs. At best, they can repair civil works, or provide basic services such as welding; and (c) the demand for services from MHSs alone is simply not sufficient to provide a sustainable market for an RESC.

- *Quality of technical supervision:* REDP district level staff spends a considerable amount of time in the field, mostly visiting the sites when the MHS installation work is going on. As per REDP documents, in Tanahu district, the mobility report for 2062/63 shows the average number of days spent in the field in a month by the EDO, TO, CMC and the CM as 3, 4.5, 5.6 and 25 respectively. The CMs, who are based at the sites for 2 years, have the maximum interaction with the communities. Even though by design, the CMs are not expected to provide technical supervision, it was seen at many sites that the villagers tend to consult with the CM, not just for social mobilization issues, but also on technical matters. Unfortunately, the technical capability of the CMs is simply not sufficient to handle such a technically sensitive project. Most CMs, through experience, develop a basic understanding of MHSs, particularly in the civil aspects; however their knowledge cannot be relied upon to support more complex areas that need engineering knowledge. In fact, the electro mechanical components of a MHS are fairly complex, and many a time, even the TOs and EDOs are unable to support or supervise such activities. As a result, there is a tendency to approach the installer, even for minor faults in the electrical components. More importantly, the installers complete the project without in-depth monitoring and supervision. This is evident from the technical status of some of the newly commissioned plants that the review team visited (see table 14). In Kyandi I of Tanahu the quality of supervision is questionable where canal alignment, spill water disposition and even the water diversion are problematic. Similar situation was observed for water disposition, and distribution conditions in Sela Khola MHS.
- *Human resource profile:* In keeping with the programme focus on micro hydro, REDP's core staff comprises mostly engineers. An analysis of their backgrounds shows that out of the total 55 engineers in the organization, two-thirds (36) have a civil/agriculture engineering background, 20% (11) are from mechanical background and only 14% (8) have a background in electrical engineering. This profile-mix is significant, especially in light of the fact that the area that requires urgent attention is the electrical aspects (see table 15), for which staff is minimal.

Table 15: Profile of REDP programme staff

Level	Background of Manpower		
	Civil / Agricultural	Mechanical	Electrical
Centre	4	1	0
Region	3	0	1
District (EDO)	16	5	3
District (TO)	13	5	4
Total	36	11	8

A desk study on the turnover of EDOs and TOs in 2004- 2005 revealed a high turnover at the district level. Data showed that at district level, only 5-6 EDOs have remained for 2 years and 3 EDOs remained for 3 years continuously. Similarly the average tenure of a TO with REDP seems to be around two years. Many of the EDOs and TOs left for higher studies and generally do not return to REDP. The high turnover results in a lack of continuity in decisions and poor accountability.

5.4 Funds Management

REDP when launched was supported solely by UNDP. In 2002-03, co-financing was obtained from World Bank for specific components. Currently, UNDP supports the PMU Expenses which includes salary and travel of REDP professionals and support staff at the centre, office expenses, various studies, goods and equipment and toilet attached biogas plants. The World Bank support is for the salaries of REDS staff (excluding EDOs) and travel of REDS staff, community mobilization, subsidies for MHSs, capacity building, goods and equipment and environment related activities. A break up of the budget for REDP phase II is given below:

Source	Amount (in Million USD)
UNDP grant (until 2006)	0.8

WB grant (until 2009)	5.5
DDC/VDC contribution	0.7
ADBN/ Bank loan	0.8
Community contribution	1.1
TOTAL	8.9

The grant for technical assistance provided by UNDP is directly channeled through the Project management Unit of REDP. The World Bank fund is channeled through AEPC. The flow of fund is based on approval of Annual Work Plan by PMC. For UNDP fund, the PMU prepares a quarterly plan according to the NEX modality which is approved by the NPD.

The funds disbursement procedure for the World Bank support is as per the government system. Based on budget provisions from the government, AEPC extends grants and other project support funds to the DEF managed by the DDC for financing of approved micro hydro project proposals.

- Budget allocated for energy, end-uses and environmental activities is transferred from DEF to the account of the CEF managed by the Functional Group– upon signing of a MoU between the DDC and the FG. Budget is released only upon receipt of written request from chairperson/manager of FG with a copy of the decisions signed by all members of the FG, verification of completed activities by the supervising technician and assessment of the activities by DDC:REDS. Funds are released from the DEF to the CEF only after the acquisition of land for the power house, right of way for the canal and distribution lines, and collection of collateral for community loans, if any. Investment grants or subsidies are released based on output verification, while other costs such as for social mobilization, training etc are paid on actual basis. Expenditure statements on the use of CEF are submitted through the DDCs to AEPC, which consolidates the accounts and draws from the Special Account for reimbursement of expenditures. AEPC follows the Nepalese government planning and budgeting system. A separate budget head is assigned in the government's budget (Red Book) which allows reporting of expenditure and accounts under this line of funding under a separate budget head.
- For community mobilization related activities, the SO is required to open a separate account for REDP supported activities and Community Mobilization Coordinator (CMC) or one of Community Mobilizers, in case there is no CMC, and EDO are the joint signatories of the account. The budget allocated for Community Mobilization is transferred to the above SO account from DEF upon signing of MoU between the DDC and the SO.
- The budget allocated for Rural Energy Service Center is transferred to the account of the enterprise from DEF upon signing of MoU between the DDC and the enterprise.
- The budget allocated for operation of DDC:REDS, including salary, allowances, operations costs, other costs and miscellaneous costs, is transferred to DDC:REDS account from DEF upon receipt of allocated budget from AEPC. Similarly, budget allocated for human resource development activities is transferred to DDC:REDS account upon receipt from DEF. The budget for HRD activities will be expended by DDC:REDS only upon DDC's endorsement of Terms of Reference (ToR) of individual activity and approval from REDP.
- Both DDC and the VDC have to contribute 5% of the project cost into the CEF. The ADB loan goes to the functional group, which is a body registered at the district level.

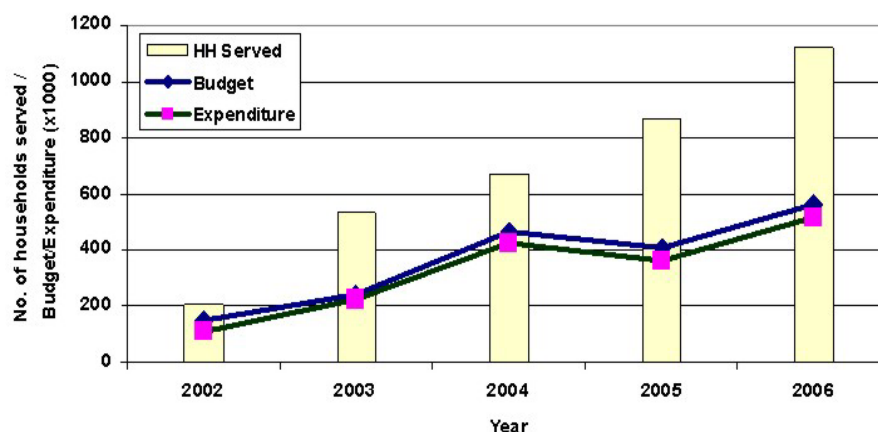


Figure 5: Budget vs expenditure from UNDP grant

A comparison of the annual expenditures with the budget under the UNDP grant over the years is as follows, which shows that the expenditures have been in line with the proposed budgets. A rough assessment of the project expenditures for REDP for 2006 (based on unaudited estimations provided by REDP) indicates that more than 80% of the costs are incurred on the community, which is a very healthy proportion, by any standards. Community costs include subsidy on RETs, costs of training and capacity building. It must however be cautioned that these figures are based on rough approximations, since UNDP and the World Bank use different cost heads, and the figures are not audited yet.

Table 16: Details of direct and indirect costs of REDP, 2006

Cost Head	Expenditure in USD			
	UNDP	World Bank	Total	% of Total
Community cost (including training)	177,468	1,689,493	1,866,961	82.7
Personnel	224,318	17,229	241,547	10.7
M&E (incl travel)	9,009		9,009	0.4
Subcontracts/consultants	34,576	3,962	38,538	1.7
Seminars/ workshop/ publications	8,430		8,430	0.4
Office expenses	58,945	32,215	91,160	4.0
Misc	1,925		1,925	0.1
Total	514,671	1,742,899	2,257,570	100

Budget notes:

For World Bank, community Sub-project Grant includes all fund related to district operations, namely (i) subsidy to micro hydro systems, (ii) environment management, (iii) human resources development, (iv) community mobilization, (v) O&M of REDS, and (vi) other contingencies. Bulk of this fund goes to the subsidy to community for the micro hydro systems installation. Training and Promotional Activities include all activities related to the Human Resources Development (HRD).

For World Bank, office expenses include all expenses related to office support, including vehicles.

For World Bank, incremental operating cost, which is included in the above table as personnel, includes salaries and allowances of the staff employed for the purpose of carrying out the project and operation and maintenance of the project facilities, vehicles and equipment.

For UNDP, M&E includes travel costs.

The funds flow arrangement through the government system is appropriate, and as such, a move towards internalization of the programme. The recently created Rural Energy Fund under AEPC has been highlighted in the rural energy policy and is an appropriate mechanism for channelizing all subsidies on renewable energy technologies, including those provided within REDP. The only issue of concern that emerged in funds disbursement is a delay in transfer of the World Bank funds from AEPC to DDC:REDS, which at times leads to delays in the timely implementation of project activities at local level. In the past, this problem has been solved to an extent by AEPC by using UNDP funds provisionally, authorizing the DDC: REDSs to use other fund available in their accounts with the condition of reimbursement once the fund are made available from AEPC.

5.5 Reporting, Monitoring, and Organizational Learning

REDP has a well laid out monitoring and reporting system in place, for the assessment of progress made. An assessment of the effectiveness of the monitoring systems is as follows:

- Broad-basing project information has been very effective within REDP, not just in terms of disseminating project information, but also as a monitoring strategy. Most communities are well informed about the project components, conditions, and terms of REDP. This helps to place control in the hands of communities, mitigates risks of manipulation by politicians, government officials, contracting agencies, and local elites. Access to complete project information also provides communities a sound basis to voice their concerns and needs, which can be and has been integrated into the project strategy. The various community forums created under the project play a key role in broad-basing information on the project, demystifying technology-related issues and providing an opportunity to the community to clarify issues. Involving the community at the most decentralized level has meant that the project is very close to the primary stakeholders with high involvement of users' in all aspects.
- At the community level, the forums created have been effective in terms of creating a widespread interest in REDP and an understanding of its components. This was seen at all the sites visited by the review team.
- The project reporting and monitoring has been of high quality and UNDP has also been happy with both the quality and timeliness of the reports. The financial reports, the narrative reports, the audited statements, and the annual work plans have reached UNDP on time.

5.6 Human Resource Management

As far as staff recruitment is concerned, the central level staff of the PSU is directly hired by REDP. At the district level, REDP supports the DDC in establishment and operationalization of DDC:REDS through management support. For EDOs and TOs, REDP solicits applications from qualified persons on behalf of

DDC and makes the selection of the personnel on free competition basis. To DDC, REDP recommends appointment of DDC:REDS staff on contract basis. The Administrative Assistant and the Messenger are recruited locally by the DDC directly. Preference is given to women for the post of Administrative Assistant. All DDC:REDS staff are given appointment letters by the DDC. For EDOs and TOs, a roster is maintained, from which personnel can be invited to join the project as and when there is a vacancy in any district. The programme provides the salary and allowances of the DDC:REDS personnel through sub-contract arrangement. The roles and responsibilities of all the professionals are well laid out as per the job description given in the Project Document.

The staff appraisal system for the central level, the EDOs and the TOs are in line with the UNDP system, of annual performance appraisals. The annual increments of the district level staff are at par with those of the government, and are revised every year, based on the recommendation from the PMC. The concept of awards for the 'best staff member' and 'best project' was instituted some time back. These have been given only once so far, and are planned to be revived. Apart from this, there are no performance linked incentives at any level.

REDP builds the capacities of its staff largely through structured training programmes. To the extent possible these are conducted back to back with periodic review meetings, in order to economize on costs¹².

REDP human resource management for the project has been reviewed from the following angles:

- *Work environment and staff morale:* Interactions with staff members convey a high degree of commitment at all levels and a sense of pride and challenge in working in such adverse environments. While most feel that the REDP processes are streamlined and well understood by all, at the same time, they have adequate autonomy in their jobs and room for innovations and trying out new approaches. The staff was found to have excellent rapport with the village communities, and good communication with them. The work environment at the district offices was extremely congenial, with good team-work and coordination among the staff members.
- *Human resource management at the project level:* REDP project staff has a very high proportion of engineers at all levels. The project management justifies this on the grounds that knowledge of micro hydro is a must for the project. The guidance on social aspects of the project is expected to come, at a strategic level, from the advisors at the central level, and the community Mobilizers at the field level. Furthermore, all social processes are well defined in the various guidelines that have been developed by the project, and are followed in letter and in spirit. Nevertheless, the complexity of social issues and their status in the field does warrant strong inputs in this area. Currently, the composition of REDP staff in terms of education background is as follows:

Table 17: Composition of REDP project staff

	Number of team members with educational background			
	Electrical Engineering	Agricultural engineering	Civil Engineering	Mechanical engineering
REDP central office	0	2	2	1
Regional Energy Advisors	1	0	3	1
EDO	3	0	16	4
TO	4	5	8	5

- *High staff turnover:* As discussed in the section on technical performance, high staff turnover is a serious problem within REDP. Some illustrative facts are as follows:
 - Before 2003, 16 TOs left the organization, out of which 7 went for pursuing higher studies, mostly for Masters level degrees.
 - Before 2003, 16 EDAs (Energy Development Officers) left the organization, 13 for higher studies.
 - Between 2004 and 2006, a total 55 TOs were hired, out of which the programme could retain 39, 13 of who were promoted to EDO's positions, either in their own districts, or transferred to other project locations. 16 TOs left REDP during this period.

Since recently, the programme has started maintaining a roster of potential candidates for TOs and EDOs, who are selected on a yearly basis, and offered a position as soon as one falls vacant. While this helps to an extent, there is a serious problem of continuity and resultant lack of individual accountability.

- *Gender balance in the organization:* With respect to professional staff, an issue of concern is the near total absence of women at all levels. This is seen within the project staff at all levels (as discussed in the section on gender mainstreaming) as well as at the district level forums.

¹² A listing of all the training programmes organized by REDP in 2006 is included in Annex 9.

5.7 Dealing with Conflict

One of the main challenges faced by the project, during the last few years, has been insurgency and its implications. The field level operations were affected in many ways, and some of the recurrent challenges faced were as follows:

- Harassments and threats (restriction on movement, interrogation, and forced donation) to the staffs of DDC: REDSs and SOs while traveling to sensitive VDCs
- Difficulty in organizing community level meetings (mass/COs etc.)
- Poor resources mobilization from the line agencies at the district levels
- Decreased pace of physical outputs caused by
 - Mass scale migration of youth in affected districts, which made it difficult to get labour contribution for MHS work, also creating excessive pressure on the old and women.
 - Frequent Bandhs, which affected the logistics of transportation of material/ organizing meetings, resulting at times, in looting of material/stoppage of delivery of construction material.
- Curtailment of ADB/N's visits for loan assessment, which affected/delayed community loans
- Tight surveillance from both the Security Forces and the Maoists

It is encouraging to note that even though the operations had to be slowed down, REDP never pulled out from any of the programme VDCs, even in the years most fraught with these problems.

- REDP organized special training on working in the conflict situations to CMs and CMCs and imparted knowledge, skill and technique for safe tackling with both Maoists and the Security Forces on the restriction of movement, interrogation, donation
- All local staff were advised and cautioned to give top priority to the safety while discharging the assigned roles and responsibilities.
- Keeping local people at the forefront of all operations (ownership/operation management/ decision making) helped. In most communities, the people themselves volunteered to deal and negotiate directly with Maoists for obtaining concurrence in advance for implementation of the programme activities and traveling of the programme staffs and technicians to and from the villages.

It is clear that it was the community involvement and initiative that was instrumental in diffusing the most difficult situations during the conflict years. The attributing factors are the implementation modality based on the participation, inclusion, transparency and consensus decision making that have made all community people fully accountable on all activities being undertaken. The situation has now considerably improved, albeit not completely, and the pace of implementation picked up.

5.8 Costs and Benefits of REDP

A detailed cost benefit analysis (CBA) of REDP is beyond the scope of this review. What are presented in this section are some thoughts on the costs incurred and the benefits accruing at various levels. As such, the cost effectiveness of a project as multi-faceted as REDP can be carried out from several angles. At its most basic, a CBA could be to divide the cost of the project with the households covered, which indicates a total investment of USD 183 per household. What this investment results in, for an 'REDP family' is a conglomeration of benefits, both quantitative and qualitative ones: A 52% rise in annual income from NRS 48,000 in 1996 to NRS 73,000 in 2005 (Winrock International 2006); an improvement in literacy rates, especially among girls; reduction in workloads, and improvement in health status of women; improvement in infrastructure including access to drinking water and toilets, reduction in child mortality; money saved through reduced use of kerosene and batteries. Added to this, there are higher order benefits of improved awareness on development issues, connectivity to the outside world and improved empowerment, among many others, which are impossible to quantify.

The review team looked at this issue from two angles: the cost of providing electricity through MHSs, in comparison with national benchmarks, and the costs and benefits of REDP's capacity building initiatives.

Costs and benefits of capacity building

REDP makes tremendous investments in building capacities at different levels. The following table presents an estimate of the annual capacity building costs that are incurred for each district.

Table 18: Average annual capacity building costs for an REDP district ¹³

S. No	Training	Approx. no of trainees/ year	Training cost /head (NRS)	Total cost (NRS)
1	Micro Hydro Operator	3	29,000	87,000
2	Micro Hydro Manager	3	17,000	51,000
4	CO operation	50	500	25,000
5	Income generation (community level)	80	600	48,000
6	Income generation at district level (advanced)	20	2,500	50,000
7	Nursery Naika (district level)	2	3,000	6,000
8	TO technical training	1	25,000	25,000
9	EDO training	1	25,000	25,000
10	AFA training	1	25,000	25,000
11	CM basic community mobilization training	1	25,000	25,000
12	District energy planning workshop		2,500/district	2,500
13	In-country study tour		50,000/district	50,000
TOTAL				419,500

Hence, with an investment of less than NRS 500,000, REDP manages to build the capacities of communities in income generation and organizational development; raise awareness about the programme at the district level; and train all its programme staff.

In terms of share of capacity building in total project cost, the total budget sanctioned for capacity building is calculated as 3% of the community sub-project cost (all district costs including subsidy for micro hydro, grant for end-uses, environment related activities, community level awareness programmes and DDC:REDS operation, excluding except the salary of the EDO). So far, the actual expenditure (till November 2006) on capacity building has amounted to roughly 5% of the total expenditure of the community sub-project Grant.

As discussed earlier, the direct impact of REDP income generation trainings on income levels of community people has not been very significant. However, this investment is instrumental in not just implementing REDP, with all its benefits, in a district, but also in mobilizing financial and non-financial resources from other programmes. A look at the complete list of resources mobilized by the REDP communities in Kavre district (included in Annex 8) shows clearly that the cost effectiveness of REDP's capacity building, in terms of leveraging other resources, is excellent.

Cost of providing electricity through MHSs

In Nepal, the ceiling set by AEPC for micro hydro scheme costs is NRS 150,000/ kW. Once the plant cost is within this limit, it is eligible for NRS. 70,000 / kW and a transport subsidy, which is linked to the remoteness and distance of the site from the road head. For the country as a whole, the average cost, as calculated by the Micro Hydro functional status report 2005, is around NRS 2,70,000 per kW (Hydro Consult 2005)¹⁴. In comparison to this, the cost of MHSs installed under REDP, as shown in the following table, is on the low side. This has been achieved primarily through community contributions.

Table 19: Cost per kW of sample MHSs under REDP

MHS (capacity)	Number of households covered	Cost per kW (NRS)
Kyandi khola II, Tanahun (12 kW)	140	138,980
Sela Khola, Dadeldhura (12 kW)	105	166,290
Tursu Khola, Dailekh (15 kW)	159	147,003
Oirang Khola, Taplejung, 30 kW	268	145,009
Labdhi Khola II, Baglung (35 kW)	307	169,495
Indrawati Khola, Sindhupalchowk (40 kW)	350	120,477

In reality, it has been observed that the cost prescribed for micro hydro promotion in Nepal, are not usually sufficient, and more often than not, the developers are forced to cut costs in the civil components, and compromise in terms of quality of work.

¹³ The number of trainees per district is based on approximation. The actual number would typically depend on the staff turnover in a particular district, and number of new sites.

¹⁴ There are huge variations in plant cost, depending on the distance from the road head. The study showed that the average cost/ kW ranges from NRS 2,70,000 (at less than 30 km from road head) to 5,10,000 (at more than 75 kms from the road head).

6. Sustainability of Effort

‘Sustainability’ within the context of REDP can be defined at several levels.

- At *community* level, the programme is faced with the question whether the community based institutions created will sustain themselves or not, after the project is completed. Another pertinent issue in sustainability relates to technological sustainability, whether the technologies set up, especially the micro hydro schemes can be expected to continue functioning, with the revenues that they are generating, and by the local manpower. This issue is particularly relevant as the programme scales up, and starts to withdraw from older programme areas.
- At the *district* level, a pertinent issue is how well are the project governance system integrated with the government machinery and what can be realistically expected with respect to internalization of REDP at the district level within the DDC, which is really the hub of all activity.
- At the *programme* level, there is the larger issue of financial sustainability/ self sufficiency, i.e. whether now, or at foreseeable time in the future, REDP can be expected to continue as a government programme, without donor support. A related question is what is the extent of ownership of the government towards the programme.

The review examined the sustainability issue within REDPO from the above angles, in an attempt to arrive at the answers to the following questions, pertinent at this stage of the programme, when it completes the second phase:

- What is the level of external inputs required to sustain the community managed REDP project?
- What strategies can be adopted within the project to increase the level of internalization within the government machinery?
- How can the programme be made more financially sustainable?

6.1 Sustainability at the Community Level

The duration of active support to any site within REDP is two years, during which the installation and commissioning of the MHS takes place, the COs, and FGs are formed, their capacities built and Community Mobilizer is stationed at the site. This is what REDP calls the implementation phase, after which the staff visits the site as and when required, and it is expected that the site has been *internalized*.

A frequently raised concern is how to ensure the sustainability of the technology systems as well as the community processes during the internalized phase. There has been considerable thinking on this, and the following strategies are adopted:

- For financial sustainability of the MHS, they are linked with end use applications, which are expected to be a regular source of income, and generate enough funds to meet any servicing, repair and maintenance needs that may come up in the future.
- Communities are provided capacity building inputs in income generation activities, so as to ensure that they are in a position to continue paying the electricity tariff.
- For each MHS, management systems for the smooth operation and maintenance are set up: the operator and the manager are trained in technical as well as managerial aspects.
- Since some years, REDP has been piloting the strategy of federating all community organizations into registered cooperatives. The primary challenge in this has been how to internalize all the community organizations within one common framework, without having to split them. The cooperative model was first piloted in 2002, after which seven cooperatives were registered in Kavre, followed by 2 in Sindhupal Chowk and 1 in Myadi. As of now, 11 such cooperatives have been registered with the district authorities. The pros and cons of this model however are yet to be analyzed objectively.
- There has been some discussion on the possibility of linking the MHSs with the national grid so that excess power can be sold, which can be a source of additional revenue.
- REDP has piloted the concept of ACM in some selected VDCs of first five districts where the remunerations of ACMs were borne either by MHFGs or VDCs. The process however got disturbed and/or abandoned in most cases, because of the insurgency problems.

Observations on sustainability of REDP at the community level are as follows:

- The MHFG, responsible for the operation of the MHS, is a forum that continues to function effectively. For most FGs that were visited, the review team found regular meetings, updated books of accounts, complete knowledge on the finances, and clarity in roles and responsibilities of the office bearers. The level of ownership for the micro hydro plant is extremely high among the community members, and there seems to be a determination that the MHS should continue working, at any cost.

- The MHSs rank high on technical sustainability. The technologies promoted under REDP are well in line with the needs of the communities, are based on local resources, and the users are able to tackle most of the day to day problems that crop up. The tariffs set are affordable in most cases, and cost sharing mechanism are instituted by community consensus. In most cases, in case there are any technical snags, the communities approach the manufacturers themselves. The only issue that is likely to come up in the future is the cost of major repairs. The tariffs collected are adequate to meet the operational costs of salaries of the operator and the manager, but very few MHSs have generated enough funds from the tariffs (usually in the range of NRS 1-1.50/watt per month) to be able to undertake any major repairs that may be required in the future.
- The community processes are at their peak when the MHS construction and installation work is ongoing. The commissioning of the MHS is concomitant with the CM moving out of the village, and once that happens, there is a tendency for the community processes to lose some of their momentum. At the CO level, the regularity of meetings drops over time, the savings stagnate, and the number of members who attend meetings regularly dwindles. The review team witnessed this trend in almost all the sites visited, especially in the ones that were more than 2-3 years old, and where the visits of the CM had ceased. It must be mentioned here that the general health of men's COs seems to be better than that of the women COs. Reactions to why this was happening drew diverse responses such as: *.....there isn't much to discuss any more every week, so what is the point in meeting regularly.....the CO president is aware of what is happening with the community and that is enough.....once the technologies are in place, there isn't anything left to discuss, etc.*
- It was envisaged that the COs would play a pivotal role in all developmental activity within the REDP villages. This has happened, but to a limited extent. Again, as long as the CM continues to provide handholding support to the COs and FGs, resources are mobilized from other government departments, and admirable initiative demonstrated in terms of undertaking other developmental works, such as cleaning of ponds, clearing of pathways and walking trails etc. Once the CM moves out, and these activities are left to the initiative of the individual COs, their effectiveness varies widely, and is dependent on the local leaders and their interest and initiative.

To summarize, the conclusion on sustainability of REDP at the community level is that a functional MHS is the critical minimum requirement for any level of sustainability, as in the minds of the people; it is the focal point of all REDP activity. Even though this has not happened so far at any of the sites, it is unlikely that any processes would continue, if the MHS stops functioning. The sustainability of the community organizations however is an issue that requires attention.

6.2 Sustainability at the District Level: the Issue of Internalization

Right from the beginning, it was envisaged that as the project progresses, REDP would be internalized within the government systems, with the DDC taking over the responsibility for many of the project functions over time.

In line with this, there were three major expectations at the district level:

- The programme document for REDP phase II identified the following internalization commitments from the DDC, which the DDCs are expected to make in writing, at the time of district selection:
 - Incorporation of energy as a distinct sector in the district development plan and programmes
 - Establishment of rural energy development section as a sectoral office under the umbrella of the DDC
 - Formation of a district energy fund from its own resources to provide financial assistance to community owned MH schemes
 - Establishment and operation of District Energy Committee under the chairmanship of the DDC chairman with representatives from related line agencies in the district. The committee will act as the fifth sectoral committee in participatory planning process
 - Provision of office premises, physically separate from the DDC premises with at least 4 rooms to DDC:REDS at DDC cost.
 - Provision for paying 25%, 50%, 75% and 100% of the basic salary of the Energy Development Officer during the second, third, fourth and fifth year onwards from the DDC's annual budget. The post of EDO will be internalized in DDC and will be endorsed by the District Council.
 - Assurance of abstention from politically influencing decisions on selection of programme VDCs, Support Organization, DDC:REDS Support Staff etc.
- It was envisioned that the DDC: REDS would eventually be the focal point for all energy activity at the district level.
- The DDC would play a monitoring role for both ongoing and completed REDP projects in the field, on their own initiative.

Since the inception of REDP, considerable progress has been made in this respect:

- The awareness regarding REDP is extremely high. This was visible at all the meetings of the review team with the DDC staff, where everyone had good things to say about REDP, and made valuable suggestions on how it can be further improved. The DDC staff has good information about the project components and the REDS staff enjoys a good rapport with the rest of the DDC staff. It should however be noted that REDP is known more as a rural energy, and specifically micro hydro project, and less as a holistic village and community development one.
- The districts (and the VDCs) contribute 5% of the total investment cost of the MHSs, the DDC also makes a contribution in terms of rent of the DDC:REDS building.
- There has been a partial internalization of the recruitment process within the DDC. During phase I of the project, both the TO and the DEA (District Energy advisor, a position that was removed in phase II) were appointed from UNDP. This was followed by a system wherein the TO was appointed from the DDC, while the DEA by the UNDP. In the present system in phase II, the appointment of both the TO and the EDO are done by the project, but the appointment letters are issued by the DDCs. The appointment of the messenger and the AFA are done by the DDC.
- Energy has been incorporated as a distinct sector in the district development plan and programmes, and most REDSs, going beyond REDP implementation, have completed a decentralized energy plan for the whole district.

In the given situation of political fragility and frequent turnover of district staff, this is a creditable achievement. In principle, there is high ownership towards the programme at the district level, but this has not translated into concrete action and monetary stake from the DDCs. Clearly, in the present scenario, the expectation that REDP can be fully internalized within the DDCs in the short run is highly unrealistic. The reasons for this are as follows:

- The DDC:REDS operates like a REDP unit, known more as a UNDP supported project, rather than one of the many DDC sections. The reasons for this are obvious: the staff is recruited by and are accountable to the PSU, and not to DDC; they draw their salaries from the project and very importantly, the REDS office is located in a separate building, with noticeably better infrastructure than the DDC.
- Because of the political instability, there has been an absence of political leadership at most districts, which is a primary cause of unwillingness to take any new responsibilities on the part of the existing staff of DDC. For REDP, this has meant that while the DDCs have been happy for the programme to continue in their districts, very few leaders have been willing to take on any additional REDP functions.
- The DDCs suffer from a severe resource crunch which makes it somewhat difficult for them to make any monetary contribution towards project. At the DDC level, the LDO, the planning officer and the accountant are appointed by the central government, while others are recruited locally, for whose salaries, they receive grant from the centre. The DDC has no resources of its own except for some minimal funds from land taxes, contracts etc. The infrastructure available with DDC is extremely basic.
- There is also the question of capacity of the DDC itself which is extremely restricted, and clearly inadequate to envision and implement a complex programme like REDP, with its many layers.

The overall assessment is that while the efforts of REDP and the districts must be commended in achieving a certain degree of internalization, an expectation that the district government machinery would be able to internalize any of the critical functions of REDP in the near future, especially at the existing level of project inputs, is quite unrealistic.

6.3 Programme Level Sustainability

The last few years have witnessed a number of developments, within REDP, and outside of the programme, that contribute positively towards its sustainability.

The programme enjoys considerable ownership from all stakeholders, amply demonstrated by the following:

- It is a joint partnership project of the GoN, UNDP and the WB, and is executed by the AEPC under the Ministry of Environment, Science and Technology.
- Strong government ownership of REDP is evidenced by the gradual and steady expansion of extension to 10 districts from initial 5 districts in 1998, 15 districts in 2000 and 25 districts in 2004.
- The AEPC is planning to expand the REDP to 40 districts from FY 2007/08 and eventually to all 75 districts to achieve the government targets on MHSs.
- Approval of the Rural Energy Policy, taking into considerations the experiences and lessons learnt from REDP implementation. This has also been approved by 25 DDC councils.
- Development of CDM by AEPC for the MHS taking into consideration of increased implementation of MHSs under the REDP in the longer term at least 15 years.

- The DDC: REDS is the first and only section that is operational under DDC in line with the Local Self Governance Act 1999.
- The tenth plan and the rural energy policy provide a definite framework for rural energy activities in the country, and demonstrate government commitment to the sector.
- Co-financing from the World Bank for phase II of REDP has been a positive development. Discussions with WB point towards a continued commitment over the years to come.
- Since last year, REDP has been working towards developing a MHS-based CDM Project for AEPC/GoN. Activities completed so far include preparation of the Project Idea Note (PIN), the Carbon Finance Document (CFD), the Project Design Document (PDD) and signing of a Letter of Interest (LOI) by AEPC/GoN. Once formalized, this mechanism will allow the AEPC/GoN in earning revenue from the trading of Certified Emission Reduction (CERs) on annual basis. It is planned that CERs will be sold to the Community Development Carbon Fund (CDCF), and the project is being proposed as small scale project below 15 MW with bundling of around 750 individual micro-hydro projects of REDP (6.5 MW) and Energy Sector Assistance Programme (ESAP, 8.5 MW), both under the umbrella of AEPC.

While all of the above are extremely positive developments, the final inferences on the sustainability issue are rather mixed. It is evident that the programme enjoys excellent support from all quarters, especially the government, both at the centre and in the districts and a number of REDP elements are already integrated into other programmes and policies. At the same time however, it is clear that the financial commitment from the government is not likely to increase significantly in the near future, certainly not to an extent that will enable the donors to step out of the programme completely. Suggestions on future direction in this area are presented in the chapter on recommendations.

7. Conclusions, Recommendations and Lessons Learned

This review has attempted to provide an overview of REDP, in terms of the overall strategy, activities undertaken, resources utilized, effectiveness of the strategies and their impacts so far. It has also assessed the relevance of the programme, in the broader context of national policies and priorities, and in view of its sustainability. The main conclusions of the review, the ensuing recommendations and the lessons learned are summarized in the following paragraphs.

7.1 Conclusions

The Rural Energy development Programme has been implemented in 25 districts of Nepal in remote, rural locations, over the last ten years. The intended objectives were well achieved by the project. Some of the key aspects worth highlighting are as follows:

7.1.1 Implementation, relevance and impacts

- The targets REDP set for itself during phase II were met satisfactorily. As planned, the programme was expanded to 25 districts, covering 150 VDCs, with programme infrastructure set up in all of these. 185 micro hydro plants (2.47 MW capacity), 2119 solar home systems, 4022 biogas plants and 9795 improved cookstoves are providing energy services to more than 23,000 households. The achievement in terms of MHS installation has been on the low side, totaling to an installed capacity of 2.47 MW, almost 20% short of the planned 3 MW. This was primarily because of the insurgency problem. Works are underway on more than 100 schemes, and it is expected that the target will be achieved within June 2007.
- The programme has a high relevance in the current Nepalese context, particularly in the remote, mountainous locations, which are unlikely to be covered by the national grid in the foreseeable future. The interventions designed are well in line with the aspirations and needs of the target communities, which are addressed at three levels: meeting basic energy needs of lighting; immediate livelihood improvements through end use promotion and income generation activities; and higher order impacts of sustainable development and inclusive social transformation.
- REDP, through modern energy services, provides benefits to the communities, in a wide range of areas, spanning all MDGs, especially to women and children. In comparison, the impact of enterprise development and income generation activities within REDP is relatively less significant. While the skill training courses lead to marginal improvements in family welfare, their overall contribution to raising the family incomes has not been significant.
- In collaboration with the government, REDP led a consultative process of development of a comprehensive rural energy policy for the country, which was promulgated in November 2006. The policy draws extensively from the decade-long experience of REDP and provides a comprehensive framework for future activities in the sector.

7.1.2 Project processes

- Strategically selecting its partners, REDP has established the project processes within the national governance systems, both at the centre as well at the district levels. At the district level, REDP is anchored within the DDC, which has a key role to play in the implementation process. Local NGOs (SOs) play a critical role in community mobilization, and there is a need to intensify capacity building needs at this level.
- The project processes and planning systems have evolved over time, are streamlined, and suited to the local contexts.

7.1.3 Sustainability and internalization issues

- The micro hydro plants set up in villages rank high on sustainability. The level of ownership for the micro hydro plant is extremely high among the community members, and the users are able to tackle most of the day to day problems. The tariffs are affordable in most cases, and cost sharing mechanisms are instituted by community consensus. However, the momentum of the community processes drops once the regular interaction of the Community Mobilizers with the community reduces. Sustainability of the COs in 'internalized' sites is a problem area.
- Even though the communities are forthcoming in adopting socially inclusive measures to ensure that the disadvantaged do not get left out of the benefits accruing from the project, raising cash contribution from the community is a serious problem. This is especially so at sites, where the entire communities are poor, and cannot afford to cross-subsidize the poorest.
- It was envisaged that as the project progresses, the DDCs would take over the responsibility for many of the project functions. While commendable progress has been made on this front, this has not translated into concrete action and monetary stake from the DDCs. In the present scenario and for valid reasons, it cannot be expected that REDP will be fully internalized within the DDCs in the short run.
- At the programme level, REDP is well synchronized within the government priorities and policies, and well in line with the three priority areas of energy, poverty and decentralized governance.

Table 20: REDP's strengths and weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none">• Highly relevant in the Nepalese context• Significant benefits for the project communities• Positive image and high expectations from all stakeholders• Very high ownership of the MHSs within the communities• Streamlined and appropriate project processes• Effective resource mobilization• Effective information dissemination at national and international levels• Created a pool of <i>sustainable development professionals</i> within the country	<ul style="list-style-type: none">• Community contribution is a problem in villages where the entire community is poor• Sustainability of social processes in <i>internalized</i> sites• Motivation level and project support to SOs• Lacklustre impact of enterprise development and income generating activities• Limited vision building and internalization at the district level• Lack of focus in gender strategy

7.2 Recommendations

At this juncture when REDP has completed 10 years of its existence, a number of issues regarding its sustainability and future are pertinent. These include, whether or not REDP should continue as a donor supported programme; can REDP be transferred to the national government and within what time frame; what is the level of preparedness within the government system to run a programme of this nature, and what institutional mechanisms would be appropriate for a smooth transition from a donor driven to a nationally owned programme.

The review indicates that REDP's single most important success is that it has demonstrated a community managed model of rural energy service delivery. Poor, rural communities have come together; planned; raised resources (partially); learned to operate and manage energy systems; and set in place management systems for its sustainability. In doing so, they have undergone an empowerment process, and experienced huge quality of life benefits at individual and community levels. At each site, the programme goes through a two year project cycle, during which technology systems are established and community processes are set in motion, after which the project withdraws, and moves on to other areas.

Ten years of experience have gone into developing the basic elements of this model. However, as is evident from the discussion in the preceding chapters, there are a large number of secondary and tertiary level issues that the project is still grappling with. These include, *inter alia*:

- how to increase the stake of the government functionaries in REDP, especially at the district level, which is the focus of implementation;
- how to increase the effectiveness of income generation and enterprise development activities within limited resources and inherent local constraints of poverty, lack of capital and access to markets;
- how to ensure that the momentum of the community organizations is maintained after the project;
- how to ensure that women and other disadvantaged communities move up the empowerment ladder, and graduate from being project participants to change agents;
- how to bring about and sustain a spiraling process of holistic development in programme communities;
- how to upscale the effort to include the large numbers of un-served populations, both within the existing programme districts and outside; and
- How to operationalize the rural energy policy.

At this stage, when the Nepalese economy is in a reconstruction mode, and the rural energy policy has been promulgated, the expectations from REDP are high. The Nepalese government has expressed a keen interest to up-scale REDP into 40 districts from 2007. AEPC, based on the 10th Plan target of rural electrification, has completed a survey in 36 districts with an aim of expanding to 40 districts with a target of adding at least 1.5 MW by the year 2009. According to REDP, minimum additional investment for such expansion is estimated at USD 5.5 million (excluding technical assistance), which includes an expected WB grant assistance of approximately USD 4 million.

In its next phase, it is suggested that the programme undergo significant modifications to address the above considerations. This requires a reorientation in focus at two levels:

- within the programme staff, which would have to sharpen field level strategies to increase effectiveness in its operations; and work along with the DDCs, build their capacities, and hand over critical project functions with the final goal of internalization;
- at the level of UNDP, which would have to play a proactive role in operationalizing the rural energy policy and assist REDP to develop systems required to address the secondary and tertiary issues, essentially focusing on quality and sustainability aspects of the programme.

7.2.1 Emerging directions for UNDP

UNDP has been supporting this programme for the last ten years in Nepal. A point of discussion that came up in most stakeholder meetings was whether it is time for UNDP to move out, and for the government to take over. Most discussants were of the opinion that in spite of UNDP's long standing engagement with the programme, its involvement should continue, a view that the review team largely concurs with, for the following compelling reasons:

- REDP has been successful in developing the basic model of community managed rural energy systems, but this needs to be fine-tuned significantly, for which UNDP's support would be vital.
- The government system, especially at the district level, is simply not in a position to take over the programme, neither in terms of institutional capacity, nor in terms of financial resources required to implement the programme.
- The Nepalese economy is in a reconstruction mode, and there are high expectations from this programme.
- The promulgation of the rural energy policy is only the first step, and UNDP can play a critical role in the operationalization of this on the ground.

While there is merit in the logic that UNDP should not continue doing more of the same, the review team is of the opinion that it should provide technical assistance for expansion in new districts, with co-financing from the World Bank, for which REDP has already submitted a proposal to the World Bank. As a pre-condition for this, UNDP must initiate a dialogue with the government to increasing its financial contribution. While a definite figure for this contribution can only be arrived at through discussions, it is imperative that this be done sooner rather than later, if the vision of internalizing the programme is to be achieved in the foreseeable future. Currently, the only contributions the government is making include those from the VDCs and the DDCs, which are less than 1% of the total budget, the indirect costs of some of the AEPC personnel who are working on REDP, and the loans provided to the communities by ADB/N.

In line with the above, there are five broad areas of priorities, which would be worthwhile for UNDP's involvement in the immediate future:

- Provide technical assistance in programme expansion in new districts, with an increased financial commitment from the government
- Assist the Nepal government and other stakeholders in implementing the Rural Energy Policy, including:

- Preparation of acts, regulations and guidelines
- Awareness creation and dissemination at all levels
- Assist REDP in consolidation and fine-tuning of the programme
 - Define programme goals sharply, especially elements related to gender, social inclusion, enterprise development, livelihood enhancement, holistic development and institutional capacity building.
 - Develop monitoring systems to reflect the above, in terms of outputs, outcomes and indicators.
- Step up capacity building in the following areas, focused specifically towards internalization of REDP in the national context:
 - AEPC, in decentralized project management in pilot districts.
 - DDCs, in technical monitoring functions/ building linkages.
 - SOs: Vision building/focused enterprise development.
- Develop partnerships with multilateral and bilateral agencies for sharing, resources mobilization and synergetic results, with common understanding on field level modalities, especially in the area of community mobilization.
- Support documentation, backed with analytical research and studies on specific themes, which would be useful in the developing country and international context. Some of these could be:
 - A step by step planning protocol on community based energy systems.
 - Thematic case studies and analytical issue papers
 - A toolkit based on REDP's " good practice " and "lesson learned"

7.2.2 REDP Programme level recommendations

For REDP, the focus of future activities should be in two broad directions:

- Working towards internalization of the project, and developing a time bound exit strategy.
- Fine-tuning the REDP model.

Specific recommendations are as follows:

Strategy 1: Work towards further internalization of REDP within the DDC system

It is amply clear that a complete internalization of REDP at the district level, at the existing scale of capacity building inputs, is unrealistic. The DDCs can be expected to implement a programme as complex and multi-faceted as REDP, without jeopardizing its quality, only and after their capacities are strengthened in a number of areas:

- Technical capabilities to monitor and provide back up support during and after project completion
- The REDS:DDC should take the onus of assisting the DDCs to raise resources from other sources including other donors and development programmes operating in the district.
- REDS:DDC must coordinate/ tie up with other line departments within the DDC for integration with other development activities of DDC. Even though this is taking place to some extent, the efforts in this direction need to be stepped up considerably.

Strategy 2: Intensify support to SOs/ field level functionaries

The CMs, supported by the SOs, are the most visible face of REDP to the community, and the sustainability of the project in the field depends, to a large extent, to their performance. There is an urgent need to strengthen their capacities in the following areas:

- Provide additional capacity building support for CMs, specifically in the areas of enterprise development, basic technical aspects of MHSSs, and most importantly, vision building and exposure to new ideas.
- Improve the motivation level of CMs, through providing individual growth opportunities within the project. These could include grants for higher studies, exposure trips, awards for good performance, opportunities for and support in writing publications and participation in national and international conferences and seminars.
- Strengthen SOs in areas of organizational development, periodic infrastructure development support, vision building and exposure trips for SO heads.

Strategy 3: Increase sustainability of community processes

- Revive the concept of Assistant Community Mobilizer (ACM) in sample districts. For internalized sites, the ACM could make monthly visits to the community, ensuring that the COs interact on a regular basis, resolve any issues and conflicts that come up, provide the community information on district level programmes and opportunities. It is suggested that DDC staff be trained as ACMs.

- Within internalized sites, there does not really seem to be a need for the COs to meet on a weekly basis. It is suggested that the expected frequency of these meetings be reduced to once a month in the REDP planning system.
- Undertake a review of the cooperative model that was initiated in a few districts.

Strategy 4: Fine-tune technical aspects of the programme

- Increase attention on electrical aspects of MHS operations.
- Ensure balance in staff in terms of skill in civil, electrical and mechanical engineering.
- Ensure technical backstopping service to the MHSs in the design and planning process, and post installation. This role could be played by the DDC technical unit, with appropriate capacity building¹⁵.
- TRC to provide on-site technical supervision through periodic field visits
- Hire a full-time, Technical Advisor at the central level to provide overall technical guidance and back-stopping.
- Implement/ replicate the large number of R&D prototypes developed under the project.

Strategy 5: Sharpen gender and social inclusion strategies

- Revisit gender and social inclusion goals of REDP, and define them realistically and within the context of existing realities.
- Align capacity building inputs to be in line with the defined goals.
- Ensure a critical minimum mass of women within the programme staff, both at the field level as well as at the programme management level. At the minimum, a periodic (perhaps quarterly) engagement with an external resource person with gender and energy experience would be useful.
- A gender review of management and procedural manuals, to ensure that women's and men's different perceptions and priorities are reflected.
- Support women's family and parenting responsibilities in HR procedures, especially for women working at the field level.
- Enhance the usefulness of the VCD reports, by focusing them sharply on recommendations, in line with the specifics of the particular community.
- Provide additional incentives (investment/ marketing/quality control) and sustained support to deserving VCs for enterprise development.

Strategy 6: Reorient enterprise development training to be needs-, local resource-, skill- and opportunity- based

- Do not continue with generalized income generation training programmes at REDP sites. Instead, the Community Mobilizers can be trained to provide basic information to the communities, and assist them in approaching other district level programmes for capacity building.
- For each district, develop an Enterprise Development Plan, formally identifying the opportunities, constraints (product quality, levels and timeliness of production, business linkages), develop programs to address these issues, identify market partners, and develop the necessary institutional arrangements to facilitate and maintain strategic marketing linkages.
- Identify potential entrepreneurs from the communities through a rigorous screening process, possibly through an application system.
- Provide intensive and continued hand holding support to these in terms of credit, product pricing, product selection and positioning, marketing, etc. Assist them further to build linkages with viable market chains, and exposure to higher end marketing issues like pricing, positioning, quality, branding, packaging, promotion and distribution management.

7.3 Lessons Learnt

- Energy service provision is more than making technologies available. Expanding access to modern energy services, especially at the community level, is about processes, and how these processes help

¹⁵ This is especially important in the first one or two years of operation, the projects are very vulnerable. This is when the operators are least experienced and are liable to make mistakes, equipment failures either happen early in their operational life or towards the end of their design life; design errors that have not shown up at commissioning will often surface within the first few years; it is during this time that the project is most financially vulnerable – large debt and little financial reserves to make repairs; during this period it is difficult for a project to obtain further loans to pay for additional works or repairs since the initial loan is still outstanding (Hydro Consult 2005).

strengthen institutional capacities at all levels: local, intermediate and national level to manage projects and technologies, replicate and mainstream efforts at a scale that makes a difference.

- Rural energy is an integral part of rural development, and must be viewed as such. In the perspective of poor communities, even though energy needs may be important, they are almost always superceded by other impending livelihood needs such as food/ water and shelter. In such situations, the provision of energy services can be entry point for other interventions to address rural energy problems.
- Energy services must enhance productivity of economic activities if they are to be sustainable. The facilitation of new productive activities is what creates sustainable livelihoods for poor people and makes the energy projects financially viable. Indirectly, it also increases the access to energy services by increasing income levels and affordability to purchase modern energy services. Productive services include a wide range of activities such agro-processing, transport provision, battery charging, and small-scale manufacturing.
- Women's empowerment is a complex process. Creating and sustaining women based community institutions is an effective instrument for promoting women's empowerment. These have to be supported with gender sensitive project processes, intensive capacity building and hand holding inputs, sustained over a period of time. In energy projects, participatory processes can ensure that women's needs are addressed; a basis for sustainability of the initiative.
- Local ownership is a key factor for success of decentralized rural renewable energy projects. Community mobilization is key to harnessing people's potential to help themselves.
- Capacity building in installing, operating and managing RETs is an important step toward local ownership. Further, financial contribution from communities as equity (In REDP, this is around 20% of the total investment cost) is essential to ensure a strong ownership, individually as well as collectively. This is especially true for community based projects.
- Community involvement can be an effective strategy in conflict situation. During the last few years, project operations were affected by insurgency in many ways. However the programme managed not to pull out from any of the programme VDCs and this was possible primarily because of the community involvement and initiative. The attributing project inputs are the implementation modality based on the participation, inclusion, transparency and consensus decision making that have made all community people fully accountable on all activities being undertaken.

Annexure 1. Terms of Reference

REVIEW OF RURAL ENERGY DEVELOPMENT PROGRAMME

Context of Evaluation:

The Rural Energy Development Programme (REDP) is operational as a joint programme of Government of Nepal (GoN), United Nations Development Programme (UNDP) and the World Bank in 25 districts, namely Baitadi, Dadeldhura, Darchula, Doti, Bajhang, Humla, Mugu, Achham, Bajura, Dailekh, Pyuthan, Baglung, Myagdi, Parbat, Tanahun, Kavrepalanchok, Sindhupalchowk, Dolakha, Okhaldhunga, Tehrathum, Dhading, Solukhumbu, Sankhuwasava, Panchthar and Taplejung.

Initiated on 16 August 1996 as a pilot initiative of the GoN and UNDP in five districts, the REDP has been extended and expanded in three phases to cover more than 250 Village Development Committees (VDCs) in 25 districts. The Alternative Energy Promotion Centre (AEPC) under Ministry of Environment Science and Technology (MoST) is the implementing agency of the project. The target beneficiaries of the programme are foremost the rural communities.

The programme has undertaken a community mobilization approach for empowerment of local people and their institutions to be able to plan and manage rural energy systems at local levels for social, economic and environmental benefits. The experience from local level initiatives and the district level institutional strengthening has provided important feedback for the formulation of comprehensive rural energy policy at the national level. The programme implements the energy systems in remote rural areas which will remain devoid of grid electricity for at least next five years. The GoN has planned to expand the on-going partnerships with UNDP and the World Bank in this area to cover a total of 40 districts in FY 2006/07 for ensuring productive electricity services to be made available to rural households.

The three pronged strategy of the Programme is based on integrated rural development approach which underlines improvement in quality of life for women and children, promotion of end-uses, including non-farm activities and restoration of the natural environment. Sustainable operation of rural energy systems, specifically community managed micro hydro plants, have brought positive impacts on the fragile hill environment and provided tremendous opportunities for enhancement of the rural livelihoods. Community mobilization has been the key for harnessing people's potentials, mainstreaming women and marginalized/vulnerable groups and ensuring equity. Strong support and community ownership of the programme provided safeguard against conflict impacts in different districts. A recent study (REDP-MDG 2006) concludes that the programme interventions have contributed to MDGs with significant uplift in the social, economical and environmental baselines.

The REDP has been recorded, recognized and awarded as a "best practice" programme both in the national and international arenas.

Background to the project:

The 9th Plan of GoN had the overarching goal of poverty alleviation. The Plan had intended to promote renewable energy to reduce consumption of fossil fuels and firewood as well as to provide better forms of energy to the rural population for poverty alleviation. Agricultural Perspective Plan of GoN recognizes the need of rural energy to enhance agriculture production and processing agro-produce. The 10th Plan (Poverty Reduction Strategy Paper – PRSP) highlights the linkage between low energy use and prevalence of poverty and emphasizes on promotion of decentralized, renewable energy systems for holistic development in the rural areas.

In the beginning 'energy' was considered only as a supply commodity without being linked to social, economic and environmental aspects. This was linked to lack of institutional mechanism at the central and local levels to take up energy in its multifaceted form and as a cross-sectoral issue. Further to this the difficult topography coupled with scattered settlement has been a major constraint to cost effective development and provision of energy services in Nepal.

Community mobilization is the integral part of the programme implementation modality at the community level. The community mobilization is itself based on six basic principles which include: organization development, capital formation, skill enhancement, technology promotion, environment management and empowerment of vulnerable communities.

Apart from the communities, who are the targeted beneficiaries, other key stakeholders are the government organizations, local elected bodies - District Development Committee (DDC) and VDC, Local NGOs, private sector, research and training institutions and civic societies (associations, networks and federations).

The Programme has been successful in addressing the following issues related to the promotion of rural energy systems in Nepal:

- Inconsistencies in policies for support and implementation of micro-hydro and other decentralized rural energy technologies;
- Lack of coherent institutional arrangements at all levels– community, district and centre;
- Weak coordination among key stakeholders – government, local bodies, civic societies, private sector, academic institutes, financing institutions and donors;
- Lack of proper awareness on rural energy potentials and technological options;
- Inadequate technical and managerial skills and knowledge on the installation, operation and maintenance of rural energy systems among rural populace; and
- Poor documentation and dissemination of available supports and lesson learned.

Need for Review:

UNDP has continuously provided support to the Government of Nepal since 1996 for the promotion of decentralized community managed rural energy systems in remote parts of Nepal, where the grid extension is not foreseen at least for the coming 5 years. This involved, in addition to promotion of rural energy technologies (RETs), a significant capacity building at different levels and identifying policy needs for further extension of rural energy services. UNDP's assistance was vital to formulate the Rural Energy Policy of Nepal (2006) which is the first of its kind in the whole South Asia Region.

Apart from various studies already done relating to programme performance and impacts such as programme evaluations of 1998 and 2000; and impact study of 2000, the programme has also supported many research works conducted by universities and academic institutions. All these have consistently highlighted upon the success of the programme in installation and implementation of community managed micro-hydro systems. A separate study on the contributions made by the programme to achieve MDGs has also recently completed. This study has further noted significant impacts of both energy and non-energy components of the programme in achieving MDGs.

Current phase of the programme is ending in December 2006. UNDP as well as the GoN has agreed to extend partnership to further enhance renewable energy access to the remaining rural parts of Nepal. UNDP is more interested in learning lessons from implementation of previous interventions made in this area since 1998 and doing a fresh situation analysis. Despite having clear evidence of the programme's success in promoting access to energy services to the rural areas of Nepal and general appreciation of the community based rural energy model adopted by the programme, on the front of building up national capacity to sustain the rural energy systems and their further replications and to institutionalize decentralized energy planning, resource mobilization and partnership building with the private sector; as well as implementation and monitoring of rural energy functioning, the extent to which programme has made contributions, remains yet unascertained. On broader terms, institutional and financial sustainability of the rural energy systems promoted by the programme has been questioned.

Furthermore, a clear linkage of the programme deliverables to community development and alleviation of poverty, which are the main mandates of UNDP support, has not yet been clearly known. Particularly, which programme components have been able to capture the aspirations of the poor and the marginalized communities and how; are still to be identified. Similarly, to what extent the target beneficiaries have been able to take benefits of the improved access to energy services in terms of income generation, employment and other ancillary benefits; whether the programme contributed to social and economic empowerment of the women, the vulnerable groups and the marginalized communities; are not quite obvious.

The programme has performed successfully in all areas even during the time when the whole country was suffering from violent conflict. Despite the formidable conflict situation and impacts on meeting programme delivery deadlines and monitoring, in general, it was well appreciated in all areas by the conflicting parties, and therefore did not suffer any physical attack or loss. UNDP is keen to know the reasons for programme success in extremely difficult situation and approaches undertaken by the programme to lead towards this direction.

At the same time, the programme has not been able to adopt an appropriate hand over and phasing out strategy at the district and community level, which has fostered constant dependency upon external funding to maintain the system and install new ones. It is imperative to know whether the systems already installed under project support are sufficient enough to fulfill the households' energy demands; and what possibilities remain for increasing the system effectiveness and production. Though the project has promoted a mix of energy solutions under decentralized model, however, the technological dominance of micro-hydro has prevailed over others in terms of wattage and coverage; and individual contributions of others like bio-gas, ICS, Solar power, etc has not obviously recognized.

Above and further analysis of the future enabling environment to support financial and institutional sustainability of decentralized rural energy systems in pursuant with Nepal's Rural Energy Policy and having cognizance of lessons learnt from the past, will identify new challenges to address and determine scope and strategies for future support in the area in partnership with the government, the private sector, the local NGO/CBOs and the communities.

Objective of Review:

The main objectives of the review are i) to document lessons learned from the programme implementation to guide future interventions towards removing barriers in the route of easy and swift expansion of energy services to the remaining rural areas of the country; ii) to analyze overall project performance for reaching the energy access and their benefits to the poor, vulnerable and marginalized communities; and iii) review programme components for their role in institutionalization of decentralized energy planning; implementation; maintenance and sustainability.

The other objectives of this review are:

- a) to look into whether the project contributed to build synergistic partnership at the national and local level for expansion of rural energy services to the poorest of the poor households and their future sustainability;
- b) to analyze the relevance of various programme components in targeting the poor, women, vulnerable and marginalized communities for enhancing their role in decision making; benefit sharing; access to resources; and capacity building, and
- c) to examine the achievements made by the programme both at the level of creating enabling policy environment and implementing the policies on the ground.

Scope of Review:

Assessment of programme component:

The review will assess the performance of different components of the programme such as policy and regulatory frameworks strengthening, institutional development, capacity building, resource management, creation of capitals, benefit sharing, environmental awareness, conflict mitigation and community ownership. Similarly, it will assess the social and economic benefits produced by the programme through social (access to resources, decision making process) and economic empowerment (opportunities for their engagement in socio-economic development, sharing benefits emanating from micro hydro project and other support mechanisms) of the local people.

Performance assessment:

The review will verify whether the project objectives were met and identify important lessons learnt (both success and failure lessons) from programme implementation. It will further look into opportunities for promoting the community managed approach as an effective model for promoting decentralized rural energy systems in the future, for creating a supportive environment for its replication, and contributing to environment conservation. It will take into account of the role played by the programme and the implementing agency in leveraging resources, internal or external and expanding partnership with other institutions to support and expand this initiative in other remote villages of the country.

The review will assess the role of the government institutions, particularly, AEPC and the concerned government agency including the Ministry of Environment, Science and Technology of the Government of Nepal in providing institutional support to mainstream the promotion of decentralized rural energy systems to make the programme sustainable.

Gap analysis

The review will identify remaining gaps in institutionalization of coherent rural energy planning and implementation for its sustainability in the national and district level in terms of policy, institutions, and capacity; and suggest a set of strategic interventions that would be required in the future. It will assess the current priority needs of the Government of Nepal and other potential partners and examine the possibility of collaboration in continuing or expanding the programme to other districts or the possibility of replicating some of the good lessons learnt from the programme. The review will further look into the existing government policy on connecting the micro hydro systems to the national grid where it is possible and also on the possibility of a separate mini grid to address the increased motive and lighting power needs. There has been external funding support through donors to promote the rural energy systems in Nepal for a long time and most of these systems are being subsidized. In this context, the study will investigate further need for external funding required in the sector as the subsidized systems are not considered as good avenues for private sector investment. The study will further look into the gaps that persists in developing optimum end use benefits and find the remedial cushions (increased efficiency of the system, increased plant factor and load factor etc.) to lessen the gap to create a supportive environment for private sector investment.

Scope for Review and Key Questions

a) At the Outcome level:

- 1) Review the policies related to rural energy systems' promotion in Nepal and their role in local development;
 - a. Are the rural energy related policies conducive to local development of the communities?
 - b. Are the rural energy related policies and regulations inclusive and responsive to the spirit of local governance?
 - c. Implementation of the rural energy policy for effective service delivery
- 2) Review the institutional mechanisms and capacity to implement rural energy related activities on a sustainable basis;
 - a. Are the institutional mechanisms at the centre level sufficient to support the planning and promotion of rural energy systems at the local levels?
 - b. Is the capacity of the DDC (i.e. Rural Energy Development Section) adequate for planning, implementing and monitoring?
- 3) Review the contributions made by the programme in fostering environmental governance and mainstreaming gender equality in the communities;
 - a. To what extent the programme has embedded the essence of decentralized planning?
 - b. Whether programme approach has been sensitive to gender issues while providing livelihood support?
- 4) Review the contributions made by the programme in leveraging support from other agencies through joint partnership and replicating lessons learnt in other areas;
 - a. What role the programme has played to mobilize resources and develop partnership with other institutions in providing livelihood support to the communities?
 - b. Illustrate examples of replications of any activity supported by the programme
 - c. Fostering the long-term partnership between GoN, UNDP and the World Bank for linking with the global initiatives such as CDM and MDG
 - d. Linking with current national and global development/sustainability parameters and technological options
- 5) Assess to what extent the programme has contributed towards improving the socio-economic conditions of the community members;
 - a. What changes has occurred in the socio-economic conditions of the local people that can be attributed to the programme?

b) At the output level:

- 1) Assess the level of participation by the local communities particularly, the disadvantaged groups, in decision making and benefit sharing (whether they have been able to influence the decisions?);
- 2) Assess the performance of various income generating schemes implemented by the programme and the extent to which they have benefited to the disadvantaged groups (whether these approaches have been accommodative to these groups?)
- 3) Assess sustainability of various financial capitals such as Community Energy Fund (CEF), saving, credits (what is the possibility of sustainability of these funding mechanisms?);
- 4) Assess the performance of alternate livelihood activities and skill training supported by the programme (how much these activities have been effective in providing employment and income?);
- 5) Assess the performance of rural energy technologies in the programme area (to what extent the indigenous people are benefited from the integrated water and natural resource management practice? are the poor people getting benefits from rural energy schemes?)
- 6) Assess the existing approach and rationalize supports through "smart" package for ensuring the equal level of playing fields to vulnerable communities
- 7) Assess the capacity of the local communities (particularly the vulnerable ones) to organize and get involved in undertaking collective socio-economic activities (are the local people groups capable of running income generating enterprise?).

- 8) Assess the capacity of the programme communities to prepare, implement and monitor their future plans to meet the increased energy demand (Are they able to plan and implement without external support?)
- 9) Assess the capacity of communities and DDC to diversify the productive end uses beyond the traditional ones
- 10) Assess the capacity of programme communities to network, collaborate and outsource resources for local development (Are they able to collaborate with other institutions and develop partnership programme for community development?)

Review Criteria

The Review team should apply the standard evaluation criteria, listed below, with a specific focus on relevance, impact and sustainability.

- Relevance (gauges the degree to which the project or program is justified and appropriate within the global and national/local environment and development priorities);
- Efficiency (assesses the outputs in relation to the inputs, looks at costs, implementing time, and economic and financial results)
- Effectiveness (measures the extent to which the objective has been achieved or the likelihood that it will be achieved)
- Impact (measures both the positive and negative, foreseen and unforeseen, changes to and effects on society caused by the project(s) and program(s))
- Sustainability (measures the extent to which benefits continue from a particular project or program after external assistance has come to an end)

Annex 2: Issues Examined in the Review

Performance area	Issues for examination
Relevance	<p>Degree of difficulty (what is the baseline situation in terms of the local context and challenges the programme is trying to address)</p> <p>Relevance of results (are the activities in line with needs of the target group, and in line with the national priorities)</p>
Project Impacts	<p><i>To what extent does the project contribute towards achievement of results at output, outcome and impacts levels?</i></p> <p>What have been the impacts of the project in terms of</p> <ul style="list-style-type: none"> • Poverty reduction and other MDG impacts (how well do the activities target the real causes of poverty, impacts on poverty reduction) • Gender mainstreaming and social inclusion (organizational policies and mechanisms for these, how well are women and vulnerable groups represented in decision making forums, benefits accruing to them) • Building capacities of project partners and their empowerment (To what extent does the project forge functional partnerships and contribute to capacity development among the implementing partners at various levels) • Mobilising resources (to what extent has the project been able to increase the amount of development support from sources outside of REDP through partnerships) • Policy influence
Project processes and efficiency of operations	<p><i>To what extent is the project effectively and efficiently managed in terms of?</i></p> <p>Institutional structure</p> <p>Project design and planning systems</p> <p>Fund management and financial planning</p> <p>Costs and benefits</p> <p>Project reporting and monitoring</p> <p>Human resources and personnel management</p> <p>Quality of technical works (quality of technical works, costs)</p>
Sustainability of effort	<p><i>To what extent are the project interventions sustainable, on organizational, social and financial dimensions?</i></p> <p>Sustainability of community based organizations, institutions and systems created under the project</p> <p>Sustainability of the programme in terms of government plans and sectoral priorities</p>

Annexure 3. List of Documents Perused

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17. REDP, 2000. Impact Study of Sustainable Rural Energy Development Programme
18. Rana-Deuba, A. 2001. *Rural micro hydro development programme, Nepal*. In *Generating Opportunities: case studies on energy and women*. M. Salome and G. Karlsson, UNDP.
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21. Singh, Kiran Man, 2005. *Productive uses of renewable energy: Promoting Community Managed Micro Hydro Systems for Sustainable Development and Poverty Reduction*. Paper presented in UNDP Expert Meeting on Productive Uses of Renewable Energy, Bangkok, Thailand, 9 - 11 May, 2005.
22. Ueli Meier, Scanteam; Truls Holtedahl, Norconsult; Balaram Pradhan, 2003. *Rural Electrification in Nepal and Possibilities for a Sector Wide Approach: Final Report*. October 2003
23. UNDP, 2003. REDP Project Document 2003
24. UNDP 2006. Micro-Enterprise Development Programme (MEDEP) Phase II (NEP/03/018). Mid Term Review, April 2006
25. Winrock International 2006. *Report on Assessment of Rural energy development Programme (REDP): Impacts and contribution in achieving MDGs*. Winrock International Nepal, Kathmandu.
26. World Bank 2003. *Project Appraisal Document on a proposed IDA Credit For a Nepal Development Project*, April 2003

Annexure 4. List of Stakeholders met

- Rama Kant Gauro, Member, National Planning Commission, GoN
- Shyam Sunder Sharma, Joint Secretary, National Planning Commission Secretariat, GoN
- Bal Krishna Prasai, Secretary, Ministry of Environment, Science & Technology, GoN
- Ram Prasad Dhital, RESS Programme Coordinator, Ministry of Environment, Science & Technology, GoN
- Bhuban Karki, Under Secretary, Ministry of Finance, GoN
- Subash Shivakoli, Ministry of Local Development, GoN
- Govind Raj Pokharel, Executive Director, Alternative Energy Promotion Centre (AEPC), GoN
- Rajeev Munankami, Energy Officer, Alternative Energy Promotion Centre (AEPC), GoN
- Rajendra Dhoj Joshi, Senior Education Specialist, The World Bank, Nepal
- Shiva Sharma Paudyal, Senior Programme Officer, Royal Danish Embassy, Nepal
- Munni Sharma, Programme Coordinator, Embassy of Finland, Nepal
- Bikash Sharma, ICIMOD
- Krishna Prasad Sapkota, Chairman, Association of District Development Committees of Nepal
- Shambhu Dev Baral, Energy & Environment Specialist, Association of District Development Committees of Nepal
- Vishnu Gautam, Division Chief, Agriculture Development Bank, Nepal
- Ishwari Prasad Chapgain, Civil Engineer, Agricultural Development Bank, Nepal
- Gokul Gautam, Chairperson, Resource Management & Rural Employment Centre (REMREC), Nepal
- Krishna Prasad Devkota, Executive Chairman, Universal Consultancy Service (P) Ltd, Nepal
- Janak Das Koirala, Executive Director, AG Power Company (P) Ltd & DAT Engineering Consultancy (P) Ltd.
- Mr. Surendra Mathema, Powertech Solutions
- Nepal Micro Hydro Development Association members
- DDCs representatives and SOs, Kavre, Dholakha, Tanahun, Dadeldhura districts

Annexure 5. Checklists for Discussions with Stakeholders

1. Overall Context/Policy Issues

- What are national attitudes and interests regarding energy access in remote areas?
- Are there any critical or potential policy constraints faced by the project?
- Are there any areas of conflict with local interests, government, and partners
- Are there related country or regional initiatives
- Are related initiatives successful, can they be drawn upon
- Are there particular areas and sectors in which partners are interested or uninterested
- Do partners have the mandate, expertise, material resources including staff and money to assume activities?
- How is REDP perceived by national level policy makers? Is there agreement among partners on REDP plan and strategy?
- What are the links and arrangement with others? What type of support and assistance is available from donors, partners, other agencies and host government?
- What are the principal external constraints?

2. Project implementation

(a) Project design/Problem analysis

- Was there an adequate diagnosis of the situation and analysis of the potential beneficiaries?
- What are the principal problems and constraints the programme is trying to address?
- Was there adequate consultation and participation with those related to or affected by REDP?
- What is UNDP's potential role, and how did UNDP build upon its strengths
- Were alternative approaches to achieving the objectives considered?
- What were the indicators set? Has there been a baseline study?
- To what extent do activities correspond to actual needs?
- What major assumptions were made in designing the project? Have the assumptions proved accurate
- Were there major considerations or problems that should have been foreseen but were not

(b) Project Activities

- What were the main inputs, activities and outputs?
- Are activities consistent with solutions and expected outcomes?
- How have activities begun and developed (evolution process)
- Have the objectives changed during implementation? What major changes have occurred since activities were planned? Were there considerations which should have been foreseen?
- What is the status of activities (achievements/ numbers etc)?
- How well do the activities encourage initiative? What are the mechanisms for the local communities to participate in the programme at all stages?
- Do the activities logically fit and meaningfully relate to an overall framework
- Do activities make sufficient provision for phasing out?
- Are activities and services linked to longer term integration/ sustainability?
- What special attention (mechanisms) is being given to women and children, other groups?
- Are environmental concerns being considered?
- How well have gender concerns been integrated into project planning mechanisms.

(c) Programme management

- Have roles and responsibilities been logically delineated and communicated
- Are lines of authority and reporting clear?
- Do all levels have the decision-making authority they need?

- Are there staff or skill shortages
- Have staff received sufficient training and orientation
- Were national resources, local expertise and materials used to the extent possible?
- Do material, staff and financial resources match the needs? Are decisions made in a timely way and at the right level?
- Have financial and administrative procedures been followed
- What were the strengths and weaknesses of implementation?
- Are activities routinely monitored and corrective action taken as required?

3. Project impacts

- The extent to which poor men and women have benefited from the programme, especially in terms of overcoming poverty. The extent to which local capacities have been strengthened to address gender concerns.
- Have activities contributed to solutions
- Are measures adequate to ensure activities will be sustained after REDP phases out
- Which activities or sectors have been successful and which not achieved the desired standard
- Was self reliance encouraged and achieved.
- Has the programme helped to draw attention and mobilize support?
- Have activities significantly changed or improved conditions of the beneficiaries?
- Which sectors and activities have been the most successful, the least successful?
- What weaknesses or strengths have surfaced?
- How do achievements compare to plans and objectives?
- Were the resources effectively used? Could the objectives have been accomplished at a lower cost? Were any particular activities wasteful?
- Does REDP complement, duplicate, overlap, or work at cross-purposes with other programmes
- Were there better ways to address the needs, and what could have been done differently?

4. Future Directions

- What major changes, external, institutional, political, or economic have occurred, since the activity was planned and will have a substantial impact on results?
- What are the principal constraints being faced currently?
- What are the prospects for REDP in the future (niche/strategic areas)?
- What should be the nature, extent and duration of UNDP's involvement (In new projects, in old REDP sites)?
- What changes are being sought or planned? What should we now be doing more or less of?
- Can activities be reduced without negatively affecting the ongoing 'pace'?
- Does staff have the experience and expertise to carry out the activities envisaged?
- What are the immediate, medium and long term requirements according to levels of assistance foreseen, numbers of beneficiaries and priority of needs?
- What are the key policy dilemmas?
- What activities can or should be carried out by others
- How can REDP collaborate more effectively with other organizations?

Annexure 6. Field Guide

Project/ site name:

Date:

A. Community level

COs: men and women separately, if possible and FGs (the same issues are relevant at all levels)

Instrument to be used: focus group discussions

Name of CO/FG

Numbers of CO/FG

Date/ year of formation

1.1 Project processes

- How was the group formed? How did you get to know about REDP? Do they see REDP promotional materials in other (non-REDP) villages where they go?
- How were the villagers involved in the planning process? How (how many meetings/ who came with information/ for how long the discussions went on/ were there any hurdles they had to over come and how did they do it) (participation process)
- Attendance of group members in CO meetings/ Decision Making procedure/ frequency of meetings/ what kinds of issues are discussed? Do they keep minutes?
- What are the achievements/ contribution /major problems/ solutions in relation to organizing groups?
- How are the funds managed? Do they know how they are spent? What is the system for accountability/ monitoring?
- How do they monitor the quality of construction/ installation?
- How does the CEF (community energy fund) function? Any bottlenecks?

1.2 Impacts

- What are the major activities so far?
- What are the socio - economic benefits for the family? How effective has the programme been in reducing poverty in the village and how?
- What are the major achievements/ contribution /problem/ solutions in relation to the Energy (MH, Solar, Biogas etc) .
- What are the achievements/ contribution /problem/ solutions in relation to income generating, socio-economic and other benefits.
- List specific income generating activities, identifying whether hydropower is being used in them or not?
- Make an assessment of whether the poorest sections of the community are benefiting or not.

1.3 Overall programme management and assessment of capacities built

- What is REDP supposed to deliver (assess the level of information and knowledge about the project)?
- Who is supposed to carry out the various functions under the project? Assess the awareness level regarding among CO members.
- What capacity building inputs have been provided by REDP (other than providing lights)? How was this done (especially for women Cos)? Has it helped in any other way?
- Whom do you approach in case of any problems/ complaints about your system? What is the grievance system? How does REDP respond to problems from the communities (average response time)?
- What are the activities the group can do independently and what need external support from the CM and other people.
- In how many groups you are involved (other than REDP)?
- Are there any problems being faced now with respect to REDP? Anything that should have been foreseen by the project? Any future problems that they foresee?
- What are future plan to continue and up scaling the activities?.
- Any suggestions for improving REDP implementation in the field.

1.4 Local resource mobilization

- Has the CO got any other scheme/programme/funding from any other source (list)

B. District level

Questions for the DDC/ REDS staff

Overall assessment

- To what extent, the programme is meeting the needs of the people?
- Which specific elements of the project are most useful, and which are not so useful and can be dropped in the next phase?
- How does the CEF (community energy fund) function? Any bottlenecks?
- Is the institutional setup adequate (try to find out if so many institutions are required, is there enough work for all, can it be further streamlined)
- Suggestions on in what way, their effectiveness in implementation can be further improved.
- Their assessment of cost effectiveness (could the same level of impact be achieved at a lower cost? Are there any ways of reducing the programme costs, without compromising on quality)
- Are there any specific problem areas that need to be improved.
- How sustainable is REDP? Suggestions on how the sustainability can be further improved?
- Any ideas on what strategy to adopt in old REDP villages? What inputs will need to be continued, even if REDP withdraws? Is the structure within the DDCs likely to continue, without REDP support?

Programme management and capacity assessment of staff

- Clarity about the objectives and provisions under REDP
- What is the monitoring system? Who visits? How often? How is it reported?
- How is the response system within REDP structure? Is the programme responsive to feedback from the field?
- What is the grievance system? How do they respond to problems from the communities (average response time)?
- What strategies does the project adopt to address poorest of the poor?
- Qualifications and prior experience with project management (capacity assessment)
- Workload (approx. how many days in the field in a year, how is the paperwork)
- Assessment of infrastructure and facilities at the district level? Satisfaction level?
- Assessment of motivation level of staff?
- Are remuneration in line with expectations?
- What kind of employment system do they have? Are they employed by REDP/ DDC? What kind of performance assessment system?
- Staff turnover rates? Is REDP considered a good posting? Why/ why not?
- Are there any specific capacity building needs that they have which REDP must address?

Local resource mobilization

- Has the CO got any other scheme/programme/funding from any other source.

Rural Energy service centers

- What kind of service do they provide? Is it only to REDP?
- What is the size of market outside REDP? Is it sustainable?
- What kinds of complaints do they receive from the REDP projects? Other projects? How often?
- Who pays for the repair and maintenance?
- Have there been any major repair requirements, where the expenditure has been beyond the affordability of the community? How is it repaired in such cases?

Annexure 7. Logical Framework Analysis (LFA): Status of achievements, December 2006

Intended output	Output Target	Status	Activities	Status
1. Policy and regulatory framework for rural energy developed	<p>1 Rural energy policy mainstreamed in the 10th plan</p> <p>2003</p> <p>1.1 The holistic rural energy policy for poverty alleviation finalized</p> <p>2004-06</p> <p>1.2 Operationalisation of rural energy development sectoral policy</p>	The 10 th Plan emphasizes the importance of promoting RE policy. Likewise, RE policy was finalized in 2003; however, the frequent change in the government and the NPC caused further delay in approval and there were some changes in the policy as time went by. Now the policy has been promulgated by the government (27 Nov, 2006).	<p>1.1.1 Organize workshops, seminars and consultative meetings to refine rural energy policy document</p> <p>1.1.2 Finalize RE policy document</p> <p>1.2.1 Facilitate adoption of RE policy by the government</p>	The RE Policy document was prepared with the views obtained from regional and national workshops represented by personnel from variety of sectors with linkage to energy (stakeholders).
2. Institutional structure and operating procedures in support of rural energy established	<p>2. Rural energy institutions established and operational at the centre and decentralized level to plan and manage rural energy development activities 2003-06</p> <p>2.1 Rural energy development agency established at the centre</p>	NAVIN was supported to establish REEDU. The NaREE unit of ADDCN is supported for advocacy and lobbying to promote decentralized rural energy systems.	<p>2.1.1 Finalise the institutional mechanism for rural development agency (NFP/02/M03)</p> <p>2.1.2 Organise workshops, seminars and consultative meetings with the Concerned agencies and stakeholders and finalize the institutional mechanism based upon the feedback and comments</p> <p>2.1.3 Submit the document to HMG</p> <p>2.1.4 Support HMG in operationalisation.</p>	<p>The policy formulated earlier had the institutional structure as well, but it went through various revisions ever since and the approved version has mandated NPC to form a coordination committee for rural energy development.</p> <p>The meeting is going to be held soon by NPC (the executing agency of the Nep/002/M03) to finalize the formation of the committee as mandated by the RE Policy.</p> <p>10 new EDOs were selected for new DDC: REDSs along with other support staff. DEC's were formed. Likewise, CEFs were formed as well.</p>

	<p>2003-06 2.2 Rural energy development section (REDS), District Energy Fund (DEF), Community Energy Fund (CEF) and District Energy Fund (DEF) (a) established in 10 new programme districts and strengthened (b) strengthened in 15 existing REDP districts</p>	<p>10 new programme districts were selected in 2003 and DDC: REDS in these new districts were supported from the beginning of 2004. Likewise, DEF, CEF were also established in district and community levels respectively. Strengthening of the existing 15 DDC: REDS is being done continuously.</p>	<p>2.2.1 support to recruit Energy Development Officer and other staff for REDS 2.2.2 Organize meetings of line agencies and form DEC 2.2.3 Facilitate local government bodies and communities to establish DEF and CEF</p>	
	<p>2003-04 2.3 District Energy Network (DENET) institutionalized as an specialized wing of ADDCN</p>	<p>DENET is functional. DENET has been organizing orientation training for rural energy planning in districts.</p>	<p>2.3.1 Facilitative DENET processes such as meetings, workshops, discussions etc. 2.3.2 Support to ADDCN in strengthening its newly established NaREE</p>	<p>Coordination with DENET was being done until the political scenario changed (DENET members are the DDC chairpersons representing programme districts). NaREE Unit in ADDCN has been supported continuously.</p> <p>REEDU Unit in NAVIN has been supported to prepare "Manual for Formulating Decentralized Rural Energy Plan".</p> <p>DDCs have been supported through the REDSs to prepare annual rural energy plans and incorporate them in the integrated plan of the DDC.</p>
	<p>2003-04 2.4 NAVIN strengthened for internalizing rural energy and capacity building</p>	<p>NAVIN was supported to establish REEDU unit for the lobbying and promotion of decentralized rural energy.</p>	<p>2.4.1 Support NAVIN to prepare guidelines and networking for internalization of the rural energy</p>	
	<p>2004-06 2.5 Decentralized energy planning process institutionalized and preparation of District Rural Energy Master Plan in 25 districts</p>	<p>Frameworks for decentralized rural energy planning process being developed. Piloting will be done in Jan, 2007.</p>	<p>2.5.1 Support DDCs in preparation of District Energy Situation Report 2.5.2 Support DDCs in preparation of Rural Energy Master Plan 2.5.3 Support DDCs in preparation of Annual Rural Energy Plan and Programmes</p>	
	<p>2003-06 2.6 Financial resource flow mechanism from AEPC to DEF of all programme</p>	<p>Financial guidelines to streamline the resource flow from AEPC to</p>	<p>2.6.1 Prepare Annual Rural Energy Plan and Programmes</p>	

	district for implementation of micro hydro, other rural energy systems, environment and human resource development, capacity building and other activities at the district and community levels operationalised	DEF have been prepared. Likewise, subsidy delivery mechanism (REDP) to DEF has also been approved by the government. Various activities in the district are being supported.	2.6.2 Compile plans and programmes of all districts and prepare annual workplan 2.6.3 Submit annual workplan to PMC for approval 2.6.4 Support DDCs to sign MoU with AEPC for funding support	These annual plans are compiled and presented in the PMC for approval to provide financial and technical support. MoU between DDCs and AEPC are being signed each year for funding support.
3 Joint programme of HMG with funding from WB and UNDP implemented in upscaling rural energy systems	2003-06 3.1 Women and men of 150 VDCs organized into various community organizations (COs) and Functioned Groups (FGs) for integrating rural energy systems	COs and FGs are being formed in nearly 150 communities for the promotion of decentralized community managed rural energy systems.	3.1.1 Identify support organization (SO) for organizing people into various groups 3.1.2 Create awareness among the people about rural energy systems and multiple use of water resources 3.1.3 Organize people into various functional groups including micro-hydro income generation environment management, natural resource management etc.	10 new SOs in new programme districts have been identified and selected. The SOs in existing districts are being supported for carrying out the community mobilization works, including awareness creation about rural energy systems and multiple uses of water resource through orientation, lecture series, organizing visits to other communities, training etc. Organization development in the form of CO and FGs are also being carried out under the community mobilization. Various FGs have been formed for various motive e.g. micro hydro, income generation, environment and natural resource management, biogas, improved cook stoves etc. Programme communities have been supported to identify feasible sites and preparation of detailed project report. So far 119 such schemes have been identified and DPRs of 100 schemes (>2.5 MW) have been

	<p>3.2 Micro-hydro schemes (3 MW installed capacity) and micro-watershed management activities undertaken by communities of 150 VDCs</p> <p>2003-04 50 micro-hydro schemes and as many as possible / need based toilet attached biogas plants and solar home system installed</p> <p>2004-05 50 micro-hydro schemes and as many as possible / need based toilet attached biogas plants and solar home system installed</p> <p>2005-06 50 micro-hydro schemes and as many as possible / need based toilet attached</p>	<p>Works are underway to achieve the target. The target will be achieved within June, 2007. However, there were some hindrances to achieve the target due to the ever growing insurgency problem in the past years. The target will be achieved from 109 MHSs.</p> <p>The target of 50 MHSs could not be met due to administrative problems like fund release to DEF, establishment of REDS in full capacity, selection of SO, site selection, detail design report preparation and above all the insurgency. However, the works are underway in full swing and it is expected that the overall target will be met by June 2007.</p>	<p>3.2.1 Support communities of program VDCs in identification and study of micro-hydro schemes and preparation of detailed project report</p> <p>3.2.2 Appraise technical and financial viability of MH schemes submitted by DDC REDS</p> <p>3.2.3 Support the communities to install micro hydro schemes</p> <p>3.2.4 Support-the communities to mobilize HMG subsidy for installing toilet attached biogas plants</p> <p>3.2.5 Support-the communities to mobilize HMG subsidy for installing Solar home systems (SHS)</p> <p>3.2.6 Support communities for micro-watershed management</p>	<p>prepared. So far, 62 schemes (Peltric sets and MH schemes) have been commissioned totaling almost 525 kW.</p> <p>Technical viability and financial viability are being appraised and forwarded to TRC for subsidy approval.</p> <p>521 toilet attached biogas plants have been promoted so far. Households which were not connected to the MHS due to the design power limitation, are being provided with support (information, selection of the installer, repair and maintenance, training, subsidy mobilization) to install SHS. So far 301 SHS have been installed.</p> <p>Communities are being supported for bioengineering and other activities like plantation for micro watershed management.</p> <p>Each MHS has to have an environment assessment report. This report is prepared with the assistance of the communities.</p> <p>Two communities in each district are being supported to establish nursery (botanical resource center) to support carry out plantation in the watershed area of the MHSs in the</p>
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	<p>biogas plants and solar home system installed</p> <p>2003-06 3.3 Women and men of 150 VDCs implement environment and natural resources management activities</p>	<p>Women and men of 109 communities are implementing various environment and natural resource management activities.</p>	<p>3.3.1 Support the communities of programme VDCs to undertake environmental assessment Report for MH schemes 3.3.2 support the communities to establish and operate botanical resource centre (nursery) 3.3.3 Support plantation 3.3.4 Support-the communities in health and sanitation activities 3.3.5 Support in launching environment and health and sanitation awareness campaigns at district and community levels 3.3.6 Support the communities to install and operate ICs</p>	<p>district. 13 such nurseries have already been established.</p> <p>Each district is being supported to carry out 40,000 general plantations and 3250 fruit/fodder plantation. 112,000 saplings have been planted so far. Plantation is done after the canal is constructed. 20 forests have been transformed into community forest.</p> <p>The communities are being supported in different awareness raising activities related to health and sanitation. Toilets are being promoted, which totals 5333 so far.</p> <p>Each year environment day is being celebrated in the district and community levels. Environmental awareness is being created as a built-in component under the community mobilization. Such awareness campaigns have been conducted for 410 times so far. The tools used are orientation, posters, pamphlets, training, demonstration activities etc.</p> <p>ICSs installers have been trained to construct ICS in their villages. So far, almost 2500 improved cook stoves have been installed.</p>
4 Capacities of Community, district and	<p>2003-06 4.1 Human resource development</p>	HRD Package is developed,	4.1.1 Develop or adapt existing	CM training for 130 CM/CMCs

national level institutions developed for rural energy development and implementations	packages for enhancing the capacities of community, district and central levels developed and implemented, and women and men of 150 VDCs trained on sustainable operations and management of rural energy systems.	which needs to be updated every year.	training manuals to produce master trainers 4.1.2 Organize training on: Community Mobilization for mobilizes, institution development, account and bookkeeping for COs, MH Operator, MH Manager, MH operators', agro processing mill operator, improved cooking stove RESC personnel, nursery establishment and management agro-forestry, entrepreneur development, income generator and mainstreaming gender issues for CO/VDC/DDC/DEC in-service training	Refresher training to all 130 CMs/CMCs 60 MH Operators 40 MH Managers. 40 IICS installers
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Annexure 8. Resource Mobilization, Kavre District

Out of 87 VDCs and 3 Municipalities, DDC:REDS Kavre is working in 19 VDCs of the district. The REDS has supported the VDCs mainly in Rural Energy Technologies(RETs) and Environmental Resource Management activities. Besides the subsidies of REDP and 5% investment of total project cost each by DDC and VDCs, the REDS has also become able to mobilize the resources of other line agencies by our strong social mobilization process. They are listed as follows:

S.N.	Name of VDC	Work Accomplished	Supported by Line agencies	Tentative cost in (000) NRs	Benefited HHs	Remarks
1.	Mangaltar	1832 m head race canal constructed	DFDP	NA	113	
		6 water taps of W/S	FUN Board	NA	37	
		1 forest nursery	NACRMP/DFO	NA		
		Literacy class	NACRMP/DFO	NA	20	
2.	Nayagaun	428 Bio-gas plant	Bio-gas Support Programme	4066	428	@9500
		60 Toilet constructed	DACAW	NA	60	
		Maintenance of 1 suspension bridge	BBL	NA	two villages	Cha khola
		Quonda Screen for R&D in MH	German Technical Comition	NA	NA	
3.	Katunje Besi	20 thousand seeding production	NACRMP/ Dist. Forest Office	NA	NA	
		Nusery for man Training	NACRMP/ DFO	NA	2 persons	
		Maintenance of 1 Suspension bridge	BBL/REMREC	NA	two villages	Roshi khola
4.	Pokharichauri	2 water tap of drinking water	W/S division office	NA	45	
		2 primary schools supported	DACAW	NA	235 students	
		Maintenance of 1 suspension bridge	BBL/REMREC	NA	2 districts	Chauri khola
		Energy & Environment works	BCPR/UNDP	7800	625	
5.	Madankudari	Nursery Establishment-1	FSPN	NA	NA	
		Nursery Training-1	FSPN	NA	1	
		Bio-gas support	Biogas Support Programme			
		12 wooden pole supported	Nepal Electric Authority	NA	226	
6	Kattike Deurali	12 no. of Gabion box supported to protect Head race canal	Water Induced Disaster Programme	NA	200	
		MH subsidy provided for 22 kW	Energy Sector Assist. Prgm.	1540	200	@70000
7	Budhakhani	MH subsidy provided for 22 kW	Energy Sector Assist. Prgm	1400	146	
		1 Foot bridge constructed	Bagmati Watershed Project	NA	two villages	
		Training on Nepali Hand Paper	District Cottage office	NA	6	

8	Saldhara and Salmekhachal	MH subsidy provided for 22 kW	Energy Sector assist. Prgm.			
		1 Lease hold forest handed over	District Forest Office	NA	NA	
		60 she-Goats supported	District Livestock Office	NA	NA	
		7 IG trainings conducted	RCIW/REMREC	NA	85	
		70 Sloar Tuki distributed	Alternative Energy Prom. Cntr	NA	70	
9	Falametar	Erection of 1 Suspension bridge	BBLL			Khanikhola
		Supported maintenance of canal	District Technical Office	200	154	
10	Bhimkhori	Compost preparing training	Sustainable Soil Mgnt. Progm.	NA	12	
		Off-seasonal Vegetable training	Sustainable Soil Mgnt. Progm	NA	11	
		Energy & environment project	BCPR		88	
		Support for 3 kW peltric set	Alternative energy Promn. ctr.	NA	35	
11	Kharpachok	Subsidy for 2 kW peltric	Energy Sector Assit. Progm.	110	19	
12	Milche	Supported for m H/R canal	Japan Intl. Cooperation Agen	170	107	
		120 bags cement support	Nepal School Project	48	107	
		25000 Seedling production	District forest Office	NA	NA	
		Construction of Children Development Centre	UNICEF/UN			
		3 IG trainings conducted	RCIW/REMREC	NA	NA	
		1 conservation pond constructed	RCIW/REMREC	NA	NA	
13	Majhifeda	1 primary school rehabilitated	District Education Office	NA	1 school	
		4 IG trainings conducted	FSPN/REMREC	NA	NA	
		15 Gabion boxes supported	Water Induced Dissaster Mgnt.	NA	195	
14	Banakhu & Ghartichhap	1000 bags cement for H/R canal	Nepal School Project	500	511	
		Supported for MH installation	Shiv Bahadur Deuja, MP	100	511	
		Support for VCs in the area	Local club (civic form)	25	25	
		Drop irrigation at 2 places	REMREC			
		9 she-goat supported for poors	RCIW/REMREC	NA	9	
		Maintenance of 1 Suspension bridge.	BBLL	NA	2 districts	kokhajor khola
15	Gokule	500 bags of cement supported	Nepal School Project	250	194	
		2 Literacy class conducted	RCIW/REMREC	NA		
16	Dandagaun	1 Community Forest handed over	District Forest Office	NA	NA	
		1 suspension bridge constructed	BBLL	NA	2 VDCs	chaukhola
17	Foksintar	400 bags cement supported	Nepal School Project			
		Maintenance of 1 suspension bridge	BBLL/REMREC	NA	NA	Phaudi khola

Annexure 9. Salient Features of Completed Micro-Hydro Demonstration Schemes (Dec 2006)

S.No.	Name of the Scheme	Location	Head	Flow	Power	Canal	Type of	Ben.	Total*	Year of	Installer	Remarks
			M	(Lps)	Output kW	Length M	Turbine	Hshlds	Cost (Rs)	Completion		
BAITADI					124			1096	16099708			
1	Baga Gad	Hat	25	160	20	1000	Crossflow	158	2397981	1998	TEI	
2	Aeradi Gad	Kotila	23	130	15	725	Crossflow	110	1790455	1998	NMSS	
3	Surnaya Gad	Shankarpur	8	230	9	700	Crossflow	80	1262219	1999	NMSS	
4	Jamari Gad	Mathairaj	17	250	21	1490	Crossflow	197	2577857	2001	NMSS	TPC
5	Surnaya Gad II	Vishalpur	6.5	400	13	1500	Crossflow	110	1805860	2001	TEI	TPC
6	Siradi Khola	Sivalinga	98	20	10	595	Pelton	65	1336977	2001	NMSS	TPC
7	Balle Khola	Shivalinga	78	20	8	457	Pelton	80	1101638	2001	NMSS	TPC
8	Neulali Gad	Shivalinga	18	200	18	1000	Crossflow	210	2374457	2003	NMSS	TPC
9	Surnaya Gad III	Sankarpur	17	130	10	400	Crossflow	86	1452264	2005	NMSS	TPC, Test Opetaton
DADEL DHURA					68			480	8196096			
1	Shan Khola	Jogbuda	20	40	4	1325	Crossflow	34	480788	1998	TEI	
2	Chama Gad	Belapur	22.5	63	7	850	Crossflow	78	847851	1998	TEI	
3	Sirse Gad	Sirsa	35	125	22	1800	Crossflow	129	2628000	1999	NMSS	Affected by flood, rehabilitation for 16 kW scheme.
4	Gairigaon Khola	Jogbuda	61	20	6	825	Pelton	78	830000	1999	NMSS	
5	Makail	Sirsa	23	90	10	1500	Crossflow	75	1007616	2001	TEI	Affected by flood, rehabilitation in progress.
6	Chalkatte	Belapur	101	14	7	1500	Pelton	41	825729	2002	NMSS	TPC
7	Ana Khola	Bagarkot	62	40	12	2200	Pelton	45	1576112	2003	TEI	TPC
ACHHAM					113			1187	14728656			
1	Dunirawa Khola	Duni	31	100	15	450	Crossflow	110	1766355	1999	NMSS	
2	Ardoli Gad	Khaptad	33	100	15	680	Crossflow	140	1822707	2000	NMSS	
3	Ardoli Gad II	Khaptad	14.5	100	7	1450	Crossflow	75	877115	2001	NMSS	
4	Shankti Khola	Sodasha	80	50	20	850	Pelton	250	2451435	2001	NMSS	TPC
5	Kailash Khola	Ramaroshan	13	250	15	350	Crossflow	156	1776337	2001	NMSS	TPC
6	Chahira Khola	Vasti	16.5	150	12	1465	Crossflow	150	1886998	2002	NMSS	TPC

7	Barala Khola	Layati	40	80	16	849	Crossflow	156	2149546	2003	NMSS	TPC, Test Opetaton
8	Gadikhet Khola	Sodasha	11.5	85	5	260	Crossflow	67	677983	2003	AG Power	TPC
9	Putru Khola	Khaptad	12	140	8	318	Crossflow	83	1320180	2006	GEI	TPC
BAGLUNG					343			3472	39803971			
1	Tangram Khola	Tangram	22.5	150	17	350	Crossflow	191	1859315	1998	TEI	TPC, Urja Ring
2	Theule Khola	Sarkuwa	32	150	24	550	Crossflow	290	2559261	1999	DCS	TPC, Urja Upatyaka
3	Kalun Khola	Paiyun	54	80	22	550	Pelton	230	2383759	1999	TEI	TPC, Urja Upatyaka
4	Taman Khola	Taman	52	80	20	550	Crossflow	200	2326327	1999	DCS	TPC, Urja Arc
5	Urja Khola	Rangkhani	54	100	26	625	Crossflow	250	2639866	2001	TEI	TPC, Urja Upatyaka
6	Gaundi Khola	Dudilabhati	58.5	82	24	1127	Crossflow	231	3073900	2002	UCS	TPC, Urja Ring
7	Palung Khola	Dhullubaskot	30.5	136	20	520	Crossflow	194	2697799	2002	TEI	TPC, In Urja Strip
8	Labdi Khola	Gwalichaur	66	170	56	3000	Crossflow	532	5641864	2003	DCS/AE	TPC, Urja Arc
9	Bhim Khola	Bhimghithe	47	180	42	1150	Crossflow	410	4122880	2003	DCS/AE	TPC, Urja Arc
10	Urja Khola II	Rangkhani	17	110	9	190	Crossflow	120	1324850	2003	TEI	TPC, Cascade of Urja Khola, Urja Upatyaka
11	Gaundi Khola II	Dudilabhati	26	140	18	450	Crossflow	182	2550522	2004	AG Power	1st 'Urja Gaon of Baglung, completely electified by RETs
12	Upper Kalun Khola	Paiyun	60	40	12	300	Crossflow	120	1787203	2005	NMSS	Urja Upatyaka
13	Upper Palung Khola	Rangkhani	35	120	21	530	Crossflow	234	2715534	2005	NYSE	In Urja Strip
14	Khantram Khola	Amarbhumi	44	33	7	240	Crossflow	78	1130327	2006	DCEM	
15	Urja Khola III	Paiyun	47	110	25	900	Crossflow	210	2990564	2006	TEI	
TANAHUN					167			1280	20818255			
1	Bhut Khola	Deurali	40	60	12	2000	Crossflow	53	1201202	1998	TEI	
2	Cheranga Khola	Baidi	28	250	35	450	Crossflow	223	3749473	1999	NYSE	
3	Bordi Khola	Bhirkot	18	115	10	450	Crossflow	53	1386118	1999	NMSS	
4	Diuli Khola	Kahun Shivapur	22	200	22	1025	Crossflow	163	2487407	1999	NYSE	
5	Likhandi Khola	Kot Durbar	212	20	20	200	Pelton	190	2632015	1999	NMSS	
6	Kyandi Khola I	Firfire	10	300	15	530	Crossflow	138	2119873	2001	NMSS	TPC
7	Kyandi Khola II	Raipur	8	300	12	250	Crossflow	140	1734880	2001	NMSS	Cascade System
8	Barsa Khola	Kota	115	40	23	510	Pelton	135	3105431	2001	NMSS	TPC
9	Kogmadi Khola	Gajarkot	93	13	6	70	Pelton	60	733831	2002	GEI	TPC
10	Neo Khola	Chhimkeshwori	75	16	6	30	Pelton	60	899980	2003	GEI	TPC
11	Kyandi Khola III	Firfire	17	75	6	215	Crossflow	65	768045	2005	GEI	TPC
MYAGDI					194			1691	21082108			

1	Maha Khola	Arman	159	14	11	1800	Pelton	70	1474766	1999	GE	
2	Dajung Khola	Okharbot	48	130	30	630	Crossflow	230	2824587	1999	NMSS	
3	Bagar Khola	Chimkhola	50	135	35	680	Crossflow	288	2863061	2000	NMSS	
4	Dara Khola	M una	60	165	50	1050	Crossflow	447	5303506	2001	DCS	TPC
5	Dara Khola II	Lulang	31	165	25	483	Crossflow	254	3006898	2001	DCS	TPC
6	Sanim Khola	Bima	115	14	8	430	Pelton	60	1182000	2001	GEI	TPC
7	Marang Khola	Marang	42.5	150	30	605	Crossflow	276	3692268	2003	AG Power	TPC
8	Sisneri Khola	Okharbot	95	11	5	150	Pelton	66	735022	2003	GEI	TPC
PARVAT					121			1122	15471660			
1	Chahare Khola	Bhoksing	87	15	6	225	Pelton	55	1078614	1999	GE	
2	Charchare Khola	Bhoksing	90	20	9	200	Pelton	90	1371909	1999	GE	
3	Thado Khola	Bhukatangle	155	35	27	800	Pelton	258	2847390	2000	NMSS	
4	Ghatte Khola	Kyang	58	55	16	800	Pelton	146	2136153	2001	NMSS	TPC
5	Bachcha Khola II	Pangrang	25	90	11	46	Crossflow	69	1274661	2001	GEI	TPC
6	Bachcha Khola	Bachcha	24	160	19	337	Crossflow	190	2205197	2001	TEI	TPC
7	Aguwa Khola	Saraun Khola	79.5	30	12	2650	Pelton	110	1629154	2002	GEI	TPC
8	Amdi Khola	Bachcha	43	100	21	320	Crossflow	204	2928582	2004	GEI	TPC, Test Operation
KAVRE					171			1495	19348034			
1	Daune Khola	Mangaltar	33	60	12	1900	Crossflow	107	1336671	1998	KMI	
2	Cha Khola	Nayagaon	55	60	16	555	Pelton	148	1799357	1998	KMI	
3	Chauri Khola	Pokharichauri	14	300	22	1950	Crossflow	205	2497525	2000	BYS	Crossflow T-13
4	Khani Khola	Phalametar	36	130	23	525	Crossflow	154	2109974	2000	TEI	
5	Chauri Ganga	Madankudari	15	300	22	2035	Crossflow	206	2258482	2000	UCS	
6	Parvati Khola	Buda Khani	78	50	20	180	Pelton	150	2377368	2001	KMI	TPC
7	Khani Khola II	Salme Chakal	18	250	22	435	Crossflow	240	2576565	2001	TEI	TPC
8	Chauri Khola III	Kartike Deurali	12.5	350	22	800	Crossflow	200	2614452	2002	Structo-N	TPC
9	Bhyakure Khola	Bhimkhori	27.5	90	12	580	Crossflow	85	1777640	2003	KMI	TPC
SINDHUPALCHOWK					135			1346	17110581			
1	Handi Khola I	Thampaldhap	35	150	26	1500	Crossflow	187	3289323	2000	HPI	
2	Handi Khola III	Thampalkot	64	65	20	3700	Pelton	214	2109212	2000	KMI	
3	Ghatte Khola	Chokati	68	25	9	1600	Pelton	121	1057976	2000	KMI	
4	Pangarpu Khola	Pangtang	51	70	16	147	Pelton	135	2072195	2001	HPI	TPC
5	Handi Khola II	Thampalkot	36	150	26	1620	Crossflow	275	2935971	2001	AG Power	TPC

6	Jhyadi Khola	Kunchowk	19.5	180	18	920	Crossflow	135	2899930	2003	NYSE	TPC, T-12, e-60%
7	Handi Khola IV	Gunsa	46.5	85	20	937	Crossflow	279	2745974	2005	Housing Nepal	Test Operation
DOLAKHA					113			1168	12393772			
1	Jamkitar Khola	Khopachagun	20	200	20	380	Crossflow	172	1995037	1999	NYSE	
2	Kapti Khola	Suri	30	167	25	225	Crossflow	234	2160707	2000	KMI	
3	Orang Khola	Bulung	28	72	10	1300	Crossflow	116	1069607	2000	NYSE	
4	Bhadrawati Khola	Lapilang	24	125	15	350	Crossflow	135	1450577	2000	KMI	
5	Mahadev Khola	Bhusafeda	40	85	17	930	Crossflow	232	2273200	2001	NYSE	TPC
6	Kot Khola	Shyama	17	130	11	390	Crossflow	125	1597558	2001	UCS	TPC
7	Orang Khola II	Bulung	52	58	15	270	Crossflow	154	1847086	2004	NMSS	TPC
DAILEKH					16			158	1890105			
1	Domilla Khola	Bhawani	36	90	16	890	Crossflow	158	1890105	2003	NMSS	TPC
BAJURA					20			186	2556232			
1	Thar Khola	Manakot	26	155	20	780	Crossflow	186	2556232	2004	NMSS	TPC
PYUTHAN					51			565	6996491			
1	Panderakot Khola	Syaulibang	16	200	16	460	Crossflow	190	2258072	2002	TEI	TPC
2	Dhwate Khola	Khung	22	100	11	513	Crossflow	139	1402881	2003	NMSS	TPC
3	Ghatte Khola	Arkha	27.5	110	16	714	Crossflow	152	2138015	2004	NMSS	TPC
4	Khara Khola	Syaulibang	22	70	8	216	Crossflow	84	1197523	2004	TEI	TPC
OKHALDHUNGA					21			206	2775980			
1	Andheri Khola	Beteni (Rupse)	80	20	8	500	Pelton	82	1087971	2002	NMSS	TPC, GEF-SGP Partnership
2	Salbu Khola	Ragani	65	40	13	130	Pelton	124	1688009	2003	NYSE	TPC
TEHRATHUM					48			403	6136173			
1	Khoranga Khola	Srijung	52	100	25	750	Crossflow	202	2990023	2002	AG Power	TPC
2	Phunguwa Khola	Hwaku	67	57	18	2150	Pelton	155	2452060	2003	NMSS	TPC
3	Pyuthunga Khola	Oyakjung	37	27	5	300	Crossflow	46	694090	2004	GEI	TPC
Total: (101)					1705			15855	205407822			

MH Schemes under R&D; Peltric-sets & Others

S.No.	Name of the Scheme	Location	Head	Flow	Power	Canal	Type of	Ben.	Total*	Year of	Installer	Remarks
			M	(Lps)	Output kW	Length M	Turbine	Hshlds	Cost (Rs)	Completion		
BAGLUNG					95			1099	11934549			
1	Demka	Paiyun	70	15	5	375	Peltric	35	491460	1998	BHW	Tec.Support& CM
2	Lamkuriya	Paiyun	62	17	5	125	Peltric	55	491460	1998	BHW	Tec.Support& CM
3	Saharate	Paiyun	52	10	2		Peltric	25	236500	1998	BHW	Tec. Support & CM
4	Bhaise	Dudilabhati	55	20	5	400	Peltric	54	447000	1999	GE	Tec.Support& CM
5	Kiteni	Rangkhani	50	5	1		Peltric	15	180000	1999	GEEDC	Tec.Support& CM
6	Phaparkhet	Tangram	70	7	2.5	300	Peltric	40	360000	2000	BHW	Tec.Support& CM
7	Bijuwa (Urja) Khola	Paiyun	61	25	8	200	Pelton	69	1070000	2000	KMI(BHW)	Tec. Support & CM
8	Bhulkepani (Neware Khola)	Rangkhani	57	5.5	1.5	700	Peltric	25	236000	2001	SHEEP	Tec. Support & CM
9	Deurali	Dudilabhati	42	15	3	280	Peltric	34	449990	2002	GEI	Tec. Support & CM
10	Dhaulashree	Dudilabhati	63.5	10.5	3	240	Peltric	34	449990	2002	GEI	Tec. Support & CM
11	Kamal MHS	Hugdisir	10	120	6	350	Crossflow	90	613000	2002	SHEEP	Tec. Support & CM
12	Patle Khola	Dudilabhati	82	7.5	3	350	Peltric	39	329000	2002	SHEEP	Tec. Support & CM
13	Dhudhile Khola	Dhullubaskot	85	8	3	85	Peltric	34	390000	2002	RAESC	Tec. Support & CM
14	Purling Khola	Gwalichaur	55	17	3	1000	Peltric	40	340000	2002	RAESC	Tec. Support & CM
15	Hugdi Khola A Gurungdhara	Hugdisir	28	25	3	350	Peltric	37	350000	2002	RAESC	Tec. Support & CM
16	Hugdi Khola B, Tallogaon	Hugdisir	28	25	3	350	Peltric	38	350000	2002	RAESC	Tec. Support & CM
17	Daha Khola	Rangkhani	65	13	3.5	225	Peltric	38	625000	2002	RAESC	Tec. Support & CM
18	Madi Khola	Sarkuwa	65	10	3	250	Peltric	52	350000	2003	BHW	Tec. Support & CM
19	Samundra Sagar	Bhimgithe	90	17	3	90	Peltric	30	500000	2003	LG	Tec. Support & CM
20	Dalami	Rangkhani	65	11	3	600	Peltric	27	530000	2003	GEI	Tec. Support & CM
21	Bhimdanda	Dhullubaskot	48	3	2	300	Peltric	19	185000	2003	GEI	Tec. Support & CM
22	Patle Khola II	Dudilabhati	31	45	7	262	Peltric	90	1085000	2003	SHEEP	Tec. Support & CM
23	Theule Khola	Paiyun	65	10	2.5	105	Peltric	29	165000	2003	TEI	Tec. Support & CM
24	Jana Shakti	Rangkhani	38	10	2	600	Peltric	17	478640	2003	NA	Tec. Support & CM
25	Bhulkepani	Kandebas	60	17	3	400	Peltric	28	150000	2004	Private	Tec. Support & CM
26	Bhedi Khalta	Rangkhani	60	10	3	170	Peltric	35	350000	2005	SHEEP	Tec. Support & CM

27	Dhava Khola	Rangkhani	47	14	3	85	Peltric	40	300000	2005	SHEEP	Tec. Support & CM
28	Chagadi Khola	Amarbhumi	122	6.5	3	250	Peltric	30	431509	2006	DCEM	Tec. Support & CM
KAVRE					23		Peltric	215	2750739			
1	Rosi Khola	Katunjabeshi	5	400	8	750	Propeller	46	831840	1998	KMI	R&D of Propeller turbine, not operational at present.
2	Pota Khola	Katunjabeshi	35	50	5	1300	Turgo	32	585263	2000	KMI	R&D, Turgo Turbine
3	Bauwa Khola	Pokhari Chauri	28	25	3	410	Peltric	38	419214	2002	KMI	Tec. Support & CM
4	Lekhpani Khola	Kharpachowk	103	5	2	750	Peltric	19	331707	2003	AG Power	Tec. Support & CM
5	Kusadevi Peltricset (Hor)	Kusadevi	80	14	5		Peltric	80	582715	1999	NYSE	ITDG R&D,PDDP VDC, Tech.Support of REDP
TANAHUN					6.5			66	851810			
1	Dihikhet	Deurali	50	6	1.5		Peltric	20	145000	2000	RAESC	Tec. Support & CM
2	Tundi Khola	Deurali-8	50	12	3	210	Peltric	24	429530	2001	RAESC	Tec. Support & CM
3	Charchare Khola	Baidi	100	4	2	25	Peltric	22	277280	2001	RAESC	Tec. Support & CM
MYAGDI					5			53	711049			
1	Dunot Khola	Bima	78	8	3	190	Peltric	33	399068	2001	GEI	Non-local 348308/-
2	Chhahara Khola (Shrijana)	Arman	70	6	2	500	Crossflow	20	311981	2001	GEI	Non-local 272560/-
SINDHUPALCHOWK					14.2			192	1804586			
1	Padulo Khola (Pabidal)	Chokati	58	7	2	15	Peltric	27	295206	2002	AG Power	Non-local 247632/-
2	Naidhane Khola (Kanle)	Chokati	86	7	3	135	Peltric	40	332496	2002	AG Power	Non-local 281202/-
3	Mahadev Khola (Latu)	Chokati	75	10	3	50	Peltric	50	437466	2002	AG Power	Non-local 330306/-
4	Chilaune Peltric-set	Thampalkot	100	6	3	50	Peltric	43	318030	2003	AG Power	Excluding cost of penstock pipe
5	Kattike Peltric -set	Pangtang	50	15	3	200	Peltric	27	380250	2003	AG Power	
6	Baramchi Khola (Jalbire)	Jalbire	2.15	30	0.2	210	Pico	5	41138	2003	NHE/RED S	R&D of Pico Hydro
DOLAKHA					5.5			81	868346			
1	Okhare Khola	Khopachangu	18	34	2.5	30	Peltric	37	380654	2002	AG Power	Tec. Support & CM
2	Gurdum Khola (Bulung)	Bulung	40	15	3	200	Peltric	44	487692	2002	AG Power	Tec. Support & CM

OKHALDHUNGA					10			196	1420215			
1	Devasthan MH Scheme	Dhamalagoan, Beteni	80	18	7	1350	Peltric	160	1049215	2003	NMSS	GEF/SGP Funded, SAPPROS facilitated, Technical support from REDS.
2	Leti Khola Peltric-set	Pokali -1	40	16	3	600	Peltric	36	371000	2004	AG Power	Tec. Support & CM
TEHRATHUM					11			115	1256000			
1	Guranse Khola	Srijung-2	44	20	3	1500	Peltric	30	360000	2004	Power Tech.	Tec. Support, DFDG Grant
2	Koramba Khola	Hwaku-3	88	5	2	120	Peltric	21	179000	2004	AEDC	Tec. Support, DFDG Grant
3	Sanduwa Khola	Srijung-9	44	20	3	1500	Peltric	32	360000	2004	GEI	Tec. Support, DFDG Grant
4	Nayakma Khola	Srijung-2	45	15	3	372	Peltric	32	357000	2004	Power Tech.	Tec. Support
LALITPUR					1			10	0			
1	Thotne Khola	Gotikhel	17	14	1		PAT	10		1999	KMI	PAT R&D, REDP
	GRAND TOTAL: (154)				1876.2			17882	227005116			

Annexure 10. Training programmes conducted by REDP, 2006

Type of orientation/ training	Date	Level of organization	Men	women
Role of VDC on Promotion of RET to VDC secretaries	2-3 January 2006	VDC	20	0
Role of VDC on Promotion of RET to VDC secretaries	5-6 January 2006	VDC	19	1
Orientation to the newly recommended EDOs	3-4 March 2006	EDO	10	0
ADB and REDP Jointly Organized Orientation cum Training Programme on Financing MHVEP to ADBN Field Level Officials of Central and Eastern Development Region	31 March -1 April 2006	ADB	28	0
REDP Community Mobilization Training 7 th Group	19-24 May 2006	SO	9	7
Orientation to the newly recommended TOs	8-9 June 2006	TO	18	4
MH Operators Training for MHVEP Schemes 3 rd Batch	1-22 June 2006	Com	19	0
MHVEP Managers' Training 2 nd Batch	8 – 21 June 2006	Com	17	2
Operators Training for MHVEP Schemes 4 th Batch	17 June-9 July 2006	Com	19	0
Community Mobilization Review Meeting	18-19 June 2006	SO	13	7
	18-19 June, 2006	SO	19	3
	20-22 June 2006	SO	17	5
	23-24 June 2006	SO	13	7
			11	17
Support Organization Review Meeting	2-4 July 2006	SO	18	4
District Activities Review Meeting	23-25 July 2006	EDO	23	1
Account Training to AFA	23-28 July 2006	AFA	16	7
PRA and VCDP Training to CM/CMCs of Central Development Regions	13-18 September 2006		17	6
End use promotion and entrepreneurship development training for CMs/CMCs of Eastern Region	20-26 September, 2006	CM	18	2
EDO review and VCDP	9-11 October 2006	EDO	23	1
In-service technical training for Technical Officers	12-18 October 2006	TO	17	2