

REPSO NEPAL'S PIONEERING WORK

Winrock International's Renewable Energy Project Support Office (REPSO) in Nepal has been involved in improving access to renewable energy, through public awareness raising and capacity building, for more than 22 years. In Nepal, REPSO has established a reputation for providing high quality business support services to entrepreneurs working in hydropower and other clean energy enterprises. In addition, it has been supporting the commercial generation of power from distributed energy systems such as small hydropower, solar photovoltaic, grid electrification and wind to increase the rural population's access to electricity (rural electrification), and had substantially promoted clean transportation, micro-finance, and decentralized energy through biogas. Throughout these years REPSO has contributed significantly to different sectors through its pioneering works. Some of the works initiated by REPSO in Nepal are as follows:

Increased Private Sector Participation in Environmentally and Socially Sustainable Hydropower Development (1-10 MW)

The "Increased Private Sector Participation in Environmentally and Socially Sustainable Hydropower Development" project began in June 2002 and was completed in September 2006. The project was supported by USAID's Nepal Strategic Objective 4 fund and aimed to support hydropower developers and financial sector with the aim of increasing capacity for private sector investment in environmentally and socially sustainable hydropower generation. Rural electrification cooperatives, private companies, and/or users' groups were also supported to electrify rural areas so that the benefits of hydropower generation can be made available cost-effectively to rural populations, particularly in those districts where power is generated.

Specific cost share support was provided to 10 private hydropower developers for feasibility and other studies. WI provided such support only to hydropower development companies owned by women, ethnic minorities, residents of districts where projects are being developed, and to projects located in underrepresented areas, such as Mid- and Far Western Development Regions. A total of US \$ 60,750 was leveraged in this cost-share support to 10 developers. Of 10 projects supported, two namely Piluwa and Chaku SHPs successfully reached the operation phase. Moreover, the developers of Piluwa Khola repaid their cost-share amount.

The five years of this program resulted in remarkable achievements in all three areas of project activities: Hydropower Development Capacity Building; Hydropower Finance Capacity Building, and Distribution Capacity Building. These results are presented in the following tables along with baseline data, and targeted numbers against the achieved numbers.

Private financial commitments for hydropower projects (1MW-10MW)

Indicators	Baseline	Target	Achievement
Cumulative Investments	4	50	58
in millions of \$			
Cumulative MW produced	0	15	7.10

Number of private sector firms participating in projects (1MW-10MW)

Indicators	Baseline	Target	Achievement
Cumulative number of private sector firms involved in projects	15	23	58

Private sector projects progressing toward financial closure (1-10 MW)

Indicators	Baseline	Target	Achievement
Survey licence issued	15	23	53
Feasibility study completed	10	13	25
PPA signed with NEA	6	12	13
Financial closures	3	9	8
Project constructed	0	8	3

Royalties distributed to affected communities according to policy from 1-10 MW projects

Indicators	Baseline	Target	Achievement
Amount of royalties distributed to affected communities('000s of US\$)	0	19	56

Rural households electrified through grid extension and from small hydro projects

Indicators	Baseline	Target	Achievement
Power distributed cooperatives/private companies formed	0	3	391
Power sale agreements with NEA	0	3	23
New households supplied	0	2,000	23,427

Establishment of Clean Energy Development Bank

REPSO Nepal's approach towards development of the national hydropower finance sector primarily focused on Technical Advisory Services to the Clean Energy and Infrastructure Development Bank (CEIDB), later known as the Clean Energy Development Bank Limited (CEDB). Winrock's commitment to this sector went beyond infrastructure establishment. Certain steps critical to the Bank were carried out prior to project initiation by REPSO Nepal: the feasibility study was commissioned to ascertain the viability of establishing such a Bank; preliminary meetings with promoters etc were also conducted.

The five years' project to increase private sectors participation in small hydropower development conducted by REPSO was directly related to the establishment of the Bank. With the CEDB's commercial operation since September 2006 as a full-fledged development bank, Winrock activities have mostly focused on providing technical advisory support services ranging from building and maintaining a pipeline of potentially feasible hydropower projects, assisting in beginning operation, attracting foreign investors and setting up a Technical Advisory Services Department within the bank. The CEDB is currently known as NMB

Kathmandu Electrical Vehicles Alliance

REPSO's project Kathmandu Electric Vehicle Alliance (KEVA 2003-2005) worked with the Kathmandu Metro, Government of Nepal, donors, and other groups to expand electric-based mass transit and to promote the spread of electric vehicle operational systems and technologies in Nepal. KEVA initiated key activities under three broad components: (1) public policy and regulatory dialogue; (2) public awareness and advocacy; and (3) technology and business promotion. KEVA supported several recent pro-electric vehicle policies changes such as: (i) removal of registration restrictions; (ii) continuation of reduced import duties on components of Safa tempos; (iii) exemption of customs duties for the coming five years on the import of electric equipment and vehicles related to trolley buses; and (iv) reactivation of Kathmandu-Bhaktapur trolley line.

Winrock International Nepal provided technical assistance, on the ground management and policy advocacy to stabilize EV industry facilitating credit financing to 20 women safa tempo (a 3wheeler EV) drivers bearing 40% risk guarantee. This owner-drive model resulted in 100% timely repayment of loan and attracted Clean Energy Development Bank (now NMB Bank) to provide loan to additional 300 fleets through credit financing. At present, number of banks have started energy lending in electric vehicles to empower disadvantaged, poor and separated women with increased economic opportunities.

Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement (PREGA)

REPSO served as National Technical Expert (NTE) on the Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement (PREGA) project. It coordinated closely with the then Ministry of Environment, Science and Technology (MoEST), which was the executing agency for this project. Within the framework of PREGA project, REPSO Nepal generated a pipeline of projects for consideration under Clean Development Mechanism (CDM). It carried out various activities for establishing Designated National Authority (DNA), capacity building of government officials, project developers, financial institutions and civil societies. REPSO also worked as Local CDM expert for ADB's Carbon Market Initiative, a follow up of the PREGA project. The activities included preparation of documents required for registration of CDM projects from Nepal and capacity building of domestic project developers. The CDM assessment report of the Cement Industry in Nepal was completed. Besides, REPSO also prepared the Project Design Document for Vertical Shaft Brick Kiln Project.

REPSO Nepal has built up expertise to assist projects to turn them into Clean Development Mechanism (CDM) projects as well as to build capacity of the government and other stakeholders to prepare and assess CDM projects. Winrock International-Nepal has prepared documentation for the potential projects aimed for compliance market of

CDM of the Kyoto Protocol and voluntary market. Winrock has designed Project Design Document (PDD) of Hulas Steel Industry Limited (HSIL), Pioneer Wire Limited, World Wildlife Fund (WWF)-Nepal, Alternative Energy Promotion Centre (AEPD) for Improved Water Mills (IWMs), VSBK for Brick Kiln Industries and the Promotion Renewable Energy, Energy Efficiency, Greenhouse Gas Abatement (PREGA) project.

Preparation of Project Design Document of Hulas Steel Industry Limited (HSIL) was designed to prepare a PDD of biomass based energy generation in the Steel Structures and Pole Division for galvanizing steel structures and poles of HSIL located at ward no 2, Pipara Simra VDC of Bara District of Nepal. The project is implementing as an eco-friendly initiative under Kyoto Protocol climate change initiative. The CDM project mitigates about 3,742 tCO₂e annually by displacing fossil fuels consumption.

The CDM project activity for Pioneer Wire Limited (PWL) primarily aimed at reducing the Greenhouse Gas (GHG) emissions by using two biomass gasifier units replacing fossil fuel. The crediting periods of the project is from July 2011 to June 2021. The total emission reduced over the crediting period is 67,143 tCO₂ whereas the annual average over the crediting period of estimated reduction of 6,714 tCO₂.

World Wildlife Fund (WWF)-Nepal aimed to sell carbon credits generated from 7,500 biogas digesters plants installed in Nepal's Terai Arc Landscape (TAL) project area, and use renewable biogas energy to replace the heavy consumption of fuel wood in this area for cooking. Another objective of this project was to enable Verified Emission Reductions (VERs) from the project to reduce GHG emissions by displacing conventionally used fuel sources. The project activity will result in net emission reduction of 147,613 tCO₂e over a crediting period of 7 years.

The PoA for Promotion of the Improved Water Mills project promoted dissemination of IWM replacing existing low powered, less efficient Traditional Water Mills (TWMs) to the existing owners in Nepal and to avoid possible switchover/installation to diesel based mills by new installer (potential diesel mill owners) to meet high powered milling requirements. The duration of the PoA will be for 28 years and the choice of crediting period is 7 years which is renewable upto twice. The average GHG emission reduction over the crediting period of 7 years is 8,031 tCO₂e.

The main objective of PREGA project was to increase investment in renewable energy, energy efficiency and other greenhouse gas abatement projects through CDM. Under the PREGA project, activities such as developing Project Idea Notes (PIN), Project Concept Notes (PCN), PDD for CDM projects were undertaken. During the project, PDDs for Biogas Support Programme, micro-hydropower and Solar Home Systems was developed. In

addition, PIN for IWMs was also prepared and a pre-feasibility study for trolleybus development in Kathmandu was successfully completed.

Vertical Shaft Brick Kiln (VSBK) Project, Nepal Activity-1 comprised of 25 VSBK establishments comprising 54 VSBK shafts with in Kathmandu Valley and some districts of Terai region. This activity included VSBK shafts constructed since 2005 with the support from the VSBK/CESEF Project Nepal. The project used an approved methodology (AMS II.D Energy efficiency and fuel switching measure for industrial facilities) to ensure that all measurements of GHG emission reductions are robust, conservative and verifiable. The duration of the project was 10 years non-renewable. The total emission reduction over the crediting period is 148,224 tCO₂e.

RE Financing

Winrock International's Nepal team has enabled over 44,000 low income rural families to purchase renewable energy technologies and clean cooking stoves by making loans available to them. Winrock achieved this through partnerships with commercial Banks and Financial Institutions (BFIs) which had not been prepared to make energy loans because of the perceived risk of lending to a new sector and high costs of administering small loans and collecting payment from rural customers.

A key element of Winrock's approach is to link urban BFIs with local Financial Institutions (LFIs) such as microfinance institutions, cooperatives, and savings and credit groups which are already active in rural areas. Winrock was able to demonstrate to the BFIs that LFIs were able to make rural energy loans at lower transactions costs, and collect repayments, once they received adequate training and support. The three-way partnership involved BFIs providing wholesale loans to LFIs, which were selected, trained and certified by Winrock, and LFIs adding energy technologies to their loan portfolio. Winrock trained LFIs on the basics of each of the renewable energy technologies (solar home systems, biogas digesters, micro-hydropower and improved cook stoves), on preparation of business plans, as well as on accounting and management best practices. At the same time Winrock worked to convince BFIs that it was safe to provide loans through LFIs without requiring collateral.

Winrock has developed the capacity of 10 BFIs and 400 LFIs in renewable energy lending. These projects, which were funded by different funders, enabled 44,637 poor rural households to purchase clean energy technologies - 16,983 solar home systems (SHS), 1,806 through micro-hydropower, 11,991 biogas digesters for cooking, and 13,857 improved cooking stoves - through microfinance. The loans leveraged a total investment of USD 9.72 million including government subsidy and equity from users. In addition to the quality of life improvements for beneficiary families, use of these technologies are estimated to be reducing consumption of 980,000 liters of kerosene and

32,000 tons of firewood every year with attendant annual reduction of around 10,500 tons of carbon dioxide.

Equitable Hydro

The Equitable Hydro program was launched in 2001 as an environmental and economic equity program to analyze the local impact of hydropower development in Nepal. Winrock conducted research of the existing scenario and initiate a debate of the situation to make policy makers aware of various options. The studies included evaluation of impacts on marginal and disadvantaged groups. The main objective of this action research program was to investigate the ways and means by which community level benefits from hydropower development can be enhanced and the negative impacts of hydropower projects on marginal communities minimized. The Working Paper Series under the Equitable Hydro Program addressed various questions of equity and environmental justice associated with hydropower development in Nepal, thereby helping to lay academic groundwork for better-informed public discourse and advocacy in Nepal around the issues of economic and environmental equity in the development of Nepal's substantial hydropower resources. The study suggested that the best strategy would be to give poor and oppressed people stakes in society that they would be afraid to lose. Since hydropower is a major resource of Nepal, it could play a vital role in promoting equity and justice in Nepal if it is developed in a socially and environmentally responsible manner.

The research findings highlighted a number of ways in which conflict can be reduced if there are clear and transparent benefits for people in the area where hydropower projects are being developed by both the private and public sectors.

Working Paper 1 (November 2002): "Hydropower Development in Nepal: Issues on Equity and Environmental Justice" defined the concepts of social equity and environmental justice in the context of hydropower development in Nepal and laid a conceptual framework for analyzing equity and justice issues.

Working Paper 2 (January 2003): "How Can Hydropower Royalty Lead to Social Equity and Environmental Justice?" examined various justifications in favor of hydropower royalty; reviews Acts and Regulations concerning royalty and made an assessment of the total amount of royalty generated by hydropower projects in Nepal. It also examined the distribution of royalty among different districts and assessed whether this has raised any distributional conflicts. The paper also evaluated the utilization of royalty district wise and considered whether it is likely to contribute to social equity and environmental justice.

Working Paper 3 (November 2003): "Maoists' Strike on Hydropower Plants: Any Policy Lessons?" reviewed the circumstances leading to the strikes and the ideology

behind it in order to explore the possible reasons for Maoists' targeting hydropower plants and examined whether these strikes have any connection with the issues of social equity and environmental justice. The study assessed the consequences of these actions on people's lives and their reactions to these incidents.

Working Paper 4 (August 2004): "Displacement, Resettlement, and Rehabilitation Issues in Hydropower Projects".

The development of hydropower projects often leads to displacement of many people. Such displacement may disrupt people's lives, impoverish them, and violate their fundamental rights. Paper 4 examined the extent and nature of displacement due to hydroelectricity development in Nepal. The study also reviewed the process of displacement, resettlement, and rehabilitation adopted by hydroelectricity projects and suggested some measures for making this process a development opportunity.

Working Paper 5 (November 2004): "Victims of Hydropower Injustices in Hydropower Development".

The development of a hydropower project (HEP) has many benefits, but also precipitates many adverse consequences in the lives of local people. As the people hurt by a hydroelectric project and those benefited by it may not be the same, it is imperative to foster proper understanding of adverse consequences of hydroelectric projects in order to devise measures to mitigate such negative impacts in future projects. This paper reviewed the adverse consequences produced by major hydroelectric projects in Nepal and the response of hydropower developers towards them. It also identified conditions that will induce hydropower developers to deal with such adverse impacts in a fair manner.

Working Paper 6 (February 2005): "Benefit Sharing from Hydropower Project in Nepal."

It is essential that benefits of hydropower development are shared equitably. Although the government has periodically taken steps to reiterate the importance of hydropower development in the country, there are concerns that hydropower benefits are not distributed equitably among all stakeholders. Lately, hydropower projects have made attempts to share benefits with local people. This paper reviewed the nature and magnitude of local benefits from hydropower development in Nepal and assessed the potential impact of various benefit sharing mechanisms on social equity and justice. It also identified conditions that would promote local benefits and made recommendations for enhancing equity and justice.

Working Paper 7 (January 2006): "Reorienting the Distribution and Use of Hydropower Royalty to Promote Equity and Justice in Nepal."

Since 2001, Winrock International, Nepal with financial support from the Ford Foundation had been investigating social equity and environmental justice issues related to hydropower development in Nepal with the aim of promoting equitable

and just hydropower development. One of the outcomes of this action research program was a study titled “How can hydropower royalty lead to social equity and environmental justice?” On May 13, 2005, Winrock International, Nepal and Nepal Water Conservation Foundation organized a national workshop to discuss the findings of this study. This Report presented the summary of the discussion that took place during the workshop.

Working Paper 8 (January 2006): “Addressing Inequities and Injustices in Hydropower Development in Nepal: Lessons from Abroad.” Previous research under equitable hydro and other programs had found that hydropower development in Nepal has led to inequities and injustices. There have been inequities in the distribution of costs and benefits of hydropower development. While some regions and groups of population have suffered from hydropower development, the benefits have gone to entirely different areas and groups.

Earlier studies in this series examined past experiences of hydropower projects in Nepal and identified conditions more likely to lead to equitable distribution of costs and benefits of hydropower projects among various stakeholders in society. This study reviewed experiences of other countries in dealing with problems of equity and justice in hydropower development and derived lessons for Nepal from them.

RUPES Kulekhani Program

REPSO implemented Rewarding Upland Poor for the Environmental Services they provide (RUPES) in Kulekhani watershed between 2003 and 2005 funded by International Fund for agriculture Development (IFAD) and coordinated by World Agroforestry Centre (ICRAF). RUPES Kulekhani was an action research program that proposed to develop and test a Payment for Environmental Services (PES) mechanism with the objective of promoting sustainable livelihoods among upland communities in the Kulekhani watershed of Nepal. The activities of this program involved identification and valuation of environmental services, identification of buyers and sellers, awareness building etc. The research argued that the conservation measures adopted by upstream communities of a hydropower project pose significant impact on the performance of the project and further argued that PES could be an effective mechanism to provide incentives to upland communities for enhancing and maintaining beneficial environmental services.

This study reviewed the concept of Payments for Environmental Services (PES) as a potential mechanism for sharing hydropower benefits with communities in upland watersheds. The study addressed opportunities and challenges associated with implementation of the PES mechanism in Nepal. It also examined various aspects of implementing PES in the Kulekhani watershed. Moreover, this study substantiates that upland communities of Kulekhani watershed are providing environmental services

in the form of reduced sedimentation and increased water yield to the Kulekhani reservoir. These environmental services are providing substantial benefits to the Nepal Electricity Authority and the central and district governments of Nepal in the form of increased revenue and reduced maintenance costs. The study argues that if some of these benefits are transferred to upland communities (stewards of environmental services) as payments for environmental services, those communities would have more incentives to maintain the flow of such services.

The study concludes that basic policies and institutional framework to establish the PES mechanism already exists in Nepal, and only needs refinement. The main constraints in implementing PES include: difficulties in quantifying the value of environmental services due to lack of adequate data; lack of awareness of the concept of environmental services among policymakers, buyers, and suppliers; and in many cases, lack of well-defined property rights over natural resources.