ANNUAL PROGRESS REPORT 2014

RENEWABLE ENERGY FOR RURAL LIVELIHOOD (RERL)

Inception Workshop of AEPC-GEF-UNDP RERL

DONORS

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About the Project	Geographic coverage of the project
• **Project Title: Renewable Energy for Rural Livelihood** • **Award ID: 76958** • **Web link: www.aepc.gov.np**	***National level coverage (Yes/No): Yes*** ***Number of Regions covered: NA*** ***Number of Districts Covered: NA*** ***Number of Municipalities Covered: NA*** ***Number of VDCs Covered: NA***
Strategic Results	**Implementing Partner(s)**
UNDP Strategic Plan Outcome 1: Expanding access to environmental and energy services for the poor: Strengthened capacity of local institutions to manage the environment and expand environment and energy services especially to the poor **UNDP Strategic Plan Output 1.5:** 117,500 people have improved energy access	Alternative Energy Promotion Centre (AEPC), Ministry of Science Technology and Environment (MoSTE), Government of Nepal
UNDAF Outcome 2: Vulnerable groups have improved access to economic opportunities and adequate social protection	
UNDAF/CPAP Output: 1 MW electricity scheme from mini-grid using PPP approach	
Project Budget (US$)	**Project Duration**
UNDP Contribution: 2,000,000	**Start Date (day/month/year):21/07/2014**
Government Contribution: 30,312,500 (GoN subsidy for RE projects)	**End Date (day/month/year):30/07/2019**
Other Contributions:24,249,600 for RE Projects ***Private sector: 19,601,710*** ***Local government: 4,647,890*** ***Others: 244,930***	**Implementation Modality** **NIM: National Implementation Modality**
Donor Contributions: **Donor 1: 3,000,000 (GEF)** **Donor 2: 2,000,000 (UNDP)**	
Unfunded: 244,930	
Total project budget: 59,807,030 **Total approved budget for 2014: 282,500**	

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Date: 05 April 2015

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Acronyms

AEPC	:	Alternative Energy Promotion Center
CESC	:	Community Electrification Sub-Component
CPAP	:	Country Programme Action Plan
CREF	:	Central Renewable Energy Fund
CSIDB	:	Cottage and Small Industry Development Board
DDC	:	District Development Committee (DDC)
DEECCS	:	District Energy and Environment Climate Change Section
DFS	:	Detail Feasibility Study
DREMP	:	District Rural Electrification Master Plan
ELC	:	Electronic Load Controller
GEF	:	Global Environment Facility
GIS	:	Geographic Information System
GoN	:	Government of Nepal
MHVEP	:	Micro Hydro Village Electrification Projects
MoSTE	:	Ministry of Science, Technology and Environment
NEA	:	Nepal Electricity Authority
NRREP	:	National Rural and Renewable Energy Programme
PEU	:	Productive Energy Uses
PPP	:	Public Private Partner
RE	:	Renewable Energy
RERL	:	Renewable Energy for Rural Livelihood
RSC	:	Regional Service Center
SESC	:	Solar Energy Sub-Component
SPV	:	Special Purpose Vehicles
UNCDF	:	United Nations Capital Development Fund
UNDAF	:	United Nations Development Action Framework
WB	:	The World Bank

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1. Executive Summary

In July 2014, the Government of Nepal (GoN) and United Nations Development Programme (UNDP) signed the project document of Renewable Energy for Rural Livelihood (RERL), which is a joint initiative of the GoN, Global Environment Facility (GEF) and UNDP. The main objective of RERL is to support Alternative Energy Promotion Center (AEPC) to remove barriers for up-scaling promotion of renewable energy projects, particularly less disseminated technologies such as larger micro hydro, mini-hydro and large scale solar photo-voltaic (PV) systems to improve livelihood and conserve the environment. RERL is an integral part of AEPC's National Rural and Renewable Energy Programme (NRREP) and aims to assist it in meeting its ambitious targets of providing electricity access to 150,000. To overcome the barrier in financing of larger off-grid renewable energy systems, RERL will support Central Renewable Energy Fund (CREF) to design and implement financial instruments focusing on Public Private Partnership (PPP) modality.

In 2014, RERL's support was focused on policy inputs for promotion of mini hydro, large micro hydro and large solar PV systems and identification of potential sites for development. In this regards, RERL initiated preparation of PPP guidelines for development of mini hydro and continued support in formulating renewable energy policy. Besides, RERL also support AEPC/NRREP for identification of potential Solar PV village electrification sites using Geographic Information System (GIS), preparation of District Electrification Master Plan (DEMP) of Gorkha, feasibility studies of micro and mini hydropower projects and gap identification in survey, design, installation, operation and after sales services for mini hydropower plants.

In the meantime, RERL has been involved in preparing technical specification, technology transfer and policy inputs related to mini grid and grid connection of renewable energy systems. During this period, RERL and AEPC have worked with Nepal Electricity Authority (NEA) to finalize the technical specifications and other requirements for grid connection of hydropower plants of less than 100 kW capacities. NEA Board recently approved interconnection of micro hydropower plants with their grid and the technical specifications developed jointly by AEPC/RERL and NEA.

Between July and December 2014, RERL worked extensively with Productive End-Use component (PEUC) of NRREP for orientation of government officials and training potential local level entrepreneurs for promotion of productive end-use applications. District in-charges of Cottage and Small Industries Development Board (CSIDB) of Ministry of Industries were oriented on AEPC's approach, institutional arrangements and forms and formats for productive energy use.

The new GEF-UNDP RERL assisted AEPC to complete Micro Hydro Village Electrification Projects (MHVEP) undertaken with the technical assistance of the former AEPC-UNDP-World Bank (WB) RERL. During the reporting period from July to December 2014, GEF-UNDP RERL supported communities to install 17 MHVEPs with the installed capacity of 617 kW providing electricity access to 6,131 households. In2014, communities generated 766kW from 26 MHVEPs providing electricity access to 8,351 households benefiting 45,930 people with the support of the UNDP.

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2. Background and Context

To establish a more coherent and coordinated approach to the overall sector development, AEPC is currently implementing a single framework programme called National Rural and Renewable Energy Programme (NRREP). The main objectives of NRREP are i) to improve the living standard of rural women and men, by increase employment as well as productivity, ii) reduce dependency on traditional energy and iii) attain sustainable development by integrating renewable energy (RE) with socioeconomic activities in rural communities. NRREP targets for rural electrification in 2012-2017 period is 25 MW from micro and mini hydropower benefitting 150,000 households and 600,000 solar home systems. It is a very ambitious target that requires a lot of coordination and collaboration among all stakeholders involved in the sector. In this context, RERL will support AEPC/NRREP to develop mini hydropower projects, large solar photovoltaic (PV) systems and large micro hydropower plants with the total installed capacity of 12.5 MW by 2019 for electrification in off-grid areas.

AEPC's focus on rural electrification has, so far, been on promotion of micro hydro and solar home systems and has a reliable mechanism in place to take this forward. Despite AEPC's interest, larger systems such as mini hydro and solar PV mini grid have not been widely disseminated due to various huddles. It is well recognized and acknowledged by AEPC/GoN that moving towards bigger sized systems will bring economy of scale, faster progress, wider coverage, and income generating opportunities for local people. Bigger systems offer greater opportunity for enterprise development and better financial and commercial viability.

The immediate objective of the CREF Component of NRREP is to institute the CREF as the core financial institution responsible for the effective delivery of subsidies and credit support to the renewable energy sector. RERL is assisting CREF to design and implement innovative financial instruments to attract financing in Mini/Micro Hydro, Large Solar PV and Productive Energy Uses (PEU).

Likewise, the immediate objective of the Technical Support Component is to accelerate renewable energy service delivery with better quality, comprising various technologies, to remote rural households, enterprises and communities, to benefit men and women from all social groups, leading to more equitable economic growth. RERL, in this case, is supporting for the promotion of mini hydro (>100 kW), large micro hydro (60 kW+) and large scale solar PV systems (Institutional and Mini Grids) and productive energy uses. RERL has also been supporting to enhance capacity of local fabricators, installers and system integrators involved in mini/micro hydro and solar PV.

On the other hand, the immediate objective of the Business Development for Renewable Energy and Productive Energy Use Component is to contribute to an increase in income and employment generation potential for micro, small and medium sized enterprises in rural areas, particularly for men and women belonging to socially and economically disadvantaged groups. RERL is working closely with NRREP to develop modalities, business opportunity assessment, modification of end-use technologies and training and capacity development at the central and field levels.

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3. Project summary and objectives

As mentioned above, the development objective of NRREP is to improve the living standards of rural women and men by increasing employment and their productivity by reducing dependency on traditional energy. NRREP intends to provide electricity access to 750,000 households through mini and micro hydropower and solar home systems. It also plans to integrate renewable energy with productive energy use and support establishment of 2800 micro, small and medium enterprises. RERL will support NRREP to meet its ambitious target by removing barriers for up scaling less disseminated technologies like mini hydro and large solar systems. RERL will support NRREP to meet 12.5 MW of its targets through mini and micro hydro and large solar systems.

RERL is supporting in the following areas:

1. Establishment of conducive legal, institutional and policy environment;
2. Demonstration of Technically and financially attractive larger RE systems;
3. Establishment of financing for manufactures and developers through CREF; and
4. Development of technical capacities and skills at all levels for project design, development, installation and operation and after sales services.

4. Narrative on Key Results Achieved in 2014

RERL Project was initiated on July 21, 2014 after the GoN and UNDP signed the project document. It is a joint project of the GoN, GEF and UNDP. AEPC under the Ministry of Science Technology and Environment is the Implementing Agency.After the project document was signed, RERL worked with AEPC/NRREP on policy related issues, capacity development, identification and survey of potential renewable energy development sites.

RERL initiated preparation of guidelines for establishment of GESI sensitive Special Purpose Vehicle (SPV) under the PPP modality. A standard SPV in the Nepalese context is a Limited Liability Company that promotes PPP model facilitating cooperation between the private sector, public sector and local organizations. The guidelines pave way for the formation of SPV for development and management of mini and larger micro hydro projects.

With RERL support, experts from Institute of Engineering and a local company fabricated digital electronic load controller and successfully tested it in the laboratory. This has paved way for grid connection of micro hydro. In 2015, RERL plans to support for grid connection of 2 MHPs. RERL supported PEUC of NRREP to organize an orientation programme for CSIDB personnel. PEUC approach and future collaboration and coordination of activities and formal registration of AEPC supported productive enterprises were discussed. Coordination meetings with MEDEP were also held during this duration to explore possible synergy in the productive enterprise development.

4.1 Progress towards the UNDAF/CPAP Outcome

UNDAF Outcome 2: Vulnerable Groups have improved access to economic opportunities and adequate social protection.

According to the National Census of 2011, about 30% of the households still do not have access to electricity and 90% of households depend on traditional sources of energy such as

fuelwood, agricultural residues and animal dung for cooking. In this context, the GoN, recently announced that all households will be supported to have clean cooking and lighting solution. This policy will help all Nepali people, including vulnerable groups, will have improved living conditions. AEPC is the main governmental agency for executing activities related to renewable energy and off-grid solutions to meet the GoN targets. RERL will support AEPC/NRREP in removing barriers related to lesser disseminated technologies like mini hydro and large solar PV systems.

4.2 UNDP/CPAP Output 2.4: Vulnerable Groups have increased access to sustainable productive assets and environmental services.

The CPAP target on rural/renewable energy is to support 25,000 households to have access to electricity. Between July and December 2014, with RERL support communities in rural areas installed 17 MHVEPs generating 617 kW and benefitting 6,131 households against the target of 300 kW. In 2014, with the support of the closed RERL and the on-going RERL 8,351 households got access to electricity against the target of 3,000 households.

UNDP/CPAP Output 2.4.1: AEPC's capacity enhanced for scaling up energy services in rural areas.

The GoN has accorded renewable energy development a high priority. Recently, GoN announced an ambitious target of providing access to clean energy for cooking and lighting to all households of the country by 2017. AEPC is mandated for promotion of off-grid renewable energy systems to meet this target.

4.3 Progress on Outputs

RERL has identified 6 results/outcomes to contribute to the UNDAF and CPAP outcomes and outputs. Progress is discussed below.

Outcome 1: Strengthened legal, institutional, policy, planning, and information environment ensures increased RE investment and utilization

Output 1.1: Approved and enforced policy that enables PPP model for mini-hydro and large-scale solar PV development, including fiscal incentives and suitability for possible changes in Nepal government structure (to federal system)

In 2014, RERL supported AEPC/NRREP to prepare a draft document on Renewable Energy Policy, update/revise GoN's RE Subsidy Policy and Delivery Mechanisms, prepared documents for grid connection of RE systems and technical specifications for interconnection of micro hydro and the national electricity grid. Some of these activities were initiated with previous RERL's support and continued by GEF-UNDP RERL. In a landmark decision, NEA Board decided to open grid connection for micro hydropower plants (>100 kW) and agreed to the technical specifications prepared by AEPC and NEA with RERL support.

RERL also initiated preparation of guidelines to encourage private investment in mini hydropower projects through PPP model.

Output 1.2 Methodology and database developed and made available for incorporating mini-hydro and large scale solar PV systems into district RE plans

RERL has initiated activities related to preparation of District Electrification Master Plan (DEMP) of Gorkha district that will go beyond the existing energy plans prepared by the districts. This master plan will build on the decentralized planning process practiced by DDC by bringing NEA on board and incorporating larger RE systems and grid extension to optimize resource utilization on least-cost basis. The draft methodology developed by the consultant was approved by NRREP. In this regard, RERL assessed the status of selected NEA owned Mini Hydropower Plants located at the district headquarters and potential for up gradation and capacity addition.

Output 1.3 Completed training and awareness programs for relevant government agencies and stakeholders on mini-hydro and large-scale solar PV systems development and on productive end uses

PEUC of NRREP and RERL jointly organized two orientation programmes for CSIDB for RE based MSME promotion. CSIDB was oriented on PEUC's approach, implementation modalities, forms and formats. Joint activities were also discussed during the orientation.

Outcome 2a: Increased investments in RE through financing demonstration projects on Mini-hydro, mini-grid and large-scale solar PV projects

In 2014, RERL supported CREF to organize training/orientation to prospective partner banks on investment in renewable energy projects and requirements of AEPC. Most of the activities that would contribute in achieving Outcome 2a were not included in the Annual Work Plan (AWP). This outcome is closely related with CREF establishment and operation and activities to support CREF to design and establish financial instruments and provide financing for demonstration projects are planned for 2015 onwards.

By supporting CREF to design and implement financial instrument targeting private investment and involvement of banking and financial institutions (BFIs) in renewable energy, it is expected that innovative ways will be identified to meet the high upfront costs associated with RE systems compared to traditional energy sources. First, a PPP approach based mini hydro and solar projects will be developed as demonstration to encourage private investment

Outcome 2b: Increased Investment in RE

Output 2b.1 Demonstrated PPP models facilitating operation between private sector, public sector, and local organizations through establishment of Special Purpose Vehicles (SPV) in three selected mini-hydro projects (1 MW)

Mini Hydro Detailed Feasibility Study (DFS) Guidelines prepared by previous RERL was published this year. The guidelines provide clear outline for undertaking DFS of mini hydro projects to be developed with AEPC and will also help improve quality and standardization.

RERL also undertook detailed feasibility study of Bom Khola, Taman Khola and Phawa Khola Mini Hydro projects. These are potential projects for demonstration under PPP model. RERL and NRREP will decide on the best projects to be developed as demonstration in 2015.

After the 100 kW Sani Gad Micro Hydro project was damaged by a landslide, RERL undertook detailed geological study and prepared design for the reconstruction of the damaged canal section.

Output 2b.2 Demonstrated financially sustainable and reliable mini-grid connecting ten (10) micro-hydro systems (300 kW)

RERL had undertaken due diligence works on the detailed feasibility study of Taplejung Mini Grid prepared by NRREP. A partnership under Taplejung Mini Grid has been proposed to the World Bank to be developed with Kabeli Transmission Project funding. Other activities related to mini grid and grid connections include supporting a consortium of academic institution and a private company to fabricate 2 digital Electronic Load Controller (ELC) for interconnection of MHP with the grid. This was successfully completed. On one hand, this will help improve the performance and reliability of load controller used in MHP, which is presently based on analog technology, while, on the other, paves way for local fabrication of ELC for parallel operation of two or more mini/micro hydropower plants. ELC for parallel operation is not locally available and the technology is quite complex and has to be imported. RERL will support for fabrication of such ELC in coming days. Given the fact that the national electricity grid is approaching many MHPs promoted by AEPC, these new technologies will help reduce the cost for grid connection in future.

Outcome 3a: Improved availability of financial investment supports for rural RE and other low-carbon technology applications

Since CREF would be operational only in 2015, activities supporting the achievements of this outcome have not been included in the Annual Work Plan of 2014.
CREF operation modality has recently has been finalized and selection of Handling Bank and partner banks is in the final stage. The Handling Bank is the apex financial institution and will have three core functions for the CREF portfolio: i) Wholesale lending to partner banks; ii) Subsidy Fund Management; and iii) Investment Management. RERL is working closely with CREF to identify prospective incentive packages for BFIs to finance not only RE projects but also manufacturers and installers to acquire modern technologies related to mini hydro and large solar PV systems. A gap analysis will be carried out in early 2015 and design of incentive packages will be carried out then after.

Outcome 3b: Improved design and packaging of investment support mechanisms for rural RE and other low-carbon technology applications

Output 3b.5 Functional enterprises adopting productive use of electricity

In relation to promotion of productive energy use for sustainability of RE systems and enhanced rural livelihood through utilization of electricity from mini/micro hydro and solar PV, RERL supported PEUC/NRREP to organize training for strengthening capacity of Micro Hydro Functional Group (MHFG) and Local Economic Development Committee (LEDC) to identify potential RE powered enterprises.

In a new approach to promote RE powered productive energy use, RERL and PUEC/NRREP are working with experts to develop framework and criteria to identify potential Rural Industrial Clusters. These clusters will be the focus area for PEUC support in the coming

years and also guide CESC for sites for development of larger micro hydro or mini hydro power projects.

Outcome 4: Enhanced technical capacities and skills in design, manufacture, installation, and operation, management of rural RE projects planning, assessment and monitoring

Output 4.1 Established database of technical challenges and opportunities for the design, manufacture (for micro-hydro (60+ kW) and mini hydro), installation and after-sales service in micro-hydro (60+ kW), mini-hydro and large scale solar PV systems

Capacity of private sector actors and end-users needs to be enhanced to provide technical services for less disseminated technologies such as mini hydro ad large solar PV for quality and sustainability.

In 2014, RERL has been undertaking a study to identify gaps in survey design, fabrication, system integration, installation and after sales services for Mini/Large Micro Hydro and Large Solar PV systems. This study will look at the gaps and recommend potential solution measures along with time and cost required. The gap analysis will form the basis for AEPC's support to the private companies involved in mini/micro hydropower and solar PV promotion and development.

RERL has also been undertaking a study on total quality assurance mechanism for mini hydro and large solar PV as required by the Monitoring and Quality Assurance Unit of AEPC/NRREP, which is still ongoing.

Output 4.2 Fully trained skilled and technically capable people available for project identification, feasibility studies and detailed design of mini-hydro and large scale solar PV systems

RERL, in collaboration with AEPC/NRREP, prepared and published guidelines for Detailed Feasibility Study of Mini Hydropower Projects (>100 kW). Training for AEPC/NRREP engineers/programme officers was organized to orient them on the guidelines. RERL is working with Solar Electricity Sub Component of NRREP to prepare manual for large solar PV development. The Manual is expected to be finalized in March 2015.

RERL supported Outreach Component of NRREP to organize a workshop for District Environment, Energy and Climate Change Section and provided orientation on mini hydro and large solar PV project identification. RERL also oriented personnel of Regional Service Centre of AEPC/NRREP on project identification.

Output 4.5 Fully trained, skilled and technically capable people available for operation, maintenance and business management of mini-hydro projects and large-scale solar PV systems

RERL has been working closely with PEUC of NRREP to promote end-use applications to generate/enhance revenue for sustainable operation of RE projects.

In collaboration with Practical Action, RERL/NRREP organized a Training of Trainers for MHP operation. The trainees were selected from among the MHP Operators with good credentials. This is the first of its kind training for MHP operation and it is expected that the

trainees will be resource persons to train future operators. In line with AEPC's thinking, this training will not only help train rural people using local resource persons but also decentralize training activities to districts and regions. RERL and CESC and PEUC of NRREP plan to organize management training for large micro hydro in similar modality in 2015. In the long run, it is expected that operation and management trainings will be institutionalized at the local level in vocational schools and MHPs.

In 2014, RERL also helped PEUC/NRREP to organize to 2 orientation/training programs for district heads of CSIDB. They were familiarized on PEUC modalities, forms and formats for establishment of RE powered enterprises. RERL has also signed a Memorandum of Understanding (MoU) with CSIDB at the national level for joint collaboration in promoting productive end uses at larger micro-hydro, mini-hydro and large solar project sites

With an objective to remove barriers for promotion of less disseminated larger renewable energy technologies such as mini hydro and large solar PV systems, in 2015 project envisages supporting Central Renewable Energy Fund to design and implement financial instruments to attract private investment in renewable energy to meet the upfront cost through PPP modality.

5. Cross Cutting Issues

5.1 Gender Equality, Women's Empowerment, and Social Inclusion

Towards achieving the national goal of building an equitable and gender inclusive society by ensuring equal rights to women and men of all castes, creed and regions in the social, political and economic aspects of national development, AEPC/NRREP is promoting GESI sensitive renewable energy projects and productive end-use applications. RERL is supporting NRREP to mainstream Gender and social inclusion (GESI) in RE projects, particularly mini hydro, large micro hydro and solar PV systems.

In 2014, RERL initiated preparation of GESI sensitive PPP modality for development of mini hydropower projects. This modality focuses to protect the interest of women and other marginalized communities in rural/renewable energy projects while attracting private investment. As part of designing PPP modality, focus is being given on how to protect the interests of women and other marginalized communities in a commercial setup like Special Purpose Vehicle.

5.2 Capacity Development and Sustainability

Capacity development of all stakeholders including strengthening of AEPC's capacity is the key strategy of RERL for sustainable renewable energy systems and sustainability of the implementation approach itself.

5.2.1 Capacity Development

RERL has an extensive and elaborate capacity development package for the next five years targeting development and sustainability of less disseminated renewable energy technologies such as mini hydro and large solar PV installations. RERL supports in capacity development of AEPC through policy inputs and formulation of different modalities and approaches for renewable energy development. Support is also being

provided to the private companies involved in providing services and equipment related to mini/micro hydro and solar PV projects. Besides, RERL has been supporting in operation and management and productive energy use related training.

In 2014, RERL collaborated with Practical Action to provide TOT for MH operation. 20 operators were provided higher level technical training and aspects of training. They will work as the resource persons for MH operation training in future. Similarly training will be organized for MH management in close consultation with CESC and PEUC of NRREP in 2015.

Orientation on productive energy use enterprises powered by RE systems was provided to personnel/district heads of CSIDB with the intention that the district offices will facilitate in registration of enterprises and include AEPC supported entrepreneurs in their regular activities.

5.2.2 Sustainability Strategy

AEPC is implementing National Rural Renewable Energy Programme (NRREP) under a single programme modality. NRREP provides the framework for all other projects under AEPC including GEF-UNDP supported RERL. GEF projects are designed in such way that they provide incremental support to a baseline project/programme. All RERL activities support to achieve NRREP targets. As RERL will be preparing guidelines and manuals on different aspect of renewable energy promotion, particularly mini hydro and large solar PV systems, lessons from RERL will be internalized in AEPC/NRREP. RERL plans to strengthen the capacity of existing institutions for sustainability.

6. Partnership and collaboration

Dhading Solar: 140 Chepang households of Ward No. 3 of Mahadevsthan VDC in Dhading district have been living in extreme poverty due to remoteness and lack of resources. It is reached by 5 hours' walk from Talti Bazaar. Subsistence agriculture is the main occupation of the people. However, they do not grow enough to meet their own needs. The community lacks even the basic infrastructure such as electricity, tapped drinking water, irrigation, health and education. In this background, UNPD Nepal and RERL developed a proposal to support the Chepang community in Mahadevsthan VDC to have access to energy through solar photovoltaic systems in collaboration with UNDP Seoul Policy Centre and Bangkok Regional Hub (who linked UNDP Nepal team to the Gyeongsangbuk-do provincial government of South Korea). Gyeongsangbuk-do provincial government of South Korea showed interest on the RE work that UNDP was promoting in collaboration with the Government of Nepal and now has agreed to provide financial assistance to the above mentioned project. Under this initiative Chepang households will get access to electricity for lighting, water pumping, grain grinding and the local school will get computer and internet access. .

Lift Irrigation: RERL has supported the communities of different micro hydro catchment areas in Dhading district to install and operate 6 micro hydro powered lift irrigation systems. With the availability of additional water, the farmers are engaging in high value vegetable production. Besides RERL, financial resources were mobilized from DDC, Dhading, VDCs and the beneficiary households to undertake these projects. In similar manner, RERL supported COMSAC, an NGO registered in Dhading to prepare a proposal

to access Every Drop Matters (EDM) Fund. The proposal has been accepted by EDM steering committee and implementation will commence from early 2015.

Kabeli Transmission Project: Alternative Energy Promotion Center (AEPC) is implementing the World Bank funded Renewable Energy Component of the Kabeli Transmission Project. RERL is supporting AEPC to undertake all the activities under this Programme. RERL will assist AEPC to install a 350 kW mini hydropower plant and a mini grid interconnecting the plant with existing micro hydropower plants.

Practical Action: RERL and Practical Action and CESC/NRREP collaborated to organize TOT for MH operation. This is a first of its kind training for MH operation. The trainees will later work as resource persons and help decentralize and localize MH management and operation training.

6.1 South-South Cooperation

Electronic Load Controller (ELC) Technology Transfer to Cameroon

A representative of Cameroon's micro hydro installer companies' association was looking for electronic load controller (ELC) technology. AEPC/RERL shared related technical papers and design concepts to them. In addition, RERL coordinated meetings between leading ELC manufactures of Nepal and the Cameroon team. Cameroon representative was impressed with the in house technology in Nepal and is interested to transfer the technology to Cameroon manufacturers.

Small Hydro Training at IIT Roorkee

Small Hydro Development Training was organized by Indian Institute of Technology, Roorkee, between 13and 26 October 2014. The training was sponsor by International Renewable Energy Association (IRENA). RERL staff Mr. Jiwan Kumar Mallik participated in the training on small hydropower development. IIT Roorkee had provided similar training to two other RERL/DDC personnel in the past.

The Energy and Resources Institute (TERI)

With a view to provide impetus to rooftop solar PV systems uptake in India, The Energy and Resources Institute (TERI) has recently taken an initiative, called Solar PV for all (SPV4ALL: www.spv4all.org). Under this novel initiative, TERI has developed a first-of-its-kind cloud based open source Web-GIS tool for estimating rooftop solar power potential along-with an Android-based mobile application for creating consumer awareness and promoting Solar PV systems. Alternative Energy Promotion Centre (AEPC) has taken initiative for development of similar technology in Nepal and TERI is giving technical support in this regards. At the outset, significance of such tool and mobile application would have utmost importance for accelerated deployment of environment friendly solutions in Nepal. RERL has recommended TERIs "SPV4ALL" to be considered under Mobile for Good (M4G) Awards 2014 (Main Category) by Vodafone Foundation.

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7. Lessons Learned/ Implementation Issues and Challenges

RERL was initiated in July 2014 and there is hardly any learning from implementation of its activities. However, drawing from experience of past UNDP supported renewable energy projects, RERL team provided inputs for revision of some activities given in the project document during the Inception Workshop. Besides RERL team, UNDP Country Office and Regional Centre for Asia Pacific worked together to decide on the changes to the project document. Later, the changes were shared with sub/components of AEPC/NRREP and were agreed to.

8. A Specific Story

NA

9. Programmatic Revisions

Project Identification Format (PIF) for GEF UNDP RERL was submitted in 2011. There have been some major changes in the baseline situation. National Rural and Renewable Energy Programme, which is the single framework programme of AEPC/GoN on renewable energy was designed and operationalized in 2012. The ambitious target of NRREP aims to support all aspects of renewable energy development in the country. Even in this comprehensive package there some areas that have been left out, particularly R&D and innovations related to new technologies.

In this context, RERL Inception Workshop was organized on December 2 and 3 2014 with active participation of all concerned sub/components of NRREP/AEPC. The workshop agreed to make some major changes in outputs, activities and budget allocations. The main change includes reallocation of fund from Outcome 3, Improved Availability of Financial Investment support for Rural RE and other Low Carbon Technology Application. For this Outcome USD 950,000 was allocated. Under this Outcome are 2 Outputs; 1) Establish a Wholesale Financing Instrument to Incentivize Banking and Financing Institutions (BFIs) for financing domestic manufacturers to meet growing orders and be cost competitive, for which USD 450,000 was allocated; and 2) Establish a Wholesale Financing Instrument to Incentivize Banking and Financing Institutions (BFIs) to promote commercial financing for mini hydro and large solar PV projects, for which USD 500,000 was originally allocated. The reallocations for these two outputs are USD 100,000 each. Budget has been reduced for Outcome 3 as,1) CREF intends to establish fund to support for manufacturers/suppliers/installers of renewable energy technologies and thus only USD 100,000 has been reallocated, and 2) CREF has provision of built in interest rate spread as incentive for Banking and Financing Institutions (BFIs) and thus only USD 100,000 has been reallocated for this activity. With new allocations there will be a surplus of USD 750,000 in budget allocated for **Outcome 3, which will be reallocated for activities under Outcome 1, Strengthened legal, institutional, policy, planning and information environment ensures increased RE investment and utilization** and **Outcome 2b, Increased investments in RE through technical assistance to demonstrate attractiveness of larger systems.**

i. **Outcome 1, Strengthened legal, institutional, policy, planning and information environment ensures increased RE investment and utilization**: The original budget allocated for activities under Outcome 1 was USD 212,320 which has been increased to

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USD 272,500 with the difference of USD 60,180. The difference will be met by reallocated from surplus in Outcome 3. The increase in required budget is discussed below.

a. Output 1.1: Only 2 activities are planned under this output in the project document to prepare and operationalize Public Private Partnership (PPP) model for larger RE systems. However, it has been decided that more activities will be required to meet the target. New activities planned under this output include i) Preparation of Renewable Energy Policy and Renewable Energy Act documents, revision of Renewable Energy Subsidy Policy of GoN and Subsidy Delivery Mechanism.
b. Output 1.2: There is a surplus of USD 32,880 under this output. The surplus is mainly because the support for preparation of District Electricity Master Plan of 15 districts has been reduced as it is expected that District Development Committees will bear major responsibility for preparation of plans.
c. Output 1.3: Budget allocation for this output has been increased to meet the demand for training from AEPC/NRREP and other GoN agencies that have different roles in promotion of RE technologies and productive energy uses.

ii. **Outcome 2a, Increased investments in RE through financing demonstration projects on mini hydro, mini grid and large scale solar PV:** The project document envisages channeling of USD 1,172,278 through CREF to demonstration of 1 MW Mini Hydro, 1 Mini Grid and 500 kW Large Solar PV systems. The budget allocated for Mini Hydro remains the same in new allocations where as the allocations for Mini Grid and Large Solar PV systems have been reduced by USD

iii. **Outcome 2b, Increased investments in RE through technical assistance to demonstrate attractiveness of larger systems**: The total allocation for this output in the project document is USD 381,325 for 1 MW Mini Hydro, 1 Mini Grid, 500 kW large Solar PV and 2 MW large micro hydro demonstration projects. As activities under this output lead to demonstration projects that will demonstrate institutional modalities and financial viabilities of RE projects, the fund allocated is not enough. Thus, following changes have been made.

S.N.	Activities	Budget Allocated (USD)		Differences
		Pro. Doc.	Reallocation	
2b.1	Demonstrated PPP models facilitating cooperation between private sector, public sector, and local organizations through establishment of Special Purpose Vehicles (SPV) in three selected mini-hydro projects (1 MW)	180,585	420,990	- 240,
2b.2	Demonstrated sustainable and reliable mini-grid connecting micro-hydro power plant totaling 300 kW	0	49,411	-49,411
2b.3	Demonstrated financially sustainable and reliable large scale solar PV systems (500 kW total)	124,740	254,950	-130,210
2b.4	Operationalized 2 MW of off-grid large	16,000	307,000	-291,000

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	micro-hydro (over 60 kW) power projects demonstrating cost-advantage, feasibility, productive end-uses, and best practice through technical assistance			
2b.5	Completed financial closure of 7 MW of off-grid mini-hydro power projects replicating PPP model through establishment of SPVs, demonstrating cost-advantage, feasibility, productive end-uses, and best practice through technical assistance	30,000	170,000	-140,000
2b.6	Completed financial closure of 2 MW of large scale solar PV systems, demonstrating cost advantage over smaller PV systems, feasibility, productive end-uses, and best practice through technical assistance	30,000	0	0

10. **Future Work Plan or Priorities for 2015**

The main activities planned for 2015 are;

1. Support to finalize Renewable Energy Policy document and preparation of draft documents for Renewable Energy Act
2. Finalize PPP guidelines for establishment of Special Purpose Vehicle (SPV) to develop RE projects
3. Support to prepare District Rural Electrification Master Plan incorporating mini hydro and large solar PV systems
4. Support to design financial instrument to finance mini/micro-hydro and large solar projects
5. Initiation of 1 MW Mini Hydro and 1 Mini Grid as demonstration projects
6. Piloting of large solar PV projects
7. Promotion of productive end uses
8. Capacity development of manufacturers/installers/engineers on mini grid and large solar PV systems

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11. Risk and Issue Logs

11.1 Risk Log Matrix

#	Description	Category(financial, political, operational, organizational, environmental, regulatory, security, strategic, other)	Likelihood of risk (scale of 1 to 5 with 5 being the most likely) A	Impact (scale of 1 to 5 with 5 being the highest impact) B	Risk factor (A x B)	Mitigation measures if risk occurs	Date risk is Identified	Status
1.	Delay in approval of policy and acts	Strategic	3	2		RERL is designed to provide support AEPC in formulating related policies and strategies for larger system promotion. It requires wider stakeholder consultation, high level government participation and has to follow longer long administrative process for its approval.	Q4:- Formulation and Approval of RE Policy for which the larger stakeholder consultation is still pending despite efforts.	Active

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	Limited exposure in larger systems (mini hydro, mini grid and larger solar Systems) under public private partnership and unfavorable subsidy policy for private sector and larger systems	Operational	4	4		There are only few mini hydro plants supported for community participation including Haluwa Khola, salleri and Namchhe plants which were constructed with 100% donor support. No projects of larger solar systems (Village Electrification) Major challenge is for private sector investment and associated returns. Also current subsidy policy does not allow for private sector.	During planning process, Q-4	Inputs provided to Subsidy policy for revision and consultations among stakeholders including NRREP.
	Lack of Coordination with NRREP to assure co-financing in projects.	Operational	4	4		RERL needs co-financing from NRREP and hence the coordination at program level and implementation level should be strengthened, also the support structure at local level should be utilized for RERL activities.	Q-4	Enhanced Coordination and intensive discussion

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11.2 Issue Log Matrix

#	Type	Date Identified	Description and Comments	Resolution measures recommended	Status of the issue	Status Change Date
	Change in Projects than mentioned in project documents.	October 2014	The projects identified for implementation in Project document could not be implemented due to various reasons and hence the projects needs to be changed and for solar grid systems before wider dissemination, pilot activity should be carried out.	The issue has been raised in the inception workshop and agreed to change the project.	For the time being it is solved and will be reflected in the inception report.	Dec 2014
	Less mini hydro demands in AEPC as NRREP focus is more on micro hydro, and also there is financial gap for already identified projects of NRREP.	October 2014	There are only very few demands of mini hydro in NRREP/CESC component. As witnessed, three mini hydro projects initiated under CESC components took longer time for project implementation. Other identified projects are problematic one way	RERL program object and targets are oriented to RSC and other stakeholders and we hope to receive more practical demands in coming days.	Active	

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			or other mainly on financing parts.			
	Challenges for financial sustainability for isolated solar mini-grid and institutional and pumping solar systems.	October 2014	Solar Mini grid when operated in isolated mode can not supply enough energy for revenue generation. Also, the load management is critical issue for battery life. Also the PPP modality for institutional and pumping systems needs to be properly analyzed with financial cash flow.	RERL plans to carry out pilot activity before wider dissemination.		Dec 2014
	CREF modality is not clear.		The credit and subsidy will be mobilized through CREF and also there are components to develop financial instruments for CREF for possible funding.	Discussion with CREF ongoing.		Dec 2014

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12. Progress against annual plan

Project Title: Renewable Energy for Rural Livelihood Programme
Award ID: 76958
Duration of this plan : July - December, 2014
UNDAF/CPAP Outcome 2: Vulnerable groups have improved access to economic opportunities and adequate social protection
UNDAF/CPAP Output 2.4: . Vulnerable groups have improved access to sustainable productive assets and environmental
UNDAF/CPAP Output 2.4.1: . Alternative Energy Promotion Centre's capacity enhance for scaling up energy services in rural

EXPECTED OUTPUTS	PLANNED ACTIVITIES	Targets for Planned Activities	Annual achievement of Targets	Annual achievement of Targets in %	Donor name	Approved budget (from the AWP)	Amount spent	% of expenditure against the approved budget	Remarks (if targets not fully achieved)
UNDAF/CPAP Output 2.4.1: . Alternative Energy Promotion Centre's capacity enhance for scaling up energy services in rural areas									
Annual Target : Micro Hydros with the total capacity of 300 kW installed	**Outcome1 : Strengthened legal, institutional, policy, planning, and information environment ensures increased RE investment and utilization**								
	Output 1.1. Approved and enforced policy that enables PPP model for mini-hydro and large-scale solar PV development, including fiscal incentives and suitability for possible changes in Nepal government structure (to federal system)								
	Activity Result 1:								
	Activity 1.1.1 Preparation and adoption, approval and enforcement, of policy that enables PPP model for minihydro, micro-hydro, mini-grid and large-scale PV								
		Travel			GEF	400.00	353.00	88%	
	Revision of current subsidy policy (2013 version) to attract more private sector investment in off-grid mini-hydro, micro-hydro mini-grid, and large-scale PV projects	Workshop conducted with wider stakeholder on GEF Project	workshop organized	100	GEF	1,250.00	1,318.24	105%	
		PPP guidelines drafted and circulated for comments	Contract signed and inception	100	GEF	3,750.00	3,692.00	98%	
	Activity 1.1.2 Preparation and adoption of policy for future grid connection of off-grid mini-hydro, micro-hydro minigrid, and large-scale solar PV systems	Developed specifications for grid connection of mini-hydro, large solar PV systems, and micro-hydro	Contract signed	100	GEF	2,500.00	2,487.28	99%	
	Support Sustainable Energy for All (SE4ALL)	Consultants			UNDP	12,500.00	3,313.00	27%	
		Stakeholder Consultation			GEF	1,000.00	-	0%	
		Miscelleneous			GEF	300.00	230.00	77%	
	Output 1.2 Methodology and database developed and made available for incorporating mini-hydro and large scale solar PV systems into district RE plans								
	Activity 1.2.1 Preparation of the methodology for integrating minihydro projects and large-scale solar PV systems into district energy plans.	Support 1 DDC to prepare District Rural Electricfication Master Plan	Contract signed and inception	100		7,000.00	6,820.14	97%	
		Assess performance and potential for upgrading NEA owned Mini Hydro	Field report received	100	GEF	6,800.00	5,385.76	79%	
	Output 1.3 Completed training and awareness programs for relevant government agencies and stakeholders on mini-hydro and large-scale solar PV systems development and on productive end uses								
	Activity 1.3.3 Interaction with CSIDB for RE based MSME Promotion	Interaction with CSIDB for RE based MSME Promotion	2workshop organized	100	GEF	10,500.00	10,508.67	100%	
	Sub Total					**46,000.00**	**34,108.09**	**74%**	-

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	Outcome 2 (2b): Increased investments in RE								
	Output 2b.1 Demonstrated PPP models facilitating ooperation between private sector, public sector, and local organizations through establishment of Special Purpose Vehicles (SPV) in three selected mini-hydro projects (1 MW)								
	Activity Result 2:								
	Activity 2b.1.1 Updating of the feasibility study of the selected Minihydro demonstration projects to make it bankable	Publish Mini Hydro DFS Guidelines prepared by RERL/AEPC	Guidelines published	100	GEF	3,000.00	2,862.55	95%	
		Detailed Fesibility Study of Mini Hydro Projects completed	2 DFS completd	100	GEF	22,000.00	21,325.28	97%	
	Output 2b.2 Demonstrated financially sustainable and reliable mini-grid connecting ten (10) micro-hydro systems (300 kW)								
	Activity 2b.2.2 Establishment of a Special Purpose Vehicle	GESI sensitive draft guidelines prepared for Special Purpose Vehicle	Contract signed and inception report received	100	GEF	1,250.00	1,230.40	98%	
	Output 2b.3 Demonstrated financially sustainable and reliable large scale solar PV systems (500 kW total)								
	Activity 2b.3.1 Preparation of a shortlist of potential project sites selected based on a set of criteria and select sites in consultation with relevant stakeholders	Develop solar PV android mobile application for Nepal (SPV4N)	1 app developed	100	GEF	2,000.00	1,939.79	97%	
		Potential Solar PV sites Identified using GIS	100 sites identifiec	100	GEF	4,800.00	4,654.12	97%	
		Organized Orientation programme for RSCs/DEECCS to collect more demands for solar PV village electrification, institutional and pumping projects	2 workshops organized	100	GEF	4,000.00	3,948.77	99%	
	Activity 2b.3.2 Conduct detailed feasibility study of selected demonstration projects	Detailed Feasibility Study conducted of selected Solar PV demonstration projects	10 DFS report received	100	GEF	750.00	737.53	98%	
	Output 2b.4 Operationalized 2 MW of off-grid large micro-hydro (over 60 kW) power projects demonstrating cost-advantage, feasibility, productive end-uses, and best practice through techchnical assistance								
	Activity 2b.4.2 Assist AEPC/NRREP for DFS		7 DFS completed	88%	GEF	20,000.00	17,802.64	89%	
	Sub Total					**57,800.00**	**54,501.08**	**94%**	
	Outcome 3b: Improved design and packaging of investment support mechanisms for rural RE and other low-carbon technology applications								
	Output 3b.5 Functional enterprises adopting productive use of electricity								
		Travel			GEF	220.00	201.68	92%	
	Activity 3b.5.2 Support the RE project developers (SPVs) in preparing business plan for promoting productive use of electricity	Strengthen capacity of MHFG/ LEDC to identify potential enterprises in colaboration with PEUC/NRREP	15 training organized	100	GEF	15,000.00	15,000.00	100%	
	Activity 3b.5.5 Conduct exploration study for identifying potential and feasible enterprises in the project area	Support PUEC/NRREP to identify RE operated potential Rural Industrial Clusters	Field report received	100	GEF	7,000.00	6,777.35	97%	
	Sub Total					**22,220.00**	**21,979.03**	**99%**	

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	Outcome 4 : Enhanced capacities and skills of various stakeholders in the RE sector								
	Output 4.1 Established database of technical challenges and opportunities for the design, manufacture (for micro-hydro(60+ kW) and minihydro), installation and after-sales service in micro-hydro(60+ kW), mini-hydro and large scale solar PV systems								
		Travel			GEF	5,000.00	5,012.20	100%	
	Activity 4.1.1 Conduct a study on Identification of technical challenges and opportunities in design, manufacture, installation and after-sales service for Mini-hydro and Large-scale solar PV systems	Prepared draft documents on status of manufacturing, installation and after sales services related to mini hydro and large solar PV	Contract signed and inception report received	100	GEF	5,000.00	4,775.87	96%	
	Activity 4.1.2 Quality Assurance Mechanism for mini hydro and large solar PV developed	Quality assurance mechanism for mini hydro and large solar PV developed	Contract signed and inception report received	100	GEF	5,000.00	5,052.14	101%	
	Output 4. 2 Fully trained skilled and technically capable people available for project identification, feasibility studies and detailed design of mini-hydro and largescale solar PV systems								
	Activity 4.2.1 Development of manuals on project development, system design and integration manuals for large-scale solar PV systems	Manual for large solar PV development prepared and shared with relevent stakeholders	ToR prepared, consultant identified and Contract signed	100	GEF	2,450.00	2,459.02	100%	
	Output 4.3 Fully trained skilled and technically capable mini hydro manufacturers in identified areas and their after-sales services								
	Sub Activity 4.3.2.1 Support for local fabrication of Electronic Load Controller (ELC) for Mini-grid	Fabricated 2 Electronic Load Controller (ELC)	ELC fabricated & tested	100	GEF	5,000.00	4,832.15	97%	
	Output 4.5 Fully trained, skilled and technically capable people available for operation, maintenance and business management of mini-hydro projects and large-scale solar PV systems								
	Activity 4.5.5 Conduct O&M training for large-scale 60kW+ micro hydro plants	TOT for selected Operators	20 Operators trained	100	GEF	6,300.00	6,202.28	98%	
	Sub Total					**28,750.00**	**28,333.66**	**99%**	
	Activity Result 5:								
	Monitoring and Evaluation	Inception Workshop			GEF	2,300.00	2,298.67	100%	
	Sub Total					**2,300.00**	**2,298.67**	100%	
	Grand Total					**157,070.00**	**141,220.53**	**90%**	

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