CLIMATE INVESTMENT FUNDS

SREP/SC.6/8/Rev.2
October 27, 2011

Meeting of the SREP Sub-Committee
Washington, D.C.
November 1, 2011

Agenda Item 8

INVESTMENT PLAN FOR NEPAL

Proposed Decision by SREP Sub-Committee

The SREP Sub-Committee, having reviewed the *Investment Plan for Nepal*, (document SREP/SC.6/8/Rev.2),

a) endorses the Investment Plan as a basis for the further development of the projects foreseen in the plan and takes note of the requested funding of USD40 million in SREP funding from the initial allocation to Nepal. The Sub-Committee requests the Government of Nepal, in the further development of the proposed projects, to take into account comments submitted by Sub-Committee members by November 15, 2011.

b) reconfirms its decision on the allocation of resources, adopted at its meeting in November 2010, that all allocation amounts are indicative for planning purposes and that approval of funding will be on the basis of high quality investment plans and projects. The range of funding agreed for Nepal under the initial allocation is up to USD40 million in SREP resources;

c) further reconfirms that a reserve from the pledges to SREP as of November 2010 has been established, and that the Sub-Committee will agree on indicative allocations from the reserve to project proposals included in the investment plans once the investment plans for all six pilot countries have been endorsed and the Sub-Committee has approved criteria for allocating the reserve amount.

d) takes note of the estimated budget for project preparation and supervision services for projects included in the investment plan and approves a first tranche of funding for preparation and supervision services as follows:

    a. USD370,000 for "*Scaling Up Small Hydro Promotion Nepal"* (ADB)
    b. USD370,000 for the "*Scaling Up Access to Electricity in Rural Nepal"* (ADB)
    c. USD200,000 for the "*Sustainable Household Energy Solutions"* (IBRD)

Government of Nepal

Climate Investment Funds

SCALING-UP RENEWABLE ENERGY PROGRAM

INVESTMENT PLAN FOR NEPAL

September 2011

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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AEPC	Alternative Energy Promotion Centre
AEPB	Alternative Energy Promotion Board
BCF	Biogas Credit Fund
BSP	Biogas Support Program
BSP-N	Biogas Sector Partnership, Nepal
CAGR	Compound Annual Growth Rate
CBO	Community Based Organisation
CEF	Community Energy Fund
CESP	Community Energy Service Providers
CNI	Confederation of Nepalese Industries
CREF	Central Renewable Energy Fund
DEEU/ DEES	District Energy and Environment Unit/Section
DDC	District Development Committee
DoED	Department of Electricity Development
EIA	Environmental Impact Assessment
EPC	Engineer, Procure and Construct
ESAP	Energy Sector Assistance Program
ETFC	Electricity Tariff Fixation Commission
FNCCI	Federation of Nepalese Chamber of Commerce and Industries
GEF	Global Environment Facility
GHG	Greenhouse gases
GoN	Government of Nepal
GPOBA	Global Partnership on Output Based Aid
HH	Household
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IPP	Independent Power Producer
IPPAN	Independent Power Producers' Association, Nepal
IWM	Improved Water Mill
KfW	Kreditanstalt fur Wiederaufbau
LFI	Local Financial Institution
MDB	Multilateral Development Bank
MFI	Micro Finance Institution
MoEng	Ministry of Energy
MoEnv	Ministry of Environment
MoF	Ministry of Finance
O&M	Operation and Maintenance
NEA	Nepal Electricity Authority
NGO	Non-governmental Organisation
NPC	National Planning Commission
NRB	Nepal Rastra Bank (Central Bank)
PDF	Power Development Fund
PDP	Power Development Project
PFI	Participating Financial Institution
PHP	People's Hydropower Program
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
PV	Photovoltaic
REF	Rural Energy Fund
REP	Renewable Energy Project
RREP	Rural and Renewable Energy Program
REDP	Rural Energy Development Program
RERL	Renewable Energy for Rural Livelihood
RET	Renewable Energy Technologies
SHP	Small Hydro Power
SHF	Small Hydropower Fund
SHS	Solar Home System
SME	Small and Medium Enterprise
SREP	Scaling-up Renewable Energy Program
SREP-IP	SREP Investment Plan
TA	Technical Assistance
UNDP	United Nations Development Programme
VDC	Village Development Committee
WB	World Bank
WECS	Water and Energy Commission Secretariat
Wp	Watt Peak

TERMINOLOGY USED IN SELECTED TECHNOLOGIES

Hydro Power[1]

Small hydro power: Between 1 MW to 25 MW capacity, but limited to a maximum capacity of 10 MW for projects under the Scaling-up Renewable Energy Program (SREP). They are usually grid-connected, with or without reservoirs. For the purpose of the SREP Investment Plan, small hydro power (SHP) is more narrowly defined as projects in the range 1 MW to 10 MW. The discussion on SHP in this document thus pertains to projects in the capacity range relevant to SREP financing.

Mini hydro power: From 100 kW to 1 MW capacity. They are usually run-of-the river projects that serve nearby consumers through a mini grid.

Micro hydro power: From 5 kW to less than 100 kW capacity. They are run-of-the river projects that serve nearby consumers through a mini grid.

Pico hydro power: Very small localised plants of capacities up to 5 kW.

Water turbine mill: Hydro power plants that generate only mechanical power, typically in the range 5-20 kW. Used mainly for powering agro processing machinery through a belt drive.

Improved water mill: Improved version of the traditional water wheel, with a vertical axis and metal runner. Used mainly for grinding and hulling, but can also be used for electrifying a small number of households.

Biogas

Biogas is a mixture of gases mainly comprising methane (50-70%) and carbon dioxide (30-40%) produced by methanogenic bacteria feeding on biodegradable materials such as animal dung under anaerobic conditions. Biogas plants are categorised as either 'domestic' or 'institutional/community' based on ownership and usage. Plant sizes typically range from 2 m^3 to 100 m^3. The most popular size in Nepal is the 6 m^3domestic biogas plant.

Solar PV

Solar photovoltaic (PV) systems typically comprise a solar PV module that produces DC electricity, storage battery, charge controller and associated wiring and mounting structures. Inverters are used when AC electricity is desired, particularly for larger applications. Solar PV systems are mostly used for lighting (solar home systems and solar lanterns), communications and water pumping. The typical solar home system is a 20 Wp unit.

[1] Renewable Energy Data Book 2009, AEPC and other sources

EXECUTIVE SUMMARY

Introduction

This is an Investment Plan for funding under the Scaling-up Renewable Energy Program (SREP). Nepal is seeking USD 40M in grant funds from SREP to implement a well conceived and structured program to scale up Renewable Energy (RE) in the country. The SREP Investment Plan (SREP-IP) was prepared under the leadership of Government of Nepal (GoN) with assistance from experts engaged for the preparation of the IP and inputs received from a wide array of stakeholders including national and private sector institutions, industry associations, development partners and civil society. The SREP-IP also benefited from the experiences and inputs from Asian Development Bank, International Finance Corporation (IFC) and the World Bank. The SREP-IP complements the GoN's program for increasing the access to energy services from alternative energy sources.

Objectives

The objectives of the SREP program in Nepal are to: (i) leverage complementary credit, grant and private sector equity co-financing, (ii) bring about transformational impacts through scaling up energy access using renewable energy technologies (RETs), poverty reduction, gender and social inclusiveness and climate change mitigation, and (iii) ensure sustainable operations through technical assistance and capacity building.

Renewable Energy Sector Context

Nepal is presently facing an energy crisis of unprecedented proportions. The 706 MW total installed capacity of Nepal Electricity Authority (NEA), supplemented by purchases from India, is inadequate to meet demand. Forced load shedding has been inevitable, with attendant economic consequences. Only about 56% of the population has access to electricity, which includes off-grid solutions. In this context RE development, both on-grid and off-grid, is a high priority program of the government that has been supported through the enactment of relevant policies and national plans to attract private sector participation.

GoN has a goal of increasing the share of renewables from less than 1% to 10% of the total energy supply, and to increase the access to electricity from alternative energy sources from 10% to 30% within the next 20 years. Complementing these goals, the GoN envisages investments of USD 1,076 million in RE by 2020, which will include support for hydropower, solar PV and biogas technologies.

Several donor-assisted programs have been initiated in the past in the RE sector, many with follow on projects. Most of the programs will be completed during 2011-12, and development partners are presently designing cooperation programs in consultation with government. The SREP initiative will be a part of the larger program and add value to the overall renewable energy development of the country.

Expected Outcomes

The main outcomes of the GoN program that would be catalysed through the SREP interventions are:

- Additional financing leveraged with development partners and private sector equity to achieve GoN's goal in scaling up on-grid and off-grid energy access, from RE sources;
- Mainstreaming of commercial lending through financial institutions for small hydropower development, and other renewable energy projects where applicable;
- Rapid takeoff of small hydro power projects, resulting in about 50 MW of capacity addition through private sector participation;

- Electricity access to 250,000 households through 30 MW of mini/micro hydropower, and another 500,000 households through solar home systems totalling 10 MWp capacity;
- Access to clean cooking fuel for 160,000 households through biogas plants;
- Environmental, social and gender co-benefits, such as reduced GHG emissions, productive use of energy, extended hours for domestic work and children's education, improved access to information and empowerment of local communities, particularly women;
- Rationalised fund delivery for mini and micro energy projects through a single channel (the proposed Central Renewable Energy Fund) with different windows for disbursing credit and subsidies (which includes technical assistance);
- Transition of Alternative Energy Promotion Centre into Alternative Energy Promotion Board, which will serve as a one-stop shop for RE development in the country for projects up to 10 MW in capacity; and
- Information on best practices and lessons learned will be shared at national and international levels, and opportunities for developing RE will be fully understood by the public.

Program Criteria and Priorities

Considering the amount of funding available under SREP and the need to focus, only selected renewable energy options have been considered for assistance. They were evaluated against the SREP eligibility criteria based on (i) leverage (ii) transformational impact, and (iii) sustainability. Related barriers, risks and mitigation measures were also considered in their selection.

Accordingly, the SREP financing will focus on RE projects for two broad categories of investments, which require somewhat different development and financing approaches: (i) on-grid Small Hydro Power, and (ii) off-grid Mini and Micro Energy Initiatives, including mini and micro hydropower and solar PV for lighting and other productive end uses and biogas for cooking. Technical assistance and capacity building is a key component of the proposed program. The proposed program will complement a larger program, which will include other development partners and programs (such as the Rural and Renewable Energy Program). The proposed SREP investment program is summarized in the Table below.

Table ES 1:Summary of Proposed SREP Programs

Sector	Small Hydropower – SREP $20M	Mini and Micro Energy – SREP $20 M
Modalities	Structured Financing Facility: $20M for credit/risk coverage to domestic financial institutions/SHP, including Technical Assistance	Central RE Fund (under AEPC): $20 M for revolving credit/grant facility including Technical Assistance
Targets	50 MW new SHP capacity, selected from immediate pipeline of 100 MW	Biogas: $10.0 M for 160,000 biogas systems Mini- and micro-hydro: $5.0 M for 30 MW Solar Home Systems: $5.0 M for 500,000 systems

Physical Targets

The overall program targets set by government have been used as the basis in preparing this Investment Plan, which covers the period October 2012 to September 2017. SREP financing will be used to install 50 MW of small hydropower, 30 MW of Mini and Micro hydropower, 500,000 solar home systems, and 160,000 biogas plants.

Financing Plan & Channelling of Funds

The financing plan for the proposed SREP program for Nepal is provided in the Table below.

Table ES 2: Financing Plan, USD '000

Investment	GoN	SREP Initial Allocation	RREP	Other	Private Sector Equity	Total	% of Total
Small hydro power		20,000		58,750	33,750	112,500	22
Mini & micro hydro	20,000	5,000	60,401	21,265	26,667	133,333	26
Solar home systems	18,750	5,000	56,395	19,855	25,000	125,000	24
Biogas	20,000	10,000	56,703	19,963	26,667	133,333	26
Other RETs	1,500		6,500		2,000	10,000	2
Total	60,250	40,000	180,000	119,833	114,083	514,167	100

Notes:

1. The SREP USD 20 million allocated for SHP will be disbursed through a structured facility/SHP Investment Structure for partner banks or IPPs to provide Credit/Debt Facility, Risk Sharing Facility/Guarantees and/or Foreign Exchange Risk Cover Facility. (Note that USD 19 million is planned for use for the Investment Structure and USD 1 million set aside for related Technical Assistance. Note that this is an illustrative split of the use of funds)
2. The SREP USD 20 million allocated for mini and micro energy initiatives will be disbursed through CREF and utilised as a grant for subsidies and Technical Assistance; and as loans through a revolving fund. As estimated USD 2 million is to be used as subsidies and Technical Assistance, and USD 18 million for on-lending through the Debt Revolving Fund (this is an illustrative split of the use of funds)
3. Rural and Renewable Energy Program (RREP) is under an advanced stage of preparation and donors' commitment to funding is being secured (DANIDA has already committed DKK 205M).
4. 'Other' represents the funding gap and will be bridged through funds from other donors, bank financing, District Development Councils, Village Development Councils etc. The gap could partially be addressed through an allocation from the USD 60 million SREP Reserve.
5. The distribution of funding from RREP and 'Others' between the investment categories has been made in proportion to the respective total cost of each applicable RET[2]. However, it may vary depending on the donor/development partner selected for financing.

The proposed lead MDB to channel SREP funds for financing the programs in Nepal through three components is shown in the Table below.

Table ES 3: Channelling of SREP Funds

	Program	SREP Financing	Lead MDB
Component I: Small hydropower Development	SHP	$10m	IFC
	SHP	$10m	ADB (private sector arm)
Component II: Mini and Micro Initiatives: Off grid Electricity	Solar PV	$5m	ADB
	Mini/micro hydro	$5m	ADB
Component III: Mini and Micro Initiatives: Cooking	Biogas	$10m	WB

Results Framework

[2] Except for SHP which has only three sources of financing; hence 'Others' for SHP represents the total funding gap after accounting for equity and SREP financing

The SREP Results Framework is provided in the Table below.

Table ES 4: Results Framework

Results	Indicators	Baseline, Year 2010	Targets
Project Outputs and Outcomes			
1. Increase in the number of new connections	No. of HH accessing electricity from mini/micro hydropower[3]	TBD	250,000
	No. of HH using SHS	227,039	500,000
2. Increase in renewable energy supply/ capacity addition	Small hydro power	76.7 MW	50 MW
	Mini and micro hydropower	29.7 MW	30 MW
	Solar home systems for HH[4]	6.4 MW	10 MW
	Biogas (domestic)	238,587 plants	160,000 plants
3. Additional funding leveraged by SREP	Leverage factor, measured as SREP funding: sum of all other sources		At least 1:4
4. GHG emission mitigated[5]	Through small hydropower		120,000 tCO_2 p.a.
	Through mini/micro hydropower		69,000 tCO_2 p.a.
	Through solar PV		62,857 tCO_2 p.a.
	Through domestic biogas plants		800,000 tCO_2p.a.
Catalytic Replication			
1. Mainstreaming commercial financing through banks for RE projects	Total number of banks participating in the Program	7	7+
	Total number of loans disbursed	TBD	TBD
	Total value of loans disbursed	TBD	TBD
2. Improved the enabling environment for RE generation and use	Adoption of and implementation of low carbon energy development plans		TBD
	Enactment of policies, laws and regulations for RE development in general, and the setting up of AEPB in particular	RE Policy; Subsidy Policy for RE; Delivery Mechanism of Additional Financial Support to Micro/Mini Hydro project (2011), and RE Subsidy Delivery Mechanism	RE Act (including FIT), RE Central Co-ordination Committee, Central RE Fund Regulation, and Alternative Energy Promotion Board (AEPB) Act are planned
Transformative Impact in Nepal			
1. Economic development through productive end use of off-grid electricity	No. of new mini grid consumers using electricity for productive/ income generating activities	43,910	TBD
2. Gender and social inclusiveness	Number of women directly benefitting from improved home environment	TBD	TBD

[3] Assuming 120 W/HH, which may change later

[4] Assuming the most popular 20 Wp SHS, although the budget is adequate for larger systems as well

[5] These are indicative figure and need to be refined at the project design stage. Conversion factors from AEPC for mini and micro RETs: 'The Environment of the Poor in the Context of Climate Change and the Green Economy - Alternative Energy Linking Climate and Environmental Considerations', 2010

1. INTRODUCTION

1. Nepal is one of six countries identified for assistance under the Scaling-up Renewable Energy Program in Low Income Countries (SREP). As one of three programs under the Strategic Climate Fund, SREP aims to demonstrate the social, economic and environmental viability of low carbon development pathways in the energy sector. In particular, the objectives of SREP in Nepal are to: (i) leverage complementary credit and grant co-financing, (ii) bring about transformational impacts through scaling up energy access using renewable energy technologies (RETs), poverty reduction, gender and social inclusiveness and climate change mitigation, and (iii) ensure sustainable operations through technical assistance and capacity building.
2. The Government of Nepal (GoN) has designated the Ministry of Finance (MoF) and the Ministry of Environment (MoEnv) as the focal points for SREP. MoEnv has designated the Alternative Energy Promotion Centre (AEPC) as the lead agency for SREP-related activities.
3. This document is an SREP Investment Plan (SREP-IP), prepared under the leadership of GoN with assistance from consultants and inputs received from a wide array of stakeholders including Ministry of Energy and other government agencies, national and private sector institutions, industry associations, development partners and civil society. It complements the government's current Three Year Plan (2010-2013) and beyond for increasing the access to energy services from alternative energy sources.
4. Multilateral Development Banks (MDB) comprising the Asian Development Bank (ADB), World Bank (WB) and International Finance Corporation (IFC) jointly provided assistance and oversight for the Nepal SREP in collaboration with other development partners including the UN and bilateral agencies. ADB acts as the SREP country focal point.
5. A chronology of key events leading to the preparation of the SREP-IP is given below:

    - Joint MDB Scoping Mission, 3-8 February 2011;
    - Approval of an advance SREP-IP preparation grant in April 2011;
    - Joint MDB Programming Mission, 4-11 July 2011;
    - Stakeholder consultative workshop on small hydro power (SHP) and mini & micro energy initiatives, on 6 July 2011, in Kathmandu; followed by second stakeholder consultative workshop to review the draft SREP-IP, on 9 September 2011, also in Kathmandu; several one-on-one meetings with institutions, associations and individuals to elicit information and clarify matters (**Annexes 1 and 2)**;
    - Posting of the draft SREP-IP on the MoEnv website for public consultation on 15 September 2011;
    - The second and final Joint MDB Programming Mission, 20-22 Sep 2011;
    - Comments on Investment Plan from External Reviewer, Sept 25, 2011 (Response Matrix, **Annex 19**)
    - Finalisation of SREP-IP for submission to SREP Subcommittee, Oct 2, 2011.

2. COUNTRY CONTEXT

2.1. Overview

6. **Preamble:** Nepal is an low income country grappling with a different set of low-carbon development challenges compared to middle income and developed countries: (i) greenhouse gas (GHG) emissions are low; (ii) access to commercial energy services is low; (iii) transport infrastructure is limited; (iv) agriculture, livestock management, forestry, and other land use and land use changes account for a significant portion of GHG emissions[6]; and (v) public financing is limited, financial sectors are stressed, and the overall capacity to deliver start-up capital for infrastructure development is constrained. Although overall financing needs are low compared to more developed countries, innovative "bottom of the pyramid" business models are needed to monetise the value of GHG mitigation for up-front financing of low carbon development. To this end, Nepal needs support for holistic approaches to low carbon development and green growth comprising: (i) GHG mitigation in agriculture and livestock management; (ii) carbon sequestration in the forestry sector; (iii) low-carbon transport; and (iv) innovative financing including carbon markets, mobilisation of private capital seed funds, and risk mitigation products, including economic and political risk guarantees. SREP can be mobilized to cover some of the Renewable Energy (RE) needs, as discussed herein. In parallel, the Pilot Program for Climate Resilience (PPCR) is being mobilised, as well as the mechanism of Reducing Emissions from Deforestation and Degradation (REDD).

7. More than 80% of the population lives in rural areas, engaged in agricultural activities, and despite enormous hydropower potential, more than 80% of total energy consumption is from traditional biomass. *Only 8% of total energy consumption is in the form of petroleum products, but this consumes one-third of foreign exchange earnings*; this dependence on imported petroleum products needs to be broken in order to support long-term macro-economic growth. SREP will be utilized to address the under-served population's needs by focusing on the "last mile" of the energy consumption system and the "bottom of the pyramid" consumer base.

8. **Economy:** Nepal is a landlocked Himalayan country with an area of 147,181 km^2 and population of 28.6 million[7]. It is a Less Developed Country with a human development index (HDI) of 0.428[8] and per capita nominal GDP of USD 642. The GDP growth rate for the fiscal year 2010-11 is 3.47%[9]. Income inequality and low pay for women, especially in the informal sector, are some of the characteristics of the economy.

9. **Socio-political:** Nepal has a multiethnic society. The country is in the state of political transition and is in the process of transforming the unitary system of government into a federal state. Constitution making has been a very challenging task. Approximately 53% of the population live in the Hill Region (including about 5% in Kathmandu valley) and 40% in the Terai. About 83% of the population lives in rural areas, with agriculture as the main occupation[10].

[6] GHG emissions from agriculture and livestock management are mostly in the form of methane (CH_4) and nitrous oxide (N_2O) which have much higher climate change potential than carbon dioxide (CO_2), but which can be reduced the deployment of biogas digesters which mitigate methane while providing energy and residual biomass that can replace fertilizers with N_2O).

[7] Estimate for 2011, Central Bureau of Statistics

[8] Human Development Report 2010

[9] GDP 2011, Texts and Tables, Central Bureau of Statistics

[10] Population Profile of Nepal - 2007, Central Bureau of Statistics

10. **Geography:** Nepal comprises three ecological bands or regions that straddle the country: the Mountain Region in the north that borders with China, Hill Region in the middle which contains valleys (in which the capital city Kathmandu is located), and the fertile Terai Region (flatland) to the south that borders with India.
11. **Energy consumption pattern:** Total energy consumption in Nepal in the year 2008-09 was about 9.4 million tonnes of oil equivalent (401 million GJ). The composition of energy use is shown in Figure 2.1. As can be seen from the Figure, only 12% of energy consumption is from commercial energy sources such as petroleum and electricity. Petroleum products, which are imported and account for about 8% of the total energy consumed, and electricity represented only 2% of the total energy consumption in 2010.

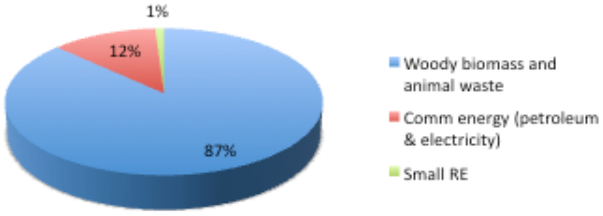


Figure 2-1 Energy Consumption Pattern in Nepal

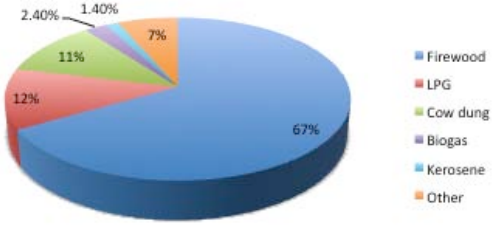


Figure2-2: Fuel use for cooking

12. Fuel use for cooking is shown in Figure 2.2. As can be seen from the figure, about two thirds of HH use firewood as their main source of fuel for cooking. The heavy reliance on such traditional fuels for cooking has a negative impact on family health due to indoor air pollution, and pose additional burdens on women who are tasked to gather the fuel. Overall, 75% of HH in rural areas and 36% of HH use in urban areas use firewood for cooking[11].
13. **Electricity access:** A little over half (56%) of HH in the country have access to electricity (including off-grid solutions)[12], while 33% of HH still depend largely on kerosene for lighting. As to be expected, urban areas have better access to electricity relative to rural areas (93% versus 49%)[13]. Almost all (99.7%) HH in the urban areas of Kathmandu valley have access to electricity.
14. The shortage of power and frequent power outages have severely constrained the economic growth of the country. Nepal's power generation capacity of 706 MW, which is predominantly hydropower, is insufficient to meet growing demand and has led to regular load-shedding during the winter (low river flow) season. Nepal, which built its first hydropower plant in 1911, has an estimated economically feasible hydropower potential of 42,000 MW spread across major river basins but much of this very significant potential is yet to be developed[14].
15. **Regional context:** Nepal's per capita primary energy consumption (14 GJ) is one of the lowest in the region; it is 52 GJ in China and 22 GJ in India, and the Asian

[11] Nepal Labour Force Survey 2008, Central Bureau of Statistics
[12] AEPC Annual Progress Report, FY 2009-10
[13] Nepal Labour Force Survey 2008, Central Bureau of Statistics
[14] The theoretical potential for hydropower is estimated to be about 83,000 MW and the technical potential is estimated to be about 45,000 MW. "Energy Sector Synopsis Report Nepal July 2010", Water and Energy Commission Secretariat (WECS), Nepal.

average is 26 GJ. With regards to electricity, Nepal's consumption is among the lowest, at 69 kWh per capita per year[15].

16. Nepal's GHG emissions are low, with total emissions estimated to be about 3.4 million tons CO2e per year, of which about 3.2 MtCO2e are from energy utilization (see Table 2.1). Carbon intensity of the economy and per capita emissions exhibited a somewhat stable trend during the past decade, while total GHG emissions increased (see Figure 2.3).

Table 2-1:GHG Emissions Excluding Land Use Change (million tCO_2e/y)

Activity	GHG Emissions (million tCO_2e/y)
Manufacturing and construction	1.2
Transport	0.9
Other fuel combustion	1.2
Industrial	0.2
Total	**3.4**

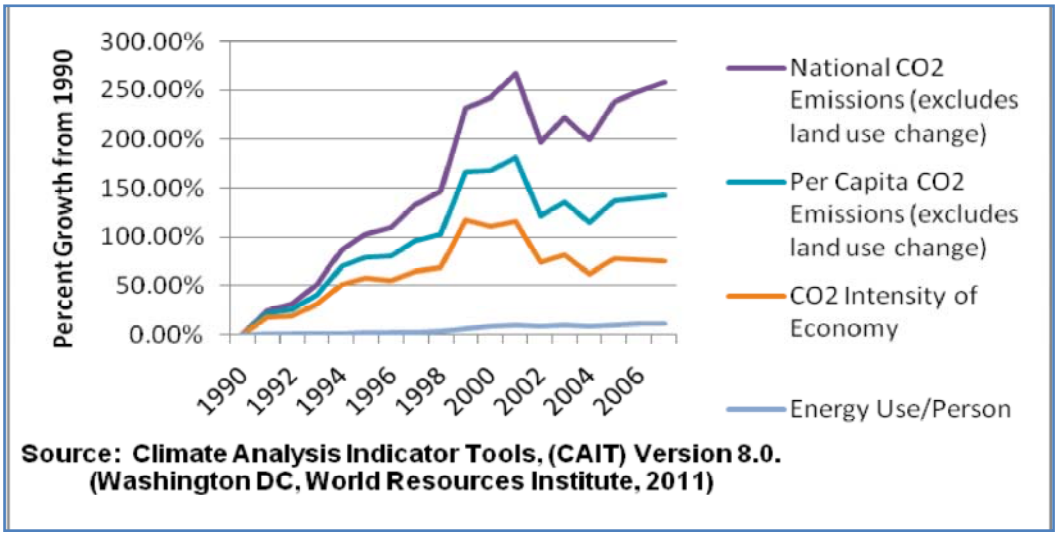


Figure 2-3: Greenhouse Gas Trends

2.2. Electricity Demand and Supply

17. At present, the Integrated Nepal Power System (INPS) has a total installed capacity of some 706 MW of which 652 MW (92%) is generated from hydro resources[16](see Table 2.2). The power sector presents the most severe infrastructure constraint for economic growth. In fiscal year 2010/2011, peak demand was 946 MW, versus 885 MW in the prior year. In the same fiscal year, annual energy demand increased 10% from the previous year to 4,833 GWh of which 982 GWh (about 20% of demand) was curtailed as load shedding. Domestic generation accounted for 3,157 GWh, and 694 GWh was met with net imports from India.[17] Thermal power generation represents less than 1% of grid-connected capacity.[18] This represents some improvement over the 2008/2009 fiscal year when system capacity shortage was about 50% of the demand at the peak-load (813 MW) period during the winter months. System losses

[15] National Energy Strategy Nepal 2010, WECS

[16] NEA Annual Report 2011

[17] Nepal Electricity Authority. 2010. *A Year in Review – Fiscal Year 2009/10*. Kathmandu. System performance data from page 10 and additional data from *NEA Transmission and System Operation Year Book Fiscal Year 2009/10*, page 20.

[18] This does not include the multitude of captive and backup generation units, which run on petroleum fuels.

were over 28% in fiscal year 2010/2011, an increase from 26.2% in fiscal year 2008/2009.

Table 2-2: Composition of Installed Capacity[19]

Source	MW	% of Total
Major Hydro (NEA) - grid connected	472.99	67.0
Small hydro (NEA) – isolated	4.54	0.7
Total hydro (NEA)	477.53	67.7
Hydro (IPP)	174.53	24.7
Total hydro (Nepal)	652.06	92.4
Thermal (NEA)	53.41	7.6
Solar (NEA)	0.10	0.0
Total capacity including private and others	705.57	100.0

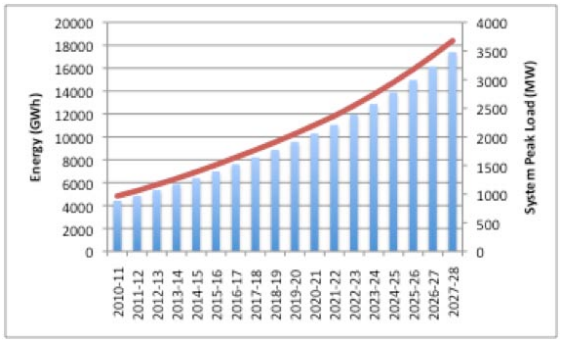
18. Demand is projected to continue growing at 7.6% annually until 2020. Due to the shortfall in power delivery capacity, the NEA introduced scheduled service interruptions (load shedding or "rolling brownouts") of 12 hours per day in 2010. These conditions provide a major opportunity for supply side and demand side energy efficiency improvements, as well as for use of other renewable energy (RE) sources to provide immediate relief to the grid.

19. The peak load in Nepal occurs during the winter when the run-of-river power plants generate at a lower capacity due to low river flows. The peak demand met by NEA rose steadily from 603 MW in 2006 to 946 MW in 2011, a compound annual growth rate (CAGR) of 9.4%. Likewise, the total available energy increased from 2,781 GWh to 3,858 GWh at a CAGR of 6.8% during the same period. The total number of consumers increased at a CAGR of 10.0% from 1.28 million in 2006 to 2.05 million in 2011, of which 95% comprise domestic connections.

20. Electricity sales by NEA increased from 2,033 GWh in 2006 to 2,735 GWh in 2011 at a CAGR of 6.1%. The domestic sector accounted for 43% of the total consumption in 2011, followed by the industrial sector at 38%, commercial (7.5%), non-commercial (4.0%), street lighting (2.4%), water supply & irrigation (2.0%), community sales (1.7%), and bulk supply to India (1.1%).

2.3. Demand Forecast by NEA and Issues

21. The energy and demand forecast for years 2010-11 to 2027-28 is provided in Figure 2-4 below. Electricity demand is forecast to reach about 3,679 MW in year 2027-28 (medium growth scenario) which is an increase of some 2,800 MW from the present peak demand. The energy forecast indicates an energy output of 17,404 GWh by 2027-28.



[19] NEA Annual Report 2011

Figure 2-4:Nepal Power System Load Forecast (source: NEA Annual Report, 2011)

22. Meeting the projected demand presents several challenges. Investment in generation, transmission and distribution is insufficient, and private investors and development partners have been reluctant to invest in the power sector because of several factors including, governance and institutional structures, which need strengthening; lack of institutional arrangements to mobilise the private sector; limited availability of domestic funds; relatively low consumer tariffs; technical and commercial losses; a financially stressed public sector utility; and inadequate human resource capacity.

23. Notwithstanding the above, progress is being made in addressing the power deficit. The recently approved WB-assisted cross border transmission project with India will help in reducing load shedding. The Electricity Tariff Fixation Committee (ETFC) is being reconstituted to review cost and retail tariff under an ADB-supported intervention. Likewise, some transmission improvement projects will facilitate a doubling of power delivery to the grid by 2017[20]. However, the issue of grid-connected access in new areas will remain a challenge in the long-term, and will be one of the areas addressed by SREP.

2.4. Electricity Tariff[21]

24. The NEA has 11 categories of tariff and uses a mix of minimum charge (with or without a portion of exempt kWh), energy charge and monthly demand charge. In addition, NEA has a Time of Day tariffs for consumers connected to 11 kV, 33 kV and > 66 kV. Details are given in **Annex 3**.

2.5. Small Hydro Power

25. Nepal has developed 24 Small Hydropower (SHP) projects (range 1-10 MW) totalling 64.6 MW in capacity. Of this, Independent Power Producers (IPPs) account for 47.3 MW, and the rest are NEA owned (see Annex 4 for list of SHPs). IPPs are presently developing 18 SHP projects totalling 77.7 MW. These projects are under various stages of completion (see **Annex 4**). NEA has also issued Power Purchase Agreements (PPAs) to 29 IPP projects with a total capacity of 103.4 MW, which are yet to achieve financial closure[22].

26. **People's Hydro Power (PHP)[23].** The GoN is considering a PHP scheme, which aims to assist District Development Councils (DDCs) to develop SHP by utilising some of the royalty payments received from SHPs in operation. The Department for Electricity Development (DoED) is to assist DDCs develop the plants. PHP is expected to contribute about 180 MW during the 2011-16 plan period.

[20] Transmission system expansion will connect new hydropower plants in the Tamakoshi River Valley to the grid, with more than 4000 GWh per year projected output by the year 2017

[21] NEA Annual Report 2011

[22] NEA is now considering the cancellation of PPAs to projects, which are taking an unduly long time to be implemented. Project developers with PPAs who have failed to develop the projects have been given 90 days notice to achieve financial closure, failing which the PPA may be revoked along with the termination of the generation licence. The government could reissue the licences to new developers on a competitive basis to develop the projects. The GoN has announced that projects over 10 MW will be awarded based on competitive bidding. Potential developers can still identify sites and apply for survey licences on a first come first serve basis for projects up to 10 MW.

[23] GoN, MoEn, DoED Project Document on Implementation Modality of People's Hydropower (for Projects 3 MW to 25 MW), April 2011

27. **Civil Servant Financed SHP:** This is a new proposal to develop about 50 MW of SHP with contributions from civil servants. Details have yet to be determined.

28. **Power Purchase Tariffs for SHP:** NEA purchases SHP power from IPPs at NPR 8.40/kWh (11.2 US¢/kWh)[24]during the dry season, and NPR 4.80/kWh (6.4 US¢/kWh) during the wet season, with a 3% price escalation for 5 years from the date of commercial operations.[25]

2.6. Mini and Micro Energy Initiatives

29. Several Renewable Energy Technologies (RET) based interventions with assistance from development partners have been initiated in the past in the mini and micro energy sector, and many projects are still in operation. Projects implemented during the last 10 years are summarized in Table 2-3: Micro Energy Capacity Addition.

Table 2-3: Micro Energy Capacity Addition

Year of Installation	Number of installations				
	Micro Hydro*	Pico/Peltric Hydro*	Improved Water Mills	Solar Home Systems	Biogas - Domestic
2000/01	40	112	107	6,211	17,857
2001/02	50	36	58	13,775	15,527
2002/03	34	61	65	18,482	16,340
2003/04	53	80	538	15,106	11,259
2004/05	35	66	599	17,887	17,803
2005/06	38	48	934	6,688	16,118
2006/07	42	46	851	10,806	17,663
2007/08	98	70	1,168	38,375	14,884
2008/09	86	32	1,073	53,662	19,479
2009/10	60	36	986	34,219	21,158

* The total installed capacity of these micro hydro and pico/peltric hydro power plants is approximately 15 MW.

30. The latest three-year averages indicate that 81 micro hydropower plants and 46 pico/peltric hydropower plants[26], 42,085 solar home systems and 18,507 domestic biogas plants are being commissioned annually through existing programs; indicating both the steady progress being made, as well as the vast gap to be bridged to meet the energy needs of off-grid communities.

31. **Suppliers:** Nepal has a large and vibrant private sector that provides goods and services to the RET sector. They are prequalified by the Alternative Energy Promotion Center (AEPC)[27]to ensure quality, these include 57 installation/construction companies for micro/pico hydro power projects and improved water mills (IWM); 52 consulting companies for survey and design of micro hydro projects; 81 biogas companies; 37 solar companies and 5 companies for quality control; 32 companies for the manufacture of improved cooking stoves; and 13 companies/institutions in the field of wind technology.

32. **Capacity Addition & Program Success:** Commissioning of micro energy projects supported by AEPC and donors through various projects and programs are summarised in Table 2-4: Summary of Installed RET Systems (as of 2010) below[28].

[24] at an exchange rate of about NPR 75 to 1.00 USD
[25] This reflects a 20% increase from the earlier PPA, and came in to effect as of March 23, 2011.
[26] with annual capacity addition of approximately 2 MW
[27] Renewable Energy Data Book 2009, AEPC updated with current statistics from AEPC
[28] Renewable Energy Data Book 2009, Biogas Year Book 2009 and AEPC Annual Progress Report 2009-10.

Table 2-4: Summary of Installed RET Systems (as of 2010)

RET	No.	Capacity	# of Districts
Hydro power			
Small hydro[29]	26	76.72 MW	
Mini hydro	40	14.95 MW	31
Micro hydro	864	14.75 MW	59
Pico hydro	1,262	2.45 MW	53
Improved water mill	7,686	-	46
Biogas			
Household	238,587	-	72
Community	61	-	20
Institutional	111	-	25
Solar PV			
Household	227,039	6.4 MWp	74
Institutional	259	0.22 MWp	42
Water pumping	79	0.14 MWp	26
Wind			
Off-grid	26	9.2 kW	11
Biomass			
Improved cooking stoves	560,167	-	48

[29] NEA, DoED and IPPAN, as of mid 2010

3. RENEWABLE/RURAL ENERGY SECTOR CONTEXT

3.1. Government's Policy and Targets for the Sector

33. RE is a priority program of government as it provides a least cost solution to remote, sparsely populated areas unviable for grid extension, while being clean, safe and environmentally friendly[30]. GoN's goal for the next 20 years is to increase the share of RE from less than 1% to 10% of the total energy supply, and to increase the access to electricity from alternative energy sources from 10% to 30%[31]. The low coverage of the national grid, increasing demand for rural electrification, appropriateness of decentralised energy systems in sparsely populated rural areas, availability of alternative energy resources, and the need to respond to climate change are some of the key drivers for increasing investment in the RE sector.

34. It is estimated that Nepal has about 42,000 MW of commercially exploitable hydropower[32] including over 100 MW of micro hydropower[33]; 2,100 MW of solar power for the grid[34]; and 3,000 MW of wind power[35]. Also, another 1.1 million domestic biogas plants[36]can be installed.

35. The government plans to mobilise investments amounting to USD 1,076 million in RE by 2020, which will include support for hydropower, solar PV and biogas technologies. The source of funds include government revenue, support from development partners, financing from local financial institutions and private equity. Complementing this, the current Three Year Plan (2010-2013) envisages the addition of 15 MW of mini/micro hydro power; 225,000 solar home systems; 90,000 domestic, 50 community and 75 institutional biogas plants; 1 MW of wind power; and 4,500 improved water mills.

3.1.1. Policies Relating to Micro and Mini Energy Initiatives

36. Supportive GoN policies include Rural Energy Policy 2006; Subsidy Policy for Renewable (Rural) Energy, 2009, Delivery Mechanism of Additional Financial Support to Micro/Mini Hydro project (2011), and Renewable (Rural) Energy Subsidy Delivery Mechanism, 2010. The policies provide guidelines on the institutional mechanism, subsidy criteria and delivery mechanism, including the setting up of a Renewable Energy Fund (REF), with AEPC playing a pivotal role. The subsidies, usually co-financed with donor funds under specific projects or programs, are primarily aimed at providing energy to low-income rural HHs. The REF is a successful fund, and is making all payments to manufacturers and installations in Energy Sector Assistance Program (ESAP) projects. SREP will build on its success by channelling credit for on-lending to MFI/LFI for mini-micro technologies.

37. Other enabling measures include the establishment of national, district, and community rural energy funds; tax and duty concessions and exemption of mini, micro and pico hydro projects from royalties and licensing requirements. **Annex 5**

[30] See section 5.4 on co-benefits

[31] Presentation by AEPC on Scaling-up Renewable Energy Program in Nepal, 6 Feb 2011

[32] WECS and UNDP estimates

[33] Energy Sector Synopsis Report Nepal 2010, WECS

[34] This potential is estimated to be realized by using 2% of the suitable land area. The average annual Solar irradiation in Nepal is estimated to be 4.5 kWh/sqm/day (Solar and Wind Energy Resource Assessment Report, 2008, AEPC)

[35] This potential is estimated to require about 10% of the suitable land area (Solar and Wind Energy Resource Assessment Report, 2008, AEPC)

[36] Biogas Support Program (BSP) Phase IV (2003-1010), 2009, AEPC

provides a summary of the subsidies and other government incentives available for projects employing RETs.

38. Although the Rural Energy Policy 2006 has already been promulgated, its execution needs various acts and regulations as defined by the policy. Some important acts/regulations like Rural Energy Act (including Feed-in-Tariff), Renewable Energy Central Co-ordination Committee, Central (Renewable) Energy Fund Regulation, and Alternative Energy Promotion Board (AEPB) Act are planned.

39. Official support for rural energy development (also referred to as RE) has been put into practice starting from GoN's Sixth Plan (1980-1985)[37]. The allocations to RET development under various development plans of Nepal are summarised in Table 3.1 below.

Table 3-1: Government Support for Rural and Renewable Energy Development

Period	Activity
Sixth Plan 1980 - 85	GoN subsidy of NPR 2.67 million to micro hydro entrepreneurs through the Agricultural Development Bank of Nepal
Seventh Plan 1985 - 1990	GoN made specific reference to the RET sector as a means of providing benefits to its rural population and conserving forest resources
Eighth Plan 1992 - 97	GoN provided NPR 330 million in the form of subsidies for the development of micro hydro, biogas, solar, biomass and wind energy projects
Ninth Plan 1997 - 2002	Total outlay of NPR 5,548 million, with NPR 776 million (14%) from GoN and balance leveraged with private sector and donor funding
Tenth Plan 2002 - 2007	Total estimated investment NPR 4,587 million, with GoN contributing NPR 550 million
Three Year Interim Plan 2007 -2010	Total investment NPR 4,957 million, of which about 80% is in the form of subsidy from GoN and donors;
Current Three Year Plan 2010 - 2013	Estimated investment of NPR 7,107 million, of which the GoN will contribute NPR 1,350 million in the form of subsidy.

40. The current Three Year Plan sets an ambitious target of providing electricity to an additional 7% of the rural population through RETs. Expenditure on RETs over the past decade has been around NPR 12 billion, and the current expenditure is close to NPR 3 billion annually.[38] The Plan also recognises the importance of Public Private Partnerships (PPP) in power development.

41. Sector Wide Approach: Following a feasibility study concluded in July 2010, AEPC is proceeding with an implementation study to introduce a sector wide approach for the rural/renewable energy sector which aims to promote a unified approach and delivery based on policy targets, and a joint approach to capacity development among key stakeholders.

3.1.2. Policies Relating to Small Hydro Power

42. **Nepal Electricity Sector Regulatory Framework.** To facilitate development of hydropower and attract domestic foreign investment, GoN announced a new Hydropower Policy in 2001.The new policy amended the royalty payments payable by SHP, with GoN providing several incentives for SHP development (see **Annex 6**).

[37] National Planning Commission Reports (various)
[38] AEPC Planning Unit

43. NEA made a commitment in 1998 to purchase all IPP power from projects below 5 MW at a pre-announced standard price. The policy was later amended to include power plants between 1 MW to 10 MW, and then more recently up to 25 MW.

44. The Electricity Act 1992 of Nepal recognised the concept of build-own-operate-transfer (BOOT) in developing hydro projects. Under BOOT, project ownership is transferred to the government after the expiry of the term of the licence, which is up to a maximum period of 50 years[39] for generation, transmission or distribution of electricity. The Electricity Act also prescribes terms for issues relating to royalties, taxation, foreign investment, export projects and guarantees that "no nationalisation shall be made of land, building, equipment and structure of the project."

45. Other relevant energy sector policies of GoN include the *Water Resources Strategy 2002* and *National Water Plan 2005*; *National Electricity Crisis Resolution Action Plan 2008*, introduced to address power shortages and included power purchase by NEA at a flat rate from IPPs up to 25 MW, an income tax holiday, acceptance of an Initial Environmental Examination (IEE) instead of an Environmental Impact Assessment (EIA) for projects implemented by 2011, and 80% government subsidy for plants below 1 MW capacity; *Reports of the Task Force* for Generating 10,000 MW Hydropower in 10 Years (2011-2020) and 25,000 MW Hydropower in 20 Years (2011-2030); and *National Energy Strategy 2009 (draft)*.

3.2. Energy Sector Institutional Structure

46. The principal institutions responsible for policy-making and program implementation in the RE sector are listed below.

47. **Ministry of Energy (MoEng):** Established in 2009 through a reorganisation of the former Ministry of Water Resources, MoEng's role includes planning to develop energy resources to accelerate the social and economic development of the country, policy development, energy conservation, regulation; energy research; promotion of multipurpose electricity projects; promotion of private parties in electricity development; bilateral and multilateral agreements for energy/electricity; tax related matters; and coordination of institutions related to the sector.

48. **Department of Energy Development (DoED):** A department under the MoEng, it is primarily responsible to ensure enforcement of the regulatory framework; accommodate, promote and facilitate private sector participation in power sector by providing a 'One Window' service; and issue licences for power projects.

49. **Nepal Electricity Authority (NEA):** Set up in 1985 through a merger of related government bodies, NEA is a vertically integrated state-owned firm under the MoEng responsible for generation, transmission, and distribution of electricity. NEA recommends long and short-term plans and policies and tariffs for the power sector. NEA is the only domestic off-taker of power and all domestic IPPs require a PPA from NEA to sell power to the grid.

50. **Water and Energy Commission Secretariat (WECS).** WECS was established in 1981 to develop water and energy resources in an integrated and accelerated manner in the country.

51. **Electricity Tariff Fixation Commission (ETFC).** Set up for the regulation of retail tariffs, ETFC has been reconstituted recently by cabinet.

[39] Hydropower Policy prescribes that generation licence for domestic supply shall be for 35 years, and 30 years for export oriented hydro projects. The term of licence for transmission and distribution is 25 years for each. Survey licences are for a maximum period of 5 years

52. **Ministry of Environment (MoEnv).** Set up as a separate entity in 2009 following a reorganisation, some of the main objectives of MoEnv include promotion of sustainable development through environmental protection; conservation; coordination of adaptation programs to minimise the negative impacts of climate change. The MoEnv is also responsible for policy and plan formulations and coordination of the RE sector.

53. **Alternative Energy Promotion Centre (AEPC).** Established in 1996, its role is to promote the use of RETs and the efficient use of energy, reduce environment impacts, develop commercially viable alternative energy technologies, and raise the living standard of the people, particularly in rural areas. AEPC is a semi-autonomous government body under the MoEnv and was formed under Clause 3 of the Development Board Act 2013 BS, and is currently operating under the mandate given by the Alternative Energy Promotion Development Board Formation Order (Fifth Amendment) 2063. Its governing board includes government, private sector, non-governmental organisations (NGOs) and financial institutions. To implement its mandate, the AEPC typically works partners including government agencies, donors, private sector and civil society[40].

54. The process to expand mandate of the AEPC and the establishment of the Alternative Energy Promotion Board (AEPB) through the promulgation of an Act has begun. The AEPB would be an autonomous agency with powers to raise grant and loan funds locally and internationally to develop RE, maintain a separate fund (refer Section 6 for a discussion on the Central Renewable Energy Fund (CREF)); provide support to local bodies, NGOs and CBOs; and promote PPPs in RE development. The AEPB will need organisational strengthening to implement its expanded mandate. A discussion on plans for the institutional development for the renewable energy sector and AEPB is given in **Annex 7**.

55. **Local Institutions and Communities in RET**: The mini and micro energy sector is supported by several industry associations that include the Nepal Micro Hydro Development Association, the Solar Electrical Manufacturers' Association of Nepal, and the Nepal Biogas Promotion Association. Two NGOs, the Biogas Sector Partnership-Nepal (BSP-N), and the Centre for Rural Technology-Nepal also support RET programs. The Association of District Development Committees of Nepal (ADDCN) and Association of Village Development Committee in Nepal (NAVIN) are important players actively engaged in advocacy, networking, and policy guidance in the renewable energy sector.

56. **Independent Power Producers Association of Nepal (IPPAN).** IPPAN is a non-profit, non-governmental organisation established in 2001 to encourage private sector participation in hydropower development in the country. IPPAN serves as a link between the private sector and GoN agencies, and helps in the exchange of technology, expertise, knowledge, financial and management information among the IPPs in the country.

57. **Other Industry Associations**: The Federation of Nepalese Chamber of Commerce and Industries (FNCCI), and Confederation of Nepalese Industries (CNI) serve as umbrella organisations with a mandate extending beyond RETs.

3.3 Ongoing and Planned Investments in Mini and Micro Energy

3.2.1. Past and Ongoing Programs

58. Several donor-assisted energy sector programs have been initiated in the past, many with follow-on projects. Projects under implementation are summarised in Table 3-2:

[40] AEPC Annual Progress Report, FY 2009-10

Recent and Ongoing RE Programs and briefly discussed below. Programs are externally co-funded with a total annual budget of almost NPR 3 billion in subsidy support. Many of the programs will be completed in 2012 or sooner, and development partners are designing cooperation programs in consultation with GoN, with SREP adding value to the initiative by being a part of the larger program.

Table 3-2: Recent and Ongoing RE Programs

No.	Project title	Donor	Unit	Allocated budget	Project completion date	Project description
1	Distribution system rehabilitation project	WB			2012	Improve technical losses and reliability of power supply, and to reduce technical losses in various places
2	Energy and customer accountability project	WB			2012	Regular energy audit of large customers, setting up remote GSM, and implementing GIS based network management
3	Energy Sector Assistance Programme (ESAP)	DANIDA, NORAD, KfW	NPR	3,828 million	2012	Preparation of national subsidy policy, TA for AEPC, financing for improved cooking stoves, micro hydro power, solar PV and setting up of solar test lab, REF and KKREP
4	Rural Energy Development Programme (REDP)	UNDP, World Bank	USD	9.305 million	2012	The fund is used for the subsidy to renewable energy and program support. The third phase of the programme was from 2007 to 2010 and extended up to March 2011
5	The Khimti Neighbourhood Area Development Project (KiND Project)	Himal Power Limited and UNDP			2011	The project is a kind of PPP to provide access to electricity to some 3,900 HH of Dolakha and Ramechhap districts through a 400 kW HaluwaKhola mini hydropower project in Namadi of Ramechhap.
6	Renewable Energy Project (REP)	EU	EUR	15.675 million	2011	REP commenced in April 2003 with support from the European Commission. It promotes the installation of institutional solar PV and solar thermal applications in schools, health posts and other institutions. The program will phase out in Feb2012
7	Biogas Support Program, phase IV	KfW/ GoN			2011	This supports biogas development in Nepal. BSP IV is the 4th phase of the program, and will end in 2011.
8	Improved Water Mill Program (IWM), Ujyalo Nepal Program& Special MH Program	GoN				This aims to provide access to electricity to HH of the selected districts through different RETs, the micro hydro being the principal technology. The RukumUjyalo Program was started in 2008 and the Ujaylo Nepal was initiated during 2009.
9	Micro Hydro Village Electrification Program (MHVEP)	WB	USD	12 million	2011	MHVEP commenced in 2003 with support from the World Bank under Power Development Project (PDP). This program is being implemented through REDP under AEPC. Phase 1 of the program was from July 2003 to December 2009. Phase II is being implemented from 2010 to Dec 2012.
10	Increasing Access to Energy in Rural Nepal	ADB	USD	933,000	2012	This supports pilot testing of innovative financing model, Social Merchant Banking, to promote improved water mill in rural Nepal.

59. Some specific details of the ongoing programs that are relevant to the implementation of SREP in Nepal are provided in **Annex 7.**

Planned New RE Programs

60. A **Rural and Renewable Energy Programme (RREP)** is presently being formulated as a follow-on to ESAP. The REF set up under ESAP will evolve into the proposed Central Renewable Energy Fund (CREF) as outlined by the Rural Energy Policy 2006.The design for CREF is being finalised, and it is envisaged that CREF will be a vehicle to mobilise both subsidy and credit funds for the RET sector.

61. A common platform for renewable energy development is presently being formulated that will attract the proposed RREP, SREP and other projects and programs in the sector.

3.4 Barriers that Impact Sustainability and Scaling Up of SHP and Mini-Micro Initiatives

62. **Small Hydro Power Sector.** Consultations with stakeholders indicate several barriers that impede the growth of the SHP sector in Nepal. **Annex 8** summarises discussions with stakeholders. The legal, policy, regulatory, institutional, financial, technical, and environmental barriers to SHP development, their impacts, and potential measure to mitigate barriers are provided in Table 3.3 below. Some of the principal barriers include: (i) need for conducive policies and regulatory framework; (ii) limitations on bank financing: unattractive loan tenor and interest as banks are unable to raise long-term borrowings; inability to hedge the exchange risk for foreign financing; (iii) streamlined licensing procedures; (iv) no single agency fully empowered to serve the SHP sector; (v) poor or no access infrastructure or power evacuation lines; (vi) need for EIAs;(vi) financial implications for NEA given that take-or-pay PPAs force it to absorb power from SHPs at all times, causing it to under utilise some of its own power plants; (vii) non-availability of equity and mezzanine financing for project developers; (viii) low load factors of SHPs and their inability to deliver energy during the periods of power shortages; (ix) suboptimal exploitation of hydropower sites due to ad hoc development resulting from the absence of integrated river basin plans; (x) lack of transmission lines close to SHP sites to evacuate power (xi) underwriting guidelines of banks which provide traditional collateral based lending; and low retail tariffs that result in NEA paying SHPs more than they can recover from customers; and (xii) high capital and cash reserve requirements.

63. **Mini and Micro Hydro Power Sector.** In common with many RETs, the main barriers are the high front-end cost and financing. The former is largely addressed through targeted output based capital subsidies. However, suppliers are concerned about the reliability of timely subsidy payments, which adds to their financing costs.

64. Other factors affecting RET development include: (i) lack of detail in implementation modalities, by-laws and guidelines relating to the Rural Energy Policy and Smart Subsidy Policy; (ii) poor knowledge of national renewable energy policies and the Rural Energy Policy 2006, in particular at district and village level; (iii) absence of a framework for PPP models in the RE sector (including revenue sharing models)[41]; (iv) access to term loans; (v) low load factors; (vi) projects that are too large for a small community of dispersed HH, but not large enough to be economically connected to the grid; (vii) lack of trained stakeholders; (viii) high capital costs; and (ix) high transactions costs due to remoteness of project locations, etc.

65. **Annex 8** provides a summary table of the key barriers and possible mitigation measures for the shortlisted RET subsectors for SREP support.

[41] RERL Program document

4. PROPOSED RET SUB-SECTORS AND CONTRIBUTION TO LOW-CARBON ROADMAP

4.1 Renewable Energy Technology Options and SREP Investment Context

66. Two main reasons are driving GoN's high priority in promoting the RET sector: (i) compared to extending the national grid, it is less expensive to provide access to modern energy services through RETs for remote and sparsely populated human settlements; and (ii) grid connections and RETs provide cleaner, safer and more convenient energy to people, which also support measures to mitigate greenhouse gas (GHG) emissions and climate change.

67. GoN's goal for the next 20 years is to increase the share of renewable energy from less than 1% to 10% of the total energy supply, and to increase the access to electricity from alternative energy sources from 10% to 30%[42], duly complemented by the current Three Year Plan (2010-2013). By 2020, GoN has a plan to mobilise investments totalling USD 1,076 million in renewable energy by 2020 (not including large hydro), of which USD 115 million will be allocated to mini, micro and pico hydro, USD 333 million for solar home systems and USD 135 million for biogas[43]. MoEnv is in the process of formulating a 20-year perspective plan for RETs.

68. SREP will complement the overall RET development program from 2012. Donors are designing cooperative programs in consultation with GoN, and SREP will add value to the initiative by being a part of the larger program. *SREP will support on-grid SHP and off-gird mini/micro energy initiatives, with the latter focusing on mini/micro hydropower, solar PV and biogas for cooking*. This will involve investment as well as related capacity building of local government bodies.[44]

4.2 Selection of Projects for SREP Financing

69. Considering the amount of funding available under SREP and the need to focus efforts, only selected RETs have been considered for assistance in this Investment Plan as indicated above. They were screened against three pillars that are aligned with SREP eligibility criteria, namely: (i) Leverage: ability to attract additional credit and grant funds; (ii) Transformational impact: potential for scaling up, potential for innovation, poverty reduction, gender/social inclusiveness, and climate change mitigation; and (iii) Sustainable operations: project readiness, cost effectiveness, fit with national priorities. The levelized cost of electricity generation from different energy generation sources in Nepal was also examined (see Figure 4-1: Levelised Cost of Generation for different power sources).

70. A discussion on the evaluation and selection of the technologies is given in **Annex 10**, and is summarised in Table 4-1: Selection Criteria and Short-listing of Projects below in terms of impact. Scoring is on a seven-point scale for each of the three pillars, with a score of 7 being the highest. Based on this analysis, it is proposed that small, mini and micro hydro power, solar PV and biogas technology based projects be supported under the SREP Investment Plan as they appear to have the highest overall impact.

4.3 Contribution to Road Map for Low-Carbon Development

71. The Three Year Plan for the period 2010/11 to 2012/13 identifies development interventions including development of the hydropower sector (SHP as well as micro-

[42] Presentation by AEPC on Scaling-up Renewable Energy Program in Nepal, 6 Feb 2011

[43] Report of the Task Force for Generating 10 MW Hydropower in Ten Years, MoEn, 2009

[44] Aide Memoire, SREP: First Joint Programming Mission to Nepal, 4-11 July 2011

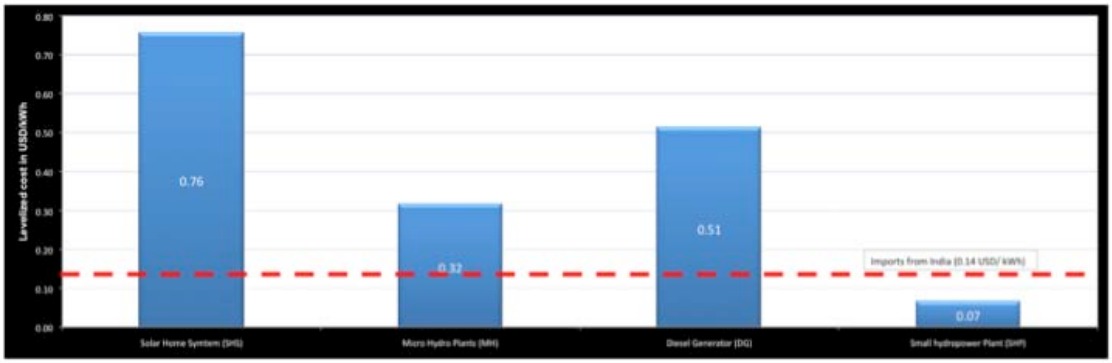
energy including biogas and SHS). The long-term targets up to 2027, are: Generating 4,000 MW of power by 2027 to meet domestic demand; Expanding electricity services to cover 75% of the population through the national grid, 20% of the population through isolated small and micro hydropower systems, and 5% of the population through alternative energy sources (e.g., biogas and SHS); and Increasing annual per capita electricity consumption to 400 kWh from the 71 kWh in 2006.

72. As per the Three Year Plan, the key strategies to be adopted by the GoN to achieve these targets are: Improving regulation of businesses involved in electricity generation, transmission, and distribution; Encouraging and promote private sector investments in hydropower through an effective one-stop approach so that investors can obtain all approvals from a single agency; and Expanding the capacity of the electricity generation, transmission and distribution systems for greater access and increased economic development.

73. To implement the above strategies and achieve the stated objectives, it is recommended that the GoN's RE Development Road Map should include the following principal elements: Establish an enabling framework of laws and policies to alleviate barriers to RE and mitigate associated risks; Develop an institutional framework to support RE development by the private and public sectors; Establish an institution with the authority and responsibilities necessary to serve as a single-stop window for RE development; Develop a financing mechanism, including risk mitigation instruments, to address the needs of project developers and commercial banks; Establish an electricity market structure for domestic use and exports that encourages development of RE; and Build capacity of public and private sector agencies to implement policies.

Table 4-1: Selection Criteria and Short-listing of Projects

Criteria	**Small Hydro Power**	**Mini Hydro Power**	**Micro Hydro Power**	**Pico Hydro Power**	**Improved Water Mill**	**Solar PV**	**Biogas**
Leverage	**3**	**5-7**	**5-7**	**1-2**	**1-2**	**5-7**	**5-7**
Additional credit funds	High	High	High	Low	Low	High	High
Additional grant funds	Low	High	High	Medium	Medium	High	High
Transformational Impact	**6-7**	**4-5**	**6-7**	**1**	**2**	**3**	**4-5**
Potential for scaling up	High	Medium	High	Medium	Medium	High	High
Potential for innovation	Medium	Medium	Medium	Low	Low	Medium	Medium
Poverty reduction	Medium	High	High	Low	Medium	Low	Medium
Gender/social inclusiveness	Medium	Medium	High	Medium	Medium	Medium	Medium
Climate change mitigation	High	Medium	Medium	Low	Low	Low	Medium
Sustainable Operations	**5-7**	**3-4**	**5-7**	**1**	**3-4**	**2**	**5-7**
Project readiness	High	Medium	High	Medium	Medium	High	High
Cost effectiveness	Medium	Medium	Medium	Low	Medium	Low	Medium
Fit with national priorities	High	High	High	Medium	High	High	High
Overall impact	High **14-17**	High **12-16**	High **16-21**	Low **3-4**	Medium-Low **6-8**	High-Medium **10-12**	High **14-19**
Relative ranking (A = Best)	**C**	**D**	**A**	**F**	**E**	**D**	**B**



Source: Data for SHS, Micro Hydro and Diesel Generators from “Smart pathways for providing electricity in developing countries, Brijesh Mainali and Prof. Semida Silveira Energy and Climate Studies School of Industrial Engineering and Management Royal Institute of Technology (KTH) Stockholm, Sweden, Risø International Energy Conference 2011, May 10 - 12. Data for SHS estimated based on typical cost of developing a 5 MW hydropower plant in Nepal

Figure 4-1: Levelised Cost of Generation for different power sources

5. PROGRAM DESCRIPTION

74. Nepal is seeking USD 40M in grant funds from SREP to implement a well conceived and structured program to scale up RE in the country. The proposed SREP investment program will support RE projects for two broad categories of investments, which require somewhat different development and financing approaches: on-grid Small Hydro Power, and off-grid Mini and Micro Energy Initiatives. The program is summarized in Table 5.1 and discussed below. Financing instruments are discussed in Section 6.

Table 5-1: Program Summary

Sector	Small Hydropower – SREP $20 M	Mini and Micro Energy – SREP $20 M
Modalities	Structured Financing Facility: $20 M for credit/risk coverage to domestic financial institutions/SHP, including Technical Assistance	Central RE Fund (under AEPC): $20 M for revolving credit/grant facility including Technical Assistance
Targets	50 MW new SHP capacity, selected from immediate pipeline of 100 MW	Biogas: $10.0 M for 160,000 biogas systems Mini- and micro-hydro: $5.0 M for 30 MW Solar Home Systems: $5.0 M for 500,000 systems

5.1. Small Hydropower

75. **Business Models for SHP Project Financing.** The prevailing view among stakeholders is that long-term sustainability of SHP requires developing robust market implementation mechanisms that will favour sound investment projects, which in turn will attract generation licences and capital. Direct subsidies are neither required nor advisable for development of SHP projects. This will allow debt finance providers to adopt suitable underwriting practices and finance SHP projects. There are several areas in which SREP can support SHP development while fostering a market-driven approach including but not limited to the following options.

76. **NEA Credit Support**. An explicit GoN guarantee of one or both of (i) the timely (rather than ultimate) payments by the NEA under the SHP Standard PPA, or (ii) a termination payment to cover debt repayment in the case of a termination of the PPA due to an NEA default.

77. **Credit Facility/Debt Facility**. Provide the Partner Bank with debt capital, whether funded up-front or provided as a committed credit facility, to finance its SHP debt portfolio. Such debt may be provided on an unsecured or secured basis.

78. **Risk Sharing Facility/Guarantees**. Provide guarantees to the Partner Bank to fund the SHP Project exposure and cover a portion of the losses on the SHP portfolio exposure.

79. **Foreign Exchange Risk Support**. PPAs are typically in local currency and pose a significant risk to projects, which have to procure equipment or financing in hard currency. NEA provides PPAs in hard currency for the proportion of the loan that is in hard currency for some projects, a policy that could be extended to SHP. Even PPA's in hard currency specify the exchange rate and thus present significant risks to developers. This is especially so given Nepal's pegged exchange rate regime, which would need to be hedged. SREP support could also cover foreign exchange risk for Partner Bank's exposures in its SHP loan book.

80. The proposed business models for financing SHP through SREP support are discussed in greater detail in Section 6 of this Investment Plan.

81. **Pipeline of SHP Investment Opportunities.** Several potential SHP projects in the range of 1-10 MW have been identified for investment. These include projects in the public and private sectors as described below.

Private Sector SHP Projects

82. According to the DoED licensing database there are some 635 SHP developers representing over 3,300 MW in SHP projects. Given that many of these projects may never materialise, it is more practical to consider SHP projects that have executed Standard PPA contracts with the NEA but have not yet achieved financial closure. A total of 27 such projects with an aggregate capacity of 102.3 MW are viable investment opportunities (see Table in **Annex 4**)

Public Sector SHP Projects

83. PHP Scheme: The PHP scheme is expected to develop 12 projects totalling 180 MW during the period 2011-16. PHP projects in the 1-10 MW range may be eligible for SREP support.

84. Civil Servant Financed SHP: There is a proposal to develop about 50 MW of SHP with contributions[45] from civil servants. Projects in the 1-10 MW range to be developed under this scheme may be eligible for SREP support.

85. **Financing SHP Investment Opportunities.** Based on an average SHP development cost of approximately USD 2,250 per kW in Nepal, financing a potential SHP investment pipeline of some 100 MW (which represents projects with PPA's but require financing) would require approximately USD 225 million. Based on prevalent financing terms in Nepal for SHP, the subordinated (e.g., equity) component of the capital sources is approximately 30%, indicating that the debt financing required for the representative SHP pipeline is some USD 160 million (NPR 11 billion). Assuming that an additional 15% financing (in the form of mezzanine or preferred shares) is required by the developers to meet lenders' 30% equity requirements, the total financing requirement for the representative SHP pipeline is about USD 200 million (NPR 13.5 billion). *While the potential pipeline for SHP is about 100 MW, SREP funds allocated to SHP would only support the development of about 50 MW.*

86. **Financing Capacity of Financial Institutions**. Financial institutions in Nepal consist of commercial banks, development banks, finance companies, micro finance institutions (MFIs), savings and credit co-operatives and non-governmental organisations (NGOs). The first three are licensed by the Nepal Rastra Bank (NRB) - the Central Bank of Nepal, but following the relaxation of licensing requirements of MFIs and financial NGOs, some MFIs are licensed by NRB and others, especially co-operatives, are regulated under the Cooperative Act.

87. The size and structure of Nepal's financial sector indicates that, subject to adequately mitigating the various barriers to financing SHP projects, some local funding sources are available which could also be leveraged to meet the financing requirements of the representative SHP investment pipeline and allow SREP to have the required transformative impact. For instance the Pension and Insurance Sectors in Nepal invest mostly in GoN instruments and in shorter-term bank deposits, and have therefore not entered the credit markets. But these sectors could potentially participate in any SREP initiative by mobilising funds to support longer term financing to the banking sector.

[45] Financed by the Provident Fund of employees

88. The commercial bank sector in Nepal is potentially another source of credit. Commercial banks account for more than 80% of the assets of the banking sector[46]. The aggregate domestic credit provided by the commercial bank sector is substantial relative to Nepal's SHP financing needs, but so far the actual credit availability and extensions to SHP from the commercial bank market has been limited. This is because commercial banks source their funding primarily from short term deposits, which carry interest rates of 8-10% and are typically demand deposits or fixed deposits for a period of one year. The interest spread in 4-5%, and the lending rates are typically above 14%. So for risk management and commercial reasons, commercial banks prefer to provide short-term financing facilities with one to three year durations to industrial and commercial enterprises with high turnover and short-term receivables as collateral, rather than to the SHP sector which need longer-term loan structures. The high interest rates for financing through local FIs coupled with the short tenor of loans, greatly impacts the project cash flows. A description of the capacity of local banks to finance SHP projects is provided in **Annex 11**.

5.2. Mini and Micro Energy Initiatives

89. **Mini and Micro Energy Financing.** Although many commercial banks have lent to RET enterprises, the concept of lending directly to individuals who are end users of micro energy systems is relatively new and untried. Lending to the sector has shown progress under ESAP, which introduced new financing models and risk mitigation measures[47].

90. Credit delivery and recovery to/from customers in remote areas is a major challenge for commercial banks. Some banks have built a close relationship with MFIs for their SME portfolio. This is an area that can be scaled up provided there are low cost long-term funds. Other banks have followed the Local Financial Institution (LFI) model adopted under ESAP.

91. Subsidy support will continue to be required for scaling up mini and micro renewable energy initiatives, which are typically off-grid and target remote rural communities. As noted previously, the important policies and delivery mechanisms are already operational, and the SREP initiative will complement the overall RET development programs that are currently being designed.

92. Under the Banking Act, banks are required to maintain at least 3% (which will reach up to 5% within the next four years[48]) of their loan portfolio in the 'deprived sector', which includes small and medium enterprises (SMEs) and RETs. Thus, there is potential for additional lending to RETs. Banks also recognize the need for capacity building of bank staff and participating micro credit retailers on RETs and technical support to evaluate project readiness for investment. Further, LFIs need training and support in social mobilisation work in remote areas[49].

93. **Business Models for Micro and Mini Project Financing.** SREP will be part of a larger RET program of GoN, and investments for mini and micro energy initiatives under SREP will build on the business models and supporting institutional arrangements that have worked well so far. *Funding from SREP for mini and micro energy initiatives will be channelled through two windows of the proposed CREF, one for subsidies and technical assistance, and the other for credit financing through a revolving fund*. SREP can help CREF be a credible financing mechanism for scaling

[46] Nepal Rastra Bank (NRB): Banking and Financial Statistics, No 56, January 2011

[47] Banks that have shown interest in lending to the micro hydro sector include Himalayan Bank, Nabil Bank, Bank of Kathmandu, Kist Bank, Kumari Bank, Agriculture Development Bank, and Clean Energy Development Bank.

[48] Monetary Policy 2011, NRB

[49] See Section 5.2 for a discussion on Local Financial Institutions (ESAP)

up RE and encouraging MDB and FIs to provide funds into the credit window of the CREF. SREP thus has an opportunity to demonstrate a model, which requires the working together of the private developers, community and a neutral development partner such as AEPC to provide comprehensive energy services through a community development program.

94. Climate resilient, gender mainstreamed and socially inclusive renewable energy planning will be an important consideration in program planning. Support to local government for planning, coordination and monitoring of RET programs at local levels will be an important consideration.

95. Nepal has introduced 'smart' subsidies for selected RETs (solar PV and biogas) to promote equitable development of energy access throughout the country. These subsidies aim to overcome disparities in terms of geographic regions; poverty levels; potential and level of penetration; and marginalisation of groups based on caste and other social factors. Further, the smart subsidies also take into account plant capacity as well as transportation costs.

96. **Subsidy Delivery.** The subsidy delivery mechanism is laid out in the Renewable (Rural) Energy Subsidy Delivery Mechanism, 2010 of GoN. This document formalises the arrangement, which has been in operation for many years and states that the REF will be the vehicle to channel subsidies. While alternative subsidy delivery routes prevail in some projects, plans are afoot to streamline all delivery through the proposed CREF.

97. **Mini and Micro Hydro Project Developers.** Subsidy support for the cost of the plant is staggered, based on predetermined milestones and verifications. Payments are released to the project developer and manufacturer/installer as appropriate.

98. **Solar PV Suppliers/Dealers.** The capital expenditure for the installation of solar PV systems in public facilities may be grant funded and guided by subsidy policy, with installations being managed by community organisations that collect the tariff to maintain the systems. Subsidies are available only for suppliers prequalified by AEPC, and disbursements are made on prescribed procedures as per the Subsidy Delivery Mechanism.

99. **Biogas.** The business model is well developed, and consumers select their supplier independently. Subsidies are disbursed based on procedures specified in the Subsidy Delivery Mechanism administered by AEPC. As discussed previously, the BSP is now in its fourth phase, with BSP-N taking over the responsibility for implementation.

100. **Credit Delivery.** This approach will continue under SREP as well as in the ESAP credit delivery model for RETs. This has three delivery options:

- In the first credit delivery model the partner banks (eleven in total of which six are presently active[50]) lend directly to the end user. Typical interest rate is about 14%, and the maximum tenor is 7 years. Collateral is a mixture of personal guarantees, project assets, deposits etc.
- In the second model banks lend direct to the end user but via an agent who acts on behalf of the bank to do the necessary paperwork, and sometimes even collect the loan instalments. The agent is known as a LFI and is generally a co-operative. Under Nepali law, co-operatives are independent legal entities and their by-laws allow them to borrow from financial institutions. As in the first model, the credit risk

[50] Himalayan Bank, Nabil Bank, Bank of Kathmandu, Kist Bank, Kumari Bank and Clean Energy Development Bank

in borne entirely by the banks. The LFI receives a one-time service charge of approximately 1-2% of the loan amount.

- Under the third credit delivery model, the LFI acts as a retail bank and takes on the credit risk. It borrows wholesale from the partner banks and lends retail to the users with a mark up. The final interest cost to the end user is about 18-20% p.a. (cooperatives generally are allowed to have a maximum spread of 6%); while the tenor is 1-3 years. Given the characteristics, this model is more appropriate for financing solar home systems and lanterns.

101. In contrast, REDP has a delivery mechanism different from ESAP only in that it channels subsidy funds through the district administration, namely, the DDCs and VDC's. Funds first go from the AEPC to the DEF at the DDC and then to a CEF at the community level. The community is empowered to operate this Fund to make payments to the supplier. The SREP intervention will also consider leveraging the REDP delivery model.

102. An important feature of SREP funding will be the access to long-term low cost credit financing for banks through the CREF. Risk mitigation instruments could also be considered. This will address a major barrier in scaling up investments in the energy sector.

103. **Credit Funds.** The Biogas Credit Fund (BCF) is financed by KfW and operated through AEPC. It is a revolving fund with credit delivery through MFIs, many of which are cooperatives. The AEPC lends to MFIs at 6% p.a. interest rate, which is then on-lent to consumers at an interest rate not exceeding 14% p.a. Of the 6% charged by AEPC, 2% goes back to the Fund, 1% to MoF and 3% is used as management expenses of BCF. AEPC monitors participating MFIs who are required to finance at least 10% of their loan amount with matching funds. Security to be provided by the MFIs is also regulated. The average cost of a domestic plant is NPR 50,000 and the maximum disbursement per plant is NPR 25,000.Credit recovery under BCF is good and this business model will be continued under SREP.

104. A Micro Hydro Debt Fund has been recently set up by AEPC with funding from GIZ (German Development Agency, formerly known as GTZ) amounting to EUR 500,000. These funds will be channelled through two commercial banks to develop micro hydropower projects in the range of 10-100 kW[51]. Although the amount is relatively small, this initiative holds promise for further scaling up to address the paucity of long-term loans for the larger projects.

105. Likewise, the CREF that is under preparation is expected to have a debt revolving fund for credit delivery for mini and micro renewable energy projects.

106. **Credit Enhancement Measures.** ESAP's main contribution to the development of RETs has been through innovative mechanisms including use of LFIs, taking insurance policies, and providing partial credit guarantees[52] to address some of the barriers to credit delivery. These mechanisms may be replicated with suitable adaptation under SREP.

107. **Outlook for Financing.** Overall, financial institutions have a positive perception of mini and micro RET investments and the measures available for risk mitigation. They have not attached an additional risk premium in terms of higher rates of interest to

[51] The AEPC may charge a management fee of up to 4% as opposed to LFI/Banks which may charge up to 12%

[52] Presently operated through the Deposit and Credit Guarantee Corporation (DCGC), a government-owned entity. DCGC guarantees 75% of the outstanding loan balances and charges ESAP a premium of 2-3% on the RET portfolio balance. Although banks have not yet called on the credit guarantee for the RET sector, the procedures for recovery are generally considered lengthy and time consuming. Furthermore, there is a cap of NPR 3 million for each loan that is guaranteed

the sector. Nevertheless, banks have expressed a need for greater access to long-term funds to refinance their lending to the sector and for further capacity development of their own staff and those of LFIs.

108. As previously noted, investments for mini and micro energy initiatives under SREP will strengthen any of the above models that have proved to be successful in the past, or variations thereof. Alternative business models that could further mainstream these technologies may also be considered, which include competitive procurement and geographic concessions:

- Bundling of micro hydro projects and bidding out to pre-qualified developers, thus minimising costs through economies of scale and achieving faster project completion times.
- A similar bundling approach for solar PV may be considered, but with the added feature of including PV installations in public facilities such as schools, health clinics, street lights etc[53]. The underlying objective is to cover the fixed costs of doing business in a remote or difficult territory in the bid price for PV installations in public facilities, thereby minimising the cost of SHS sold to HH as only the variable costs need to be considered in their pricing.
- Use of a fee for service model for HH to access electricity services through SHS. The tariff paid by the HH is pegged to an equivalent level of service from the grid. As the levelised cost of PV services is higher than the typical lifeline tariff applicable to such small consumers, the difference is paid (usually computed as an equivalent capital subsidy) to the service provider.

5.3. Technical Assistance and Capacity Building

109. The proposed transformation of AEPC into AEPB (with its mandate extending to SHPs of up to 10MW) will require institutional restructuring of AEPC through appropriate legislation and policy reforms, including the ongoing Strategic and Organisational Development initiatives. Further, the design, development, and setting up of the CREF together with the required operational and governance structures will require external advisory assistance. All these activities will be supported through SREP technical assistance where appropriate. Likewise, SREP technical assistance will be deployed for training and capacity building of other stakeholders, which may include:

Developing the capacity of banks to structure innovative financing mechanisms particularly for small and mini hydro power projects, distinct from the traditional collateral based lending

Conducting familiarisation programs for banks and LFIs on RETs

Training for system planning at the NEA and DoED for improved generation planning and greater coordination in issuance of SHP licenses with transmission system planning

Training on credit delivery models to establish and develop LFIs

Upgrading the design capabilities of manufacturers of small and mini hydro power plant and equipment, and large institutional biogas plants

Innovative approaches that will support scale up and wider outreach of energy access

Developing the capacity of local government units such as the DEEU and DEES under DDCs for supporting decentralised renewable energy development.

[53] This approach (known as Sustainable Solar Market Packages) was pioneered in the Philippines , where the winning bidder of a lot or package comprising a cluster of neighbouring villages is paid to install solar PV systems in identified public facilities, while being contractually obligated to market a minimum number of SHS to un-electrified HH in the same villages within a specified timeframe.

110. SREP technical assistance will also be used for overcoming other barriers through appropriate interventions. These may include support for productive end use promotion, studies, surveys, development of business models, development of technical standards and specifications, testing facilities, policy development and the like.

5.4. Co-benefits

111. The potential development of about 50 MW of SHP with SREP support will significantly add to the total installed capacity in the country, and have significant economic and social impacts. A key benefits of developing SHP projects is potentially making power available to parts of the country not previously electrified. This, however, will require significant investments in the transmission system. Another benefit of SREP support for SHP development will be the associated capacity building and strengthening of the capabilities of IPPs and EPC contractors in Nepal to develop SHP projects and local commercial banks to finance them. However, the pathway for development of SHP projects should consider and address the issues and constraints faced by NEA in incorporating non-firm power into the grid system.

112. Under SREP, an estimated 750,000 HH and small enterprises will gain access to electricity services through off-grid mini and micro hydro projects and stand alone solar PV systems. Apart from the direct benefit of having a convenient source of illumination, there are numerous social and environmental co-benefits such as: smoke-free and healthier indoor air; safety (kerosene bottle lamps often topple, leading to fires); security (through street lights, electric fences to protect crop etc.); extended hours for domestic work or children's study; prospects for day time productive use; access to information and entertainment (through radio, TV, mobile phones, internet etc); and the mitigation of GHG emissions by displacing kerosene lamps and candles.

113. It is targeted to install about 160,000 biogas plants (mostly domestic) under the Investment Plan. Biogas provides a clean and convenient source of heat for cooking and saves the drudgery of gathering fuel wood, a task typically assigned to women. In addition, the environmental co-benefits include the mitigation of deforestation, and the productive use of the slurry, a by-product, as an organic fertilizer.

114. All of the proposed programs support GoN's policy on renewable energy development and directly contribute to the country's need to improve energy security.

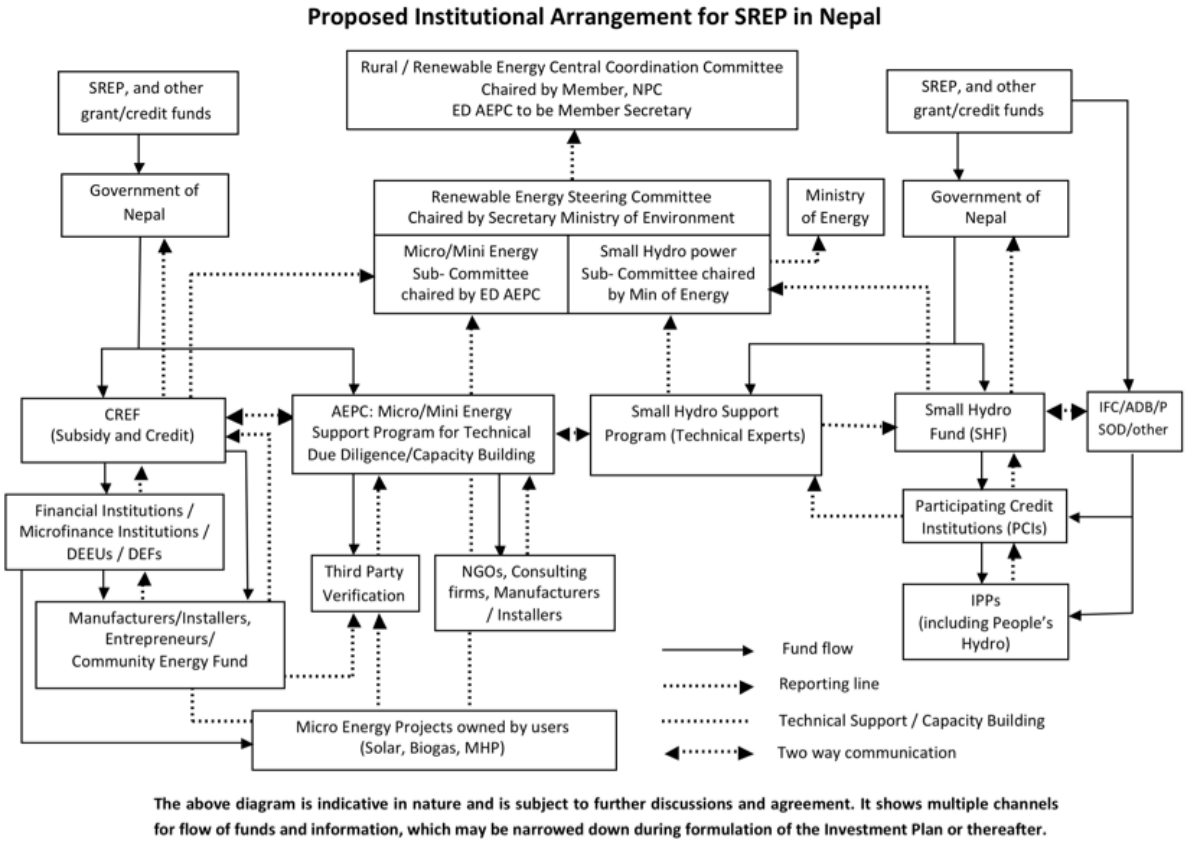
115. The proposed SREP implementation mechanism will ensure that information on best practices and lessons learned will be shared at national and international levels, and opportunities for developing RE will be fully understood by the public.

116. Further, several economic, environmental, social and gender co-benefits are triggered on many fronts that are not always immediately quantifiable. They include aspects such as the impact of improved access to information and empowerment of local communities, particularly women; and the socio-economic development of the community through opportunities for entrepreneurship that are unleashed by access to modern energy services.

5.5. Proposed Governance Structure

117. The proposed governance structure for the implementation of SREP in Nepal is provided in Figure 5-1.

Figure 5-1: Proposed Governance Structure for Implementation of SREP



The above diagram is indicative in nature and is subject to further discussions and agreement. It shows multiple channels for flow of funds and information, which may be narrowed down during formulation of the Investment Plan or thereafter.

6. FINANCING PLAN AND INSTRUMENTS

6.1 Small Hydro Power Financing

118. The objectives of the SREP with respect to SHP financing are to: (a) Reduce barriers to financing SHP; (b) Scale-up SHP by leveraging SREP investments with funds from the private and public sectors; and (c) Have a transformational impact in the local financial markets for SHP.

119. Nepal does not have a sufficiently developed capital market to absorb the demand for the long-term financing needed for development of SHP. Currently, Nepalese banks stretch their liquidity and underwriting criteria to finance SHP projects and are subjected to financing and credit risks that can lead to bank stress. A solution for scaling-up SHP financing with SREP funds would combine the strengths and comparative advantages of local and international capital providers to structure a platform for private capital and public/donor capital to work in partnership. SREP may be used to scale up SHP development through several different financing mechanisms, some of which are briefly discussed below.

120. **SHP Developer or Project Equity/Mezzanine Level**. SREP financing may be utilised to provide equity or mezzanine capital to eligible SHP developers. Co-investing with or providing mezzanine capital to SHP projects would mitigate a significant financial barrier to scaling up of SHP, and assist developers raise debt capital from credit institutions. The investment may vary from common equity in the SHP developers to co-investing directly into the SHP project either as equity or mezzanine debt and either on a funded or contingent basis.

121. **Project Senior Debt Level**. SREP financing may be used to co-invest with Credit Institutions in the senior debt of the SHP Projects directly addressing an important financial barrier. Currently, the banking sector is constrained by the size of individual credit exposures each can take on a specific SHP borrower, resulting in high participation rates within bank syndicates in order to fund SHP projects. The investment may be as a syndicate member or in contingent form by providing credit guarantees. The investment structure could also provide capital relief to the credit intermediaries to avoid single obligor exposure limits by absorbing a senior portion of the risk of ultimate loss in each SHP project financing.

122. **Take-Out Financing at Project Senior Debt Level**. Typically, the construction stage of an infrastructure project is relatively short and entails a significant degree of project risk. SREP financing could be used at the early stage, and after construction the project can seek long term financing based on the predictability of the cash-flow generation and the operating efficiency of the assets. Such long term financing will allow a debt capacity, which is higher than the short term construction financing and therefore allow for a lower equity requirement.

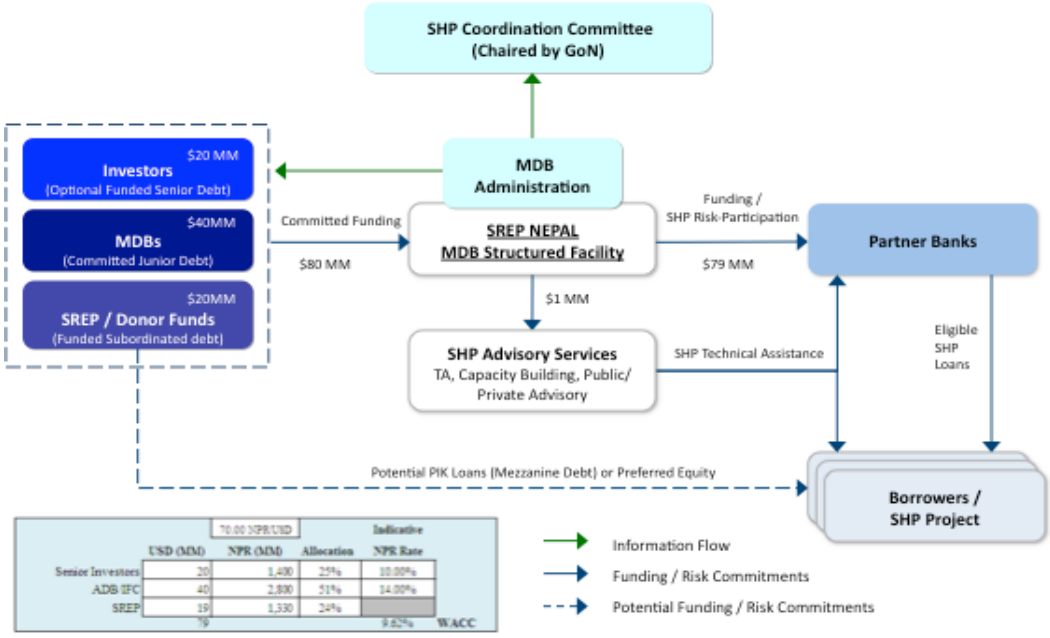
123. **Credit Institution Level**. SREP financing could be significantly leveraged by providing funding to local credit institutions to on-lend to the SHP sector. The SREP investment structure would have a transformational impact by focusing on the SHP project pipeline and underwriting criteria of the credit institution it supports. The investment structure would use SREP funds as a first tranche and be leveraged by debt provided by institutional investors such as MDBs or local banks looking to enter the SHP financing market at a higher level in the capital structure. The pension and insurance sectors in Nepal could also participate in more senior debt. SREP

financing to Credit Institutions may be in funded or contingent form and may also address a particular asset or risk. For example, the investment could be made to buy down high interest costs of the credit institutions such that their blended cost of funds is lowered, or to provide extension financing facilities to cover longer tenors to the credit institutions. The SREP investment structure would be exposed to risk related to each credit institution rather than the underlying SHP project.

124. An SHP investment structure, which provides capital commitments to credit institutions would be a beneficial use of SREP funds to scale-up SHP in Nepal. SREP financing would be offered to pre-selected credit institutions ("Partner Banks") that would finance SHPs meeting defined eligibility criteria. Furthermore, Technical Assistance funded by the SREP is recommended to provide advisory services and capacity building, SHP market information sharing, and developing SHP project financing expertise. **Annex 12** provides a Concept Paper on the proposed SHP Investment Structure.

125. Figure 6-1below provides an illustration of the proposed SREP Investment Structure for financing SHP. The SHP Investment Structure would initially be funded by a

Figure 6-1: Illustrative Example of Proposed SHP Investment Structure



SREP Structured Facility

combination of allocated SREP funds, which provide a first-loss layer above which the MDBs would commit a pro-rata share of financing capacity. The MDBs could subsequently raise additional capital from local financial institutions either on a senior basis, or pari-passu with the MDBs based on prevailing needs and local market appetite. The MDBs would also retain the ability to syndicate all or a portion of their committed financing capacity to the private sector. Figure 6-2 illustrates the effective leveraging of SREP funds. The compound financial leverage of the SHP Investment Structure could, based on conservative assumptions, exceed the 4:1 SREP guidance as measured by the total SHP capital sources mobilized by the SREP donor funds. Furthermore, to the extent that any SREP funds are used to provide subordinated

capital to SHP projects, the financial leverage as measured by the project equity capital would be higher for a 15% Mezzanine investment option (see Figure 6-2). It is important to note that the actual leverage of the SHP Investment Structure when implemented is subject to change and is dependent on factors such as the investment committee requirements of each MDB, the investment appetite of local financial institutions, the financial strength of the partner banks, and the viability of their SHP project target portfolios.

126. The proposed SHP Investment Structure would maximise the leveraging of SREP financing while retaining a flexible implementation mechanism, which is important given that the financing barriers to be addressed may change due to changing market conditions, financing practices, and policy responses by the GoN. Therefore, a market-responsive approach utilising a broader set of negotiated financing solutions may be more successful in deploying SREP funds. The proposed SHP Investment Structure will not be programmatic in its execution; rather, it will foster negotiated solutions for each partner bank based on its financial profile and the merits of its SHP project target portfolio.

127. **Annex 13** provides more details of the investment alternatives for financing SHP with the Investment Structure.

	No Mezzanine USD (MM)	15% Mezzanine USD (MM)
Senior Investors	20	20
ADB/IFC	40	40
SREP	19	19
Total Debt Funds	79	79
Project Equity (30%)	34	14
Total Sources	113	93
SREP Leverage *(Total Sources/SREP Funds)*	**5.64x**	**4.65x**
Project Leverage *(Total Sources/Project Equity)*	**3.33x**	**6.67x**

Figure 6-2: Illustrative Example of Potential SREP Leverage with and without Mezzanine financing

6.2 Central Renewable Energy Fund

128. CREF is being established to consolidate and streamline present and future funding for the mini and micro energy sector through a single channel, including the absorption of REF. This will harmonise and simplify prevailing systems and procedures while incorporating new features, and thus attract greater investment and private sector participation in the sector. CREF will disburse funds through two windows, one for subsidies and technical assistance (TA), and the other for credit. .

129. For SREP mini and micro funding, the CREF credit window will be closely linked to AEPC but administered independently of the day-to-day influence of AEPC, while operating within the modalities provided by the CREF Board. The prevailing REF administrative structure may therefore be modified and expanded to include CREF. Under the arrangements being contemplated, AEPC may provide the Secretariat for the CREF Board, thus playing an important role in the formulation of operating modalities and later maintaining an oversight during program implementation. The

draft regulations[54] propose that CREF will be governed by a Governing Council consisting of 11 members with representation from relevant government agencies and the private sector, with the Executive Director of AEPC also functioning as Secretary. The draft also proposes an Executive Committee for day-to-day management.

130. CREF would constitute several windows of financing representing the fund delivery mechanism of each donor/program. REF will be merged into CREF. The biogas component already has a credit scheme and its delivery will be through the CREF.

131. The two main funding instruments envisaged for mini and micro energy initiatives are subsidy/TA and debt. The subsidy thresholds (**Annex 5**) and delivery mechanism for each RET will be similar to that at present, but delivery will be through CREF.

132. The SREP funds, which will be a grant to GoN, will flow through the MoF and NRB into CREF. The amount to be disbursed as subsidy will flow to the RETs in a similar manner as at present in accordance with the GoN Subsidy Policy. The portion to be used for lending will flow through a Debt Revolving Fund within CREF to be re-lent to the banking sector/Participating Financial Institutions (PFIs) for on-lending to retailers such as LFIs and MFIs. PFIs may also lend directly to end users. PFIs will leverage their own funds with the refinance obtained from the Debt Revolving Fund when lending to sub-projects. The refinance component of repayments from PFIs, LFIs and MFIs will flow back to the Debt Revolving Fund for further lending. All funds borrowed need to be repaid, and hence PFIs assume the credit risk of LFIs/MFIs, while the latter assume the credit of end users[55]. The proposed funds flow structure is presented in the Figure 6-3.

133. Collateral for PFI loans to LFIs/MFIs may be asset mortgages and guarantees. When LFI/MFIs lend to individual end users in the micro energy sector, collateral arrangements do not apply, as they instead rely on peer pressure through group guarantees, recognition of seasonal income patterns and other informal methods, which are more appropriate to the rural poor.

134. Guidelines and criteria will apply in respect of selection of PFIs, re-lending and on-lending terms, collateral, eligibility of purpose and end users. Indicative figures are discussed below[56]. For instance, interest rates levied by CREF may be a maximum of 2% p.a. to cover administrative costs, by PFIs limited to 6% p.a., and by LFI/MFIs limited to 12% p.a. The maximum spreads of 4% for PFIs and 6% for LFI/MFIs are within industry norms. The maximum tenor of loans from CREF to PFIs would be seven years, and the same will apply for loans from PFIs to LFI/MFIs.These terms are for illustration purposes and the actual terms may differ.

[54] 'Drafting Regulations for the Formation of the Central Renewable Energy Fund', draft final report of February 2011; prepared for AEPC by Vipramshree Energy Pvt. Ltd., Nepal in joint venture with Legal Research and Development Pvt. Ltd., Nepal

[55] Lessons learnt from the Nepal PDF and the successful Sri Lanka ESD and RERED Projects (both World Bank and Global Environment Facility-assisted) could be considered in the design

[56] 'Drafting Regulations for the Formation of the Central Renewable Energy Fund', draft final report of February 2011; prepared for AEPC by Vipramshree Energy Pvt. Ltd., Nepal in joint venture with Legal Research and Development Pvt. Ltd., Nepal

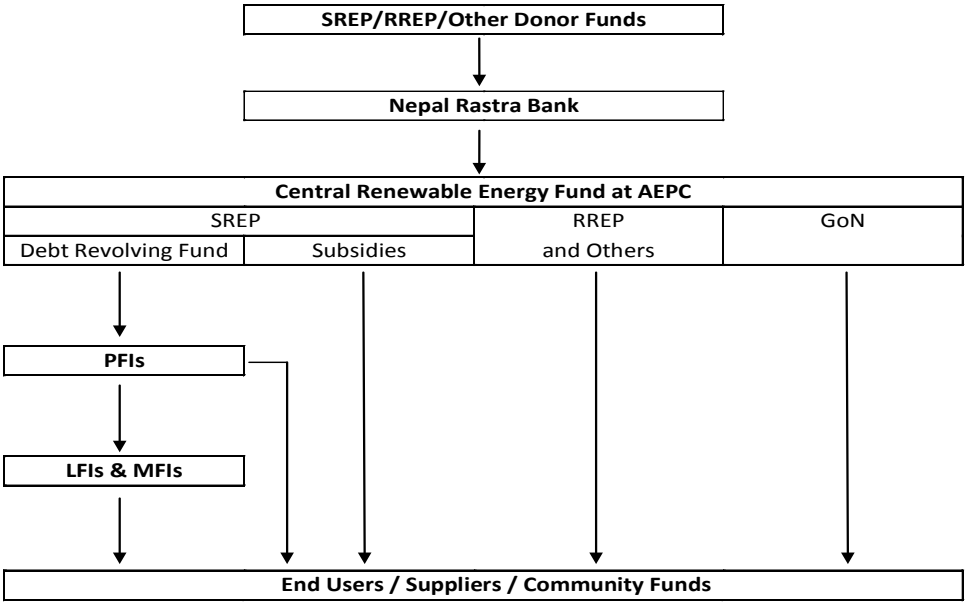


Figure 6-3: Proposed CREF Funds Flow Structure

6.3 Role of Private Sector and Leveraging of Resources

135. The Nepal SREP funding of USD 40 million will be leveraged at least 1:4 with additional resources comprising credit, grant and equity from other development partners, GoN and the private sector. The SREP funding will be divided roughly equally between SHP projects up to 10 MW in capacity, and mini and micro energy initiatives.

136. In general, the prevailing platform and modalities will be adopted for the implementation of the mini and micro energy initiative component as discussed earlier. SHP projects, and where appropriate mini hydro projects, will continue to adopt the IPP and PPP models, with equity financing from the private sector.

137. Grant funds sourced from donors and development partners will be channelled through CREF that will essentially provide (i) subsidies and TA, and (ii) refinance to financial institutions that lend directly or indirectly to the renewable energy sector.

6.4 Program Targets for 2012-2017

138. The SREP Investment Plan covers a five-year period from October 2012 to September 2017. Being part of a greater program (including RREP, which is expected to be operational by mid-2012, and other yet to be identified projects and partners), SREP inputs will be viewed as a complementary component supporting national targets, and not as an independent project. The program targets are consistent with the GoN's strategy to increase energy access, and the mini-micro energy initiatives will cover areas not covered by the grid.

139. ***The overall program targets for the SREP-Investment Plan are to develop 50 MW of SHP, 30 MW of mini and micro hydro (skewed towards micro hydro), install 500,000 SHS, and 160,000 biogas plants***.

6.5 Cost Estimates

140. The costs of the above plants or systems vary according to capacity and geographic location. The latter affects costs through factors such as availability of physical infrastructure, access, distance, terrain and the like. Costs also vary with time. **Annex 14** provides average historical costs of typical mini and micro energy plants and an estimate of future costs (or pre-subsidy market prices as the case may be) that are expected to prevail during the Plan period. The estimated costs are as follows: SHS – NPR 162,000 (USD 2,250) per kW[57]; Mini & micro hydropower – NPR 320,000 (USD 4,444) per kW; SHS – 20 Wp, NPR 18,000 (USD 250) per system; and Biogas – 6 m^3, NPR 60,000 (USD 833) per plant[58].

141. Other principal assumptions used in the analysis are a 50% split of SREP funds for SHP and micro-mini initiatives, exchange rate of NPR 72 per USD, private sector equity of 20% of SHP, GoN contribution of 15%, as applicable; RREP financing of USD 180M; and additional funding to finance the shortfall.

6.6 Financing Plan

142. Table 6-1: Financing Plan, USD '000 below provides the financing plan. The Investment Concept Brief for SHP is given in **Annex 12.**The Investment Concept Briefs for mini-micro hydropower, solar PV and biogas are provided in **Annexes 15, 16, and 17** respectively.

Table 6-1: Financing Plan, USD '000

Investment	GoN	SREP Initial Allocation	RREP	Other	Private Sector Equity	Total	% of Total
Small hydro power		20,000		58,750	33,750	112,500	22
Mini & micro hydro	20,000	5,000	60,401	21,265	26,667	133,333	26
Solar home systems	18,750	5,000	56,395	19,855	25,000	125,000	24
Biogas	20,000	10,000	56,703	19,963	26,667	133,333	26
Other RETs	1,500		6,500		2,000	10,000	2
Total	60,250	40,000	180,000	119,833	114,083	514,167	100

Notes:

1. The SREP USD 20 million allocated for SHP will be disbursed through a structured facility/SHP Investment Structure for partner banks or IPPs to provide Credit/Debt Facility, Risk Sharing Facility/Guarantees and/or Foreign Exchange Risk Cover Facility. (Note that USD 19 million is planned for use for the Investment Structure and USD 1 million set aside for related Technical Assistance. Note that this is an illustrative split of the use of funds)
2. The SREP USD 20 million allocated for mini and micro energy initiatives will be disbursed through CREF and utilised as a grant for subsidies and Technical Assistance; and as loans through a revolving fund. As estimated USD 2 million is to be used as subsidies and Technical Assistance, and USD 18 million for on-lending through the Debt Revolving Fund (this is an illustrative split of the use of funds)
3. Rural and Renewable Energy Program (RREP) is under an advanced stage of preparation and donors' commitment to funding is being secured (DANIDA has already committed DKK 205 million).
4. 'Other' represents the funding gap and will be bridged through funds from other donors, bank financing, DDCs, VDCs etc. The gap is expected to be at least partially addressed through an allocation from the USD 60 million SREP Reserve.

[57] Cost estimated based on discussions with small hydropower project developers. Costs can vary upwards or downwards by 10%, or thereabouts, based on site specific conditions and market cost of construction materials.
[58] Mostly domestic, but size may vary to include larger plants

5. The distribution of funding from RREP and 'Others' between the investment categories has been made in proportion to the respective total cost of each applicable RET[59]. However, it may vary depending on the donor/development partner selected for financing.

143. **SREP Reserve.** Additional financing may be justified from the USD 60 million SREP Reserve to meet program needs.

6.7 Channelling of SREP Funds

144. The proposed lead MDB to channel SREP funds for financing the three comonents under the two broad programs in Nepal will be as shown in Table 6-2: Channelling of SREP Funds below.

Table 6-2: Channelling of SREP Funds

	Program	SREP Financing	Lead MDB
Component I: Small hydropower Development	SHP	$10m	IFC
	SHP	$10m	ADB (private sector arm)
Component II: Mini and Micro Initiatives: Off grid Electricity	Solar PV	$5m	ADB
	Mini/micro hydro	$5m	ADB
Component III: Mini and Micro Initiatives: Cooking	Biogas	$10m	WB

[59] Except for SHP which has only three sources of financing; hence 'Others' for SHP represents the total funding gap after accounting for equity and SREP financing

7. ADDITIONAL DEVELOPMENT ACTIVITIES

145. Table 7-1: Additional Development Activities below summarises the key ongoing initiatives of GoN, duly supported by development partners, in the energy sector[60].

Table 7-1: Additional Development Activities

No.	Project title	Donor	Unit	Allocated budget	Project completion date	Project description
1	Power development project -Part C	WB	USD	31 million		This project helps to construct Khimti - Dhalkebar 220 KV transmission line and other subprojects related to system reinforcement, NEA institutional strengthening, and distribution and rural electrification. The amount is just the initial allocation.
2	Energy Acess and Efficiency Improvement Project	ADB			2013	Reduce technical loss in the Kathmandu Valley and Birgunj corridor Upgrading transmission capacity from mid west region to Kathmandu Rehabilitation of two small hydropower plants Installation of rooftop Solar PV systems in a hospital and a NEA training centre Installation of Solar PV based street-lighting in Kathmandu Valley Support for NEA's energy efficient lighting program
3	Transmission Expansion and Supply Improvement Project	ADB			2017	Upgrading transmission capacity from the western region to mid western region Improvement in transmission capacity from Tamakoshi Valley to Kathmandu Rehabilitation of two small hydropower plants
4	Distribution system rehabilitation project	WB			2012	Improve technical losses and reliability of power supply, and to reduce technical losses in various places
5	Kathmandu valley distribution system rehabilitation project	WB			2013	Improve quality and reliability, reduce technical losses of power supply, particularly in Kathmandu Valley
6	Energy and customer accountability project	WB			2012	Regular energy audit of large customers, setting up remote GSM, and implementing GIS based network management
7	Project for solar powered street lighting					Pilot country program launched in 21 locations.
8	Energy efficiency in lighting (CFL) project	ADB				
9	Energy Sector Assistance	DANIDA, NORAD,	NPR	3,850 million	2012	Preparation of national subsidy policy, TA for AEPC, financing for improved

[60] NEA Annual Report 2011, AEPC Annual Progress Report 2009-10, AEPC Planning Unit

No.	Project title	Donor	Unit	Allocated budget	Project completion date	Project description
	Programme (ESAP)	KfW, DfID				cooking stoves, micro hydro power, solar PV and setting up of solar test lab, REF and KKREP
10	Rural Energy Development Programme (REDP)	UNDP, World Bank	USD	13.7 million	2012	The fund is used for the subsidy to renewable energy and program support. The third phase of the programme was from 2007 to 2010 and extended up to December 2012
11	The Khimti Neighbourhood Area Development Project (KiND Project)	Himal Power Limited and UNDP			2011	The project is a kind of PPP to provide access to electricity to some 3,900 HH of Dolakha and Ramechhap districts through a 400 kW HaluwaKhola mini hydropower project in Namadi of Ramechhap.
12	Renewable Energy Project (REP)	EU	EUR	15,675,000	2011	REP commenced in April 2003 with support from the European Commission. It promotes the installation of institutional solar PV and solar thermal applications in schools, health posts and other institutions. The program will phase out in Feb2012
13	Biogas Support Program, phase IV	KfW/WB			2011	Thissupports biogas development in Nepal. BSP IV is the 4th phase of the program, and will end in 2011.
14	Improved Water Mill Program (IWM), Ujyalo Nepal Program& Special MH Program	GoN				This aims to provide access to electricity to HH of the selected districts through different RETs, the micro hydro being the principal technology. The RukumUjyalo Program was started in 2008 and the Ujaylo Nepal was initiated during 2009.
15	Micro Hydro Village Electrification Program (MHVEP)	WB	USD	12,000,000	2011	MHVEP commenced in 2003 with support from the World Bank under Power Development Project (PDP). This programis being implemented through REDP under AEPC. Phase 1 of the program was from July 2003 to December 2009. Phase II is being implemented from 2010 to December 2012.

8. IMPLEMENTATION POTENTIAL AND RISK ASSESSMENT

8.1 Implementation Potential

146. As discussed Section 3, several successful SHP and mini/micro energy projects and programs have been initiated in the country in the past. They have paved the way for formulating policies, setting up the legal and regulatory environment and developing financing mechanisms for credit and subsidy delivery. Local capacity has also been developed in respect of a wide array of stakeholders, including manufacturers, installers, financial intermediaries and NGOs.

147. Many of the off-grid projects and programs have been repeated as follow-on projects, and more are being planned. The proposed SREP initiative will complement GoN's plans to scale up energy access through RETs.

148. Given the above and the huge commercially exploitable renewable energy potential of the country as noted previously, the overall implementation potential of SREP is favourable.

8.2 Risks and Mitigation Measures

149. **SHP Projects**. The detailed risk matrix has been developed based on the identification of the principal barriers and risks to SHP development that will significantly influence the success of the SREP Funds in scaling up SHP in Nepal. The risk matrix also provides risk mitigation measures and allocates risks to the appropriate institution. The principal risks have been categorised as risks relating to the political environment, policies, laws and regulations, institutional mechanisms, financing, SREP fund structure, technical issues, and social and environmental issues. The Risk Matrix is provided in **Annex 18**.

150. **Mini and Micro Energy Projects**. Likewise, the main risks in the SREP implementation of mini and micro energy projects and possible mitigation measures have also been identified and are provided in **Annex 18**.

9. MONITORING AND EVALUATION

9.1 Scope

151. As discussed in previous Sections, SREP in Nepal will support the expansion of energy access and stimulate economic growth through the scaled-up deployment of RE solutions and provide a trigger for transformation of the RE market through a programmatic approach that involves government support for market creation, private sector participation, capacity building of key stakeholders and productive energy use.

152. The following key objectives have been used in developing the Program Outputs and Outcomes for the Results Framework:

- Increase in the number of HH supplied with electricity through renewable energy supply/capacity addition. Indicators used are: number of new connections, and increase in the installed capacity, measured in MW or number of new plants.
- Leverage of additional funds for renewable energy investments. The indicator used is the ratio of the amount of SREP Initial Allocation to the additional funding sourced, which should be in the ratio of 1:4. SREP resources will leverage additional funding from GoN, private sector equity, RREP and other sources. The last mentioned includes donors, development partners, commercial financing, local government units etc. As per the Financing Plan the total investment requirement of the Program is USD 514,167, indicating a leverage ratio of 1 to 11.9.

- Environmental co-benefits. Measured in terms of GHG mitigation for each investment category in tons CO_2 per annum.

153. The main drivers of the Catalytic Replication effect of the Program are expected to be:
    - **Learning and demonstration**. The Program will overcome the current paucity of term loans for financing renewable energy projects, particularly for SHPs. The program will introduce innovative project financing instruments and build the capacity of participating banks through technical assistance. Other learning will include capacity building of local manufacturers of mirco hydro plant and equipment and large biogas plants.
    - **Policy development and institutional strengthening**. The Program will help sustain and further develop the policy, institutional and regulatory environment, particularly in the context of grid-connected projects. The organisational restructuring of AEPC into AEPB, and the design, development and setting up of the CREF together with the required operational and governance structures will be provided technical assistance.

154. The Transformative Impact of the Program will be mainly in the areas of:
    - Scaling up investments and energy access through on-grid and off-grid RE solutions
    - Innovation, particularly the introduction of project financing mechanisms to scale up and mainstream the commercial financing of SHPs
    - Poverty reduction through promotion of productive end use of energy in off-grid solutions
    - Gender and social inclusiveness. Community-based projects such as micro hydropower promote participative decision making and empowerment; provide access to information and communication through radio, mobile phones etc; allow extended hours for work, study or leisure activities; improve indoor air quality, a benefit that mainly affects women and children; etc. Domestic biogas plants eliminate the drudgery of having to gathering fuel wood, a task traditionally assigned to women.
    - Climate change mitigation by eliminating the use of kerosene for lighting purposes.

9.2 Key Performance Indicators

155. Accordingly, the performance of the SREP intervention will be measured along the lines indicated in Table 9-1: Results Framework below, the targets being incremental values for the five-year investment plan period.

Table 9-1: Results Framework

Results	Indicators	Baseline, Year 2010	Targets
Project Outputs and Outcomes			
1. Increase in the number of new connections	No. of HH accessing electricity from mini/micro hydropower[61]	TBD	250,000
	No. of HH using SHS	227,039	500,000
2. Increase in renewable energy supply/ capacity addition	Small hydro power	76.7 MW	50 MW
	Mini and micro hydropower	29.7 MW	30 MW
	Solar home systems for HH[62]	6.4 MW	10 MW

[61] Assuming 120 W/HH, which may change later

[62] Assuming the most popular 20 Wp SHS, although the budget is adequate for larger systems as well

Results	Indicators	Baseline, Year 2010	Targets
	Biogas (domestic)	238,587 plants	160,000 plants
3. Additional funding leveraged by SREP	Leverage factor, measured as SREP funding: sum of all other sources		At least 1:4
4. GHG emission mitigated[63]	Through small hydropower		120,000 tCO_2 p.a.
	Through mini/micro hydropower		69,000 tCO_2 p.a.
	Through solar PV		62,857 tCO_2 p.a.
	Through domestic biogas plants		800,000 tCO_2p.a.
Catalytic Replication			
1. Mainstreaming commercial financing through banks for RE projects	Total number of banks participating in the Program	7	7+
	Total number of loans disbursed	TBD	TBD
	Total value of loans disbursed	TBD	TBD
2. Improved the enabling environment for RE generation and use	Adoption of and implementation of low carbon energy development plans		TBD
	Enactment of policies, laws and regulations for RE development in general, and the setting up of AEPB in particular	RE Policy; Subsidy Policy for RE; Delivery Mechanism of Additional Financial Support to Micro/Mini Hydro project (2011), and RE Subsidy Delivery Mechanism	RE Act (including FIT), RE Central Co-ordination Committee, Central RE Fund Regulation, and Alternative Energy Promotion Board (AEPB) Act are planned
Transformative Impact in Nepal			
1. Economic development through productive end use of off-grid electricity	No. of new mini grid consumers using electricity for productive/ income generating activities	43,910	TBD
2. Gender and social inclusiveness	Number of women directly benefitting from improved home environment	TBD	TBD

[63] These are indicative figure and need to be refined at the project design stage. Conversion factors from AEPC for mini and micro RETs: 'The Environment of the Poor in the Context of Climate Change and the Green Economy - Alternative Energy Linking Climate and Environmental Considerations', 2010

ANNEX- 1

STAKEHOLDER CONSULTATIONS: SMALL HYDROPOWER

STAKEHOLDER CONSULTATIONS: SMALL HYDROPOWER

First Workshop on 06 July 2011

A two-part workshop was conducted at Radisson Hotel, Kathmandu on 06 July 2011 to explain the scope and purpose of SREP and elicit views from a broad spectrum of stakeholders. The morning session, attended by about 80 participants, focused on Small Hydro Power (SHP), while Mini and Micro Energy Initiatives were taken up in the afternoon session that was attended by about 50 participants. The event was organised by the MDB Joint Mission comprising Asian Development Bank, World Bank and International Finance Corporation and the Government of Nepal represented by the Ministry of Environment and the Alternative Energy Promotion Centre. SREP national and international consultants also participated in the event.

The key suggestions towards the design of the proposed SREP intervention for small hydropower is summarised below:

- Financing for SHP is one of the principal barriers to greater development of SHP in Nepal
- The PPA rates from NEA payable for SHP IPPs is considered to be low and does not provide an adequate return on investment
- Inadequate transmission access is considered to be a major impediment to development of SHP in many sites far from the grid.
- IPPs have to obtain approvals from multiple GoN agencies to develop projects. A one-stop window to obtain all clearances and approvals would greatly benefit project developers
- Licenses have been issued to many firms which do not have the capacity to develop the projects, hindering the development of projects by more credible project developers.

Second Workshop on 09 September 2011

A half-day workshop was conducted on 09 September 2011 at Hotel Soaltee, Kathmandu to present the draft SREP Investment Plan and obtain feedback from a broad spectrum of stakeholders. The session, attended by about 75 participants, focused on both Small Hydropower, as well as Mini and Micro Energy Initiatives. The event was organised by the Ministry of Environment with representation from Ministry of Energy, Asian Development Bank, World Bank and the Alternative Energy Promotion Centre. SREP national consultants presented the SREP Investment Plan that included both, Small Hydropower as well as Mini and Micro Energy components.

The discussion generated views on implementation aspects as well as administrative and process issues to be addressed when finalising the SREP Investment Plan. The key suggestions from participants regarding development of small hydropower are as follows. The response of the SREP IP team to address the comments are provided against each comment.

Comment	Response
Power wheeling in regard to SHP is big problem and this problem needs to be addressed before developing SHP. So the issue of power wheeling need to be included in the report to be prepared by the Consultant.	Issues relating to transmission constraints to development of SHP have been included in the report. The wheeling of power within Nepal requires changes to the laws for direct sale of electricity to customers. Wheeling for export of power to India through transmission inter-linkages is addressed in the report, though this will take time and will not help SHP development in the near term
Some of the participants raised the issue that structure of investment plan is not clear and it need to be further clarified to make such plan a success.	The investment plan has been clarified and all financing options are being considered as opposed to recommending a specific mechanism or financing structure
The SREP fund need to made available to hydro development company and such SREP fund need to be easy accessible. We need to learn lesson from Power Development Fund where the fund available in PDF was not easily accessible to private developer.	The SREP finances will be channelled through the IFC and the private sector arm of the ADB. These agencies cannot participate in public projects and the SREP investment structure has been developed to directly finance or provide guarantees to credit institutions and IPPs
One of the participant raised the issue of developing People's hydro by DOED. He expressed the concern that how DOED as regulator be getting involved development of people's hydro. He was of the opinion that DOED should not directly get involved in developing project, it only work as facilitator not as developer.	The conflict of interest in the DOED operating as both regulator and project developer has been addressed in the barrier and risk analysis
In order to facilitate the development of SHP, distribution line has to be de-monopolise. At present it is only NEA who has distribution line. Other private sector also need to get involved in power distribution project SREP fund need to make available for such project as well.	SREP cannot finance distribution systems, but the issues of NEA being a single off taker has been addressed in the Investment Plan
In order to address the power crisis of the country, project meeting peak demand needs to be developed and SREP fund need to use for such project.	It has been decided based on selection criteria and country programs that SREP will finance small hydro and micro mini initiatives. Small hydro projects can

	meet demand during peak, though being run-of-the-river projects they are not optimized for peak load operations.
In order to make the development of hydro project easier and smooth, PPA period need to be shorten should developer chose so. At present it is for 30 years that NEA usually signed PPA with developer. NEA need to be ready to sign PPA for shorter period.	This issue has been raised by IPPAN too. NEA is however not keen on providing short-tenor PPAs. This is an issue for the Ministry of Energy to address. The issues is also addressed in the barrier analysis of the IP
Distribution and Transmission line need to be funded by SREP Fund. In other word, the SREP fund need to be made available for developing Distribution and Transmission line project as well.	SREP cannot finance transmission and distribution systems, and has been allocated for small hydro and mini-micro initiatives
Some of the participant suggested to develop model project through the use of SREP fund so that similar type of project may be developed in future.	It is intended to use the SREP funds in innovative ways to develop model financing mechanisms as discussed in the IP
One participant suggested that the SREP fund need to make as commercial fund so as to facilitate and assist private sector in developing SHP through providing fund in competitive market price.	The SREP finances will be channelled through the IFC and the private sector arm of the ADB. These agencies cannot participate in public projects and the SREP investment structure has been developed to directly finance or provide guarantees to credit institutions and IPPs

At the close of the workshop, it was concluded from the chair that:

- The SREP Investment Plan should be ready on time and of high quality, so that it gets approved without delay
- The Investment Plan is being proposed by the government, and it should address both SREP as well as national objectives

Annex 2

STAKEHOLDER CONSULTATIONS: MINI AND MICRO ENERGY INITIATIVES

First Workshop on 06 July 2011

A two-part workshop was conducted at Radisson Hotel, Kathmandu on 06 July 2011 to explain the scope and purpose of SREP and elicit views from a broad spectrum of stakeholders. The morning session, attended by about 80 participants, focused on Small Hydro Power, while Mini and Micro Energy Initiatives were taken up in the afternoon session that was attended by about 50 participants. The event was organised by the MDB Joint Mission comprising Asian Development Bank, World Bank and International Finance Corporation and the Government of Nepal represented by the Ministry of Environment and the Alternative Energy Promotion Centre. SREP national and international consultants also participated in the event.

The key suggestions towards the design of the proposed SREP intervention for mini and micro energy initiatives are summarised below:

- The micro hydro installation companies noted that the limit of 120 Watts per household (HH) is a hindrance as actual HH consumption tends to increase over time. Instead, it may be better to allow the community to decide on the limit per HH and the resultant tariff on a case by case basis.
- There should be a more effective 'smart subsidy' policy for RETs reaching to poor and marginal people; likewise they should have better credit access in these remote areas.
- The domestic biogas program should be expanded to include community and institutional ones, coupled with better access to credit facilities.
- For solar home system installations, the major constraint is the availability of financing for both the installer (working capital) and the end user.

Second Workshop on 09 September 2011

A half-day workshop was conducted on 09 September 2011 at Hotel Soaltee, Kathmandu to present the draft SREP Investment Plan and obtain feedback from a broad spectrum of stakeholders. The session, attended by about 75 participants, focused on both Small Hydropower, as well as Mini and Micro Energy Initiatives. The event was organised by the Ministry of Environment with representation from Ministry of Energy, Asian Development Bank, World Bank and the Alternative Energy Promotion Centre. SREP national consultants presented the SREP Investment Plan that included both, Small Hydropower as well as Mini and Micro Energy components.

The discussion generated views on implementation aspects as well as administrative and process issues to be addressed when finalising the SREP Investment Plan. The key suggestions from participants regarding mini and micro energy development are as follows:

- There should be a focus on capacity building of the private sector
- The flow of funds to the end user/private sector should be streamlined through an effective mechanism
- The processes and procedures for funds flow and institutional arrangements to be clear and transparent, with an effective monitoring mechanism in place
- The SREP intervention should address transformation impacts such as gender and social inclusiveness, climate change, and socio-economic co-benefits

- An aspect of scaling up should include commercialisation of new technologies such as biogas electrification
- For solar home system installations, the major constraint is the availability of working capital financing for the installer and consumer loans for the end user
- Leveraging funds from local government, particularly for mini/micro hydropower, to be mentioned.

At the close of the workshop, it was concluded from the chair that:

- The SREP Investment Plan should be ready on time and of high quality, so that it gets approved without delay
- The Investment Plan is being proposed by the government, and it should address both SREP as well as national objectives
- The Investment Plan and its implementation should address GHG emission reduction, which is also a source of additional revenue for the country.

Other Stakeholder Consultations

Discussions with Banks. Many banks are relatively new to lending to end users of RETs. Nevertheless they are keen on expanding their RET portfolio given the huge potential and the fact that RETs qualify as "deprived sector" lending (banks are required to maintain at least 3% of their portfolio in the deprived sector of face penal charges). The major barrier they face in lending to the sector is liquidity and mismatch in tenor. Banks mobilise deposits which are costly, that also have a short tenor.

Credit delivery is another concern as banks do not have the outreach nor capacity to administer relatively small loans in remote areas. However, banks do work with MFIs as well as LFIs who retail credit. This is a model that was introduced by ESAP which has been largely successful although in a very small scale, as the banks rely on internally mobilised funds. The LFI model holds promise, but banks have expressed the need for a source of affordable long-term refinance if it is to be scaled up.

Discussions with Donors. The major donor-funded programs in the sector are ESAP, RERL, and REP, all of which are coming to a close in 2011 and 2012. A follow on project for ESAP, namely RREP, is already under preparation.

Whilst these programs are entirely subsidy driven at present, the delivery mechanisms vary significantly. AEPC's objective is to streamline the delivery of all donor funded programs within a
central fund (CREF), the administration structure for which is already in place through the REF.

It is the intention of the donor community to move away from full-subsidy driven programs in the future, and instead introduce a mix of subsidy and credit.

Annex 3

TARIFF RATES
Nepal Electricity Authority

Effective from 17 September 2001

1	**DOMESTIC CONSUMERS**			
	A	**Minimum Monthly Charge: Meter Capacity**	**Min. Charge NPR**	**Exempt kWh**
		Up to 5 Ampere	80.00	20
		15 A	299.00	50
		30 A	664.00	100
		60 A	1394.00	200
		Three phase supply	3244.00	400
	B	**Energy Charge, NPR/kWh**		
		Up to 20 units	4.00	
		21 - 250 units	7.30	
		Over250 units	9.90	
2	**TEMPLES**			
		Energy charge, NPR/kWh	5.10	
3	**STREET LIGHTS**			
	A	With energy meter, NPR/kWh	5.10	
	B	Without energy meter, NPR/kVA	1860.00	
4	**TEMPORARY SUPPLY**			
		Energy charge, NPR/kWh	13.50	
5	**COMMUNITY WHOLESALE CONSUMER**			
		Energy charge, NPR/kWh	3.50	
6	**INDUSTRIAL**		**Monthly Demand Charge, NPR**	**Energy Charge, NPR**
	A	Low Voltage (400/230 Volt)		
		(a) Rural and Cottage	45.00	5.45
		(b) Small Industry	90.00	6.60
	B	Medium Voltage (11 kV)	190.00	5.90
	C	Medium Voltage (33 kV)	190.00	5.80
	D	High Voltage (66 kV and above)	175.00	4.60
7	**COMMERCIAL**			
	A	Low Voltage (400/230 Volt)	225.00	7.70
	B	Medium Voltage (11 kV)	216.00	7.60
	C	Medium Voltage (33 kV)	216.00	7.40

8	NON-COMMERCIAL		Monthly Demand Charge, NPR	Energy Charge, NPR
	A	Low Voltage (400/230 Volt)	160.00	8.25
	B	Medium Voltage (11 kV)	180.00	7.90
	C	Medium Voltage (33 kV)	180.00	7.80
9	**IRRIGATION**			
	A	Low Voltage (400/230 Volt)	-	3.60
	B	Medium Voltage (11 kV)	47.00	3.50
	C	Medium Voltage (33 kV)	47.00	3.45
10	**WATER SUPPLY**			
	A	Low Voltage (400/230 Volt)	140.00	4.30
	B	Medium Voltage (11 kV)	150.00	4.15
	C	Medium Voltage (33 kV)	150.00	4.00
11	**TRANSPORTATION**			
	A	Medium Voltage (11 kV)	180.00	4.30
	B	Medium Voltage (33 kV)	180.00	4.25

Time of Day Tariff

Consumer Category and Supply Level			Monthly Demand Charge, NPR/kVA	Energy Charge, NPR/kWh		
				Peak Time	Off-peak	Normal
				18:00-23:00	23:00-06:00	06:00-18:00
A	**High Voltage (66 kV and above)**					
	1	Industrial	175.00	5.20	3.15	4.55
B	**Medium Voltage (33 kV)**					
	1	Industrial	190.00	6.55	4.00	5.75
	2	Commercial	216.00	8.50	5.15	7.35
	3	Non-commercial	180.00	8.85	5.35	7.70
	4	Irrigation	47.00	3.85	2.35	3.40
	5	Water Supply	150.00	4.55	2.75	3.95
	6	Transportation	180.00	4.70	2.95	4.15
	7	Street Lights	52.00	5.70	1.90	2.85
C	**Medium Voltage (11 kV)**					
	1	Industrial	190.00	6.70	4.10	5.85
	2	Commercial	216.00	8.65	5.25	7.55
	3	Non-commercial	180.00	9.00	5.45	7.85
	4	Irrigation	47.00	3.95	2.40	3.45
	5	Water Supply	150.00	4.60	2.80	4.10
	6	Transportation	180.00	4.80	3.00	4.25
	7	Street Lights	52.00	6.00	2.00	3.00

Annex 4

STATUS OF SMALL HYDROPOWER PROJECTS

Projects Completed and Operational

List of 1 MW - 10 MW Operational Small Hydropower Plant in Nepal							
Name of Company	Name of Project	Location	Capacity (kW)	Date of PPA		COD	
		(District)		BS	AD	BS	AD
NEA	Chatara	Morang	3,200				Jul-96
NEA	Panauti	Kavre	2,400			2022	
NEA	Tatopani	Magdi	2,000				
NEA	Seti	Pokhara, Kaski	1,500				1985
NEA	Puwa khola	Ilam	6,200				April, 2000
NEA	Phewa	Pokhara, Kaski	1,000			2025	
NEA	Tinau	Butwal, Rupendehi	1,024				
National Hydro Power Company Ltd.	Indrawati III	Sindhupalchowk	7,500	Mangsir 15, 2054	30-Nov-97	Ashwin 21, 2059	7-Oct-02
Butwal Power Company Ltd.	Andhi Khola	Syangza	5,100	Ashadh 29, 2058	13-Jul-01		
Arun Valley Hydro Power Company Ltd.	Piluwa Khola	Sankhuwasava	3,000	Magh 9, 2056	23-Jan-00	Ashwin 1, 2060	18-Sep-03
Sanima Hydro Power Company Ltd.	Sunkoshi Khola	Sindhupalchok	2,500	Kartik 28, 2058	13-Nov-01	Chaitra 11,2061	24-Mar-05
Alliance Power Nepal Pvt.Ltd.	Chaku Khola	Sindhupalchok	1,500	Falgun 3, 2056	15-Feb-00	Ashadh 1,2062	15-Jun-05
Khudi Hydro Power Ltd.	Khudi Khola	Lamjung	3,450	Ashadh 4, 2058	18-Jun-01	Poush 15, 2063	30-Dec-06
Unique Hydel Co. Pvt.Ltd.	Baramchi Khola	Sindhupalchowk	4,200	Mangsir 3, 2066	18 Nov. 09	Kattik 28, 2067	
Thoppal Khola Hydro Power Co. Pvt. Ltd.	Thoppal Khola	Dhading	1,650	Falgun 23, 2059	7-Mar-03	Kartik 13, 2064	30-Oct-07
Ridi Hydropower Development Co. (P.) Ltd.	Ridi Khola	Gulmi	2,400	Bhadra 08, 2063	24-Aug-06	Kartik 10, 2066	27-Oct-09
Gandaki Hydro Power Co. Pvt. Ltd.	Mardi Khola	Kaski	3,100	Kartik 7, 2060	24-Oct-03	Magh 08, 2066	22-Jan-10
Khoranga Hydropower Co. Pvt. Ltd.	Pheme Khola	Phidim	999				
Hira Ratna Hydropower P.ltd	Tadi Khola	Nuwakot	5,000	Baishakh 9, 2067	22-Apr-10		
	Seti-II	Gandaki	979				
UH	Baramchi		980				
Center for Power Development and Services Pvt. Ltd	Upper Hadi Khola		991				
	Patikhola		996				
Arun Valley Hydorpower Co. Ltd.	Piluwa Khola		3,000				
Sub Total			64,669				

(i) Projects Under Construction

Small Hydro Projects Under Construction (or atleast Financial Closure acheieved)							
Name of Company	Name of Project	Location	Capacity (kW)	Date of PPA		COD	
		(District)		BS	AD	BS	AD
						Remarks	
Sunkoshi Hydro Power Co. Pvt. Ltd.	Lower Indrawati Khola	Sindhupalchok	4,500	Mangsir 23, 2059	9-Nov-02		
Himal Dolkha Hydropower Compa	Mai Khola	Ilam	4,455	Chaitra 19, 2063	2-Apr-07	At completion stage	
Barun Hydropower Development Co. (P.) Ltd.	Hewa Khola	Sankhuwasabha	4,455	Ashwin 2, 2064	19-Sep-07		
United Modi Hydropwer Pvt. Ltd.	Lower Modi I	Parbat	9,900	Magh 20, 2065	2-Feb-09	At completion stage	
Synergy Power Development (P.) Ltd.	Sipring Khola	Dolkha	9,658	Magh 20, 2065	2-Feb-09		
Nyadi Group (P.) Ltd.	Siuri Khola	Lamjung	4,950	Shrawan 17, 2064	2-Aug-07		
Ankhu Khola Jal Bidhyut Co. (P.) Ltd.	Ankhu Khola - 1	Dhading	8,400	Jestha 22, 2066	5-Jun-09	At completion stage	
Bhagawati Hydropower Development Co. (P.) Ltd.	Bijayapur-1	Kaski	4,410	Ashadh 30, 2066	14-Jul-09	At completion stage	
Laughing Buddha Power Nepal (P.) Ltd.	Middle Chaku	Sindhupalchowk	1,800	Kartik 02, 2063	19-Oct-06	At completion stage	
Laughing Buddha Power Nepal (P.) Ltd.	Lower Chaku	Sindhupalchowk	1,765	_	_	At completion stage	
Alliance Power Nepal P.Ld.	Chaku	Sindhupalchowk	3,000	-	-	At completion stage	
Bhairabkunda Hydropower P. Ltd	Bhairab Kunda	Sindhupalchowk	3,000	Mangsir 2, 2065, 17 chait 2065	17-Nov-08		
Nepal Hydropower Developer P. Ltd.	Charnawati Khola	Dolakha	3,520				
Mailung Khola Hydro Power Company (P.) Ltd.	Mailung Khola	Rasuwa	5,000	Shrawan 9, 2058	24-Jul-01		
Bojini Company Private Limited	Jiri Khola	Dolkha	990	Magh 23, 2065	5-Feb-09		
Eastern Hydropower (P.) Ltd.	Pikhuwa Khola	Bhojpur	2,475	Kartik 24, 2066	10 Nov. 09		
Radhi Bidyut Company Ltd.	Radhi Khola	Lamjung	4,400	Magh 18, 2066	01 Feb. 10		
Baneshowr Hydro	Lower Piluwa		990				
Sub-Total =			77,668				

(ii) Projects with Concluded PPAs

PPA Concluded Projects (Financial Closure not yet concluded)							
Name of Company	Name of Project	Location	Capacity (kW)	Date of PPA		COD	
		(District)		BS	AD	BS	AD
Annapurna Group Pvt. Ltd.	Madi-1 Khola	Kaski	10,000	Mangsir 18, 2060	4-Dec-03		
East Nepal Development Endeavour (P) Ltd	Upper Mai Khola	Ilam	3,100	Chaitra 19, 2061	1-Apr-05		
Shivani Hydropower Company (P.)	Phawa Khola	Taplejung	4,950	Falgun 1, 2063	13-Feb-07		
L. K. Power (P.) Ltd.	Dapcha-Roshi	Kavrepalanchowk	5,000	Chaitra 24, 2066	6-Apr-09		
Ruru Hydropower Project (P) Ltd.	Upper Hugdi Khola	Gulmi	2,599	Ashwin 4, 2066	20 Sep. 09		
Sikles Hydropower (P) Ltd.	Madkyu Khola	Kaski	9,968	Mangsir 3, 2066	18 Nov. 09		
Baishno Devi Hydro Power (P.) Ltd.	Lower Sunkoshi -III	Sindhupalchowk	9,900	Mangsir 19, 2066	04 Dec. 09		
Radhi Bidyut Company Ltd.	Radhi Khola	Lamjung	4,400	Magh 18, 2066	01 Feb. 10		
Triyog Energy & Development Pvt. Ltd.	Middle Gaddigad	Doti	2,970	Magh 20, 2066	03 Feb. 10		
Jumdi Hydropower Pvt. Ltd.	Jumdi Khola	Gulmi	1,750	Magh 21, 2066	04 Feb. 10		
Laughing Buddha Power Nepal (P.	Middle Chaku	Sindhupalchowk	1,800	Falgun 03, 2066	15 Feb. 10		
Barahi Hydropower Pvt.ltd	Theule Khola	Baglung	1,500	Chaitra 16, 2066	29-Mar-10		
Alliance Power Nepal Pvt.Ltd.	Chaku Khola	Sindhupalchok	1,500	Baishakh 10, 2067	23-Apr-10		
Nepal Hydro Dev Co.Ltd	Charanawati Khola	Dolakha	3,520	Baishakh 13, 2067	26-Apr-10		
Api Power Company Pvt.Ltd	NauGad Gad Khola	Baitadi	8,500	Baishakh 19, 2067	2-May-10		
Energing Energineering Pvt.ltd	Upper Mailun A	Rasuwa	5,000	Ashar 25, 2067	9-Jul-10		
Swambhu Hydropower Pvt.Ltd	Upper Charnawati	Dolakha	2,020	Mansir 15, 2067	1-Dec-10		
Butwal Power Company	Andhi Khola	Syanja	4,300	Poush 7, 2067	22-Dec-10		
Ingua Hydropower Company P. Ltd	Ingua Khola	Ilam	9,700	-	-		
Joshi Hydropower Development Company Pvt. Ltd.	Upper Puwa-1	Ilam	3,000				
Adishakti	Tadi khola		970				
Nama Buddha	Tinau		990				
Gyatri Hydropower	Charanawati		980				
Garjang Upatyaka	Chake khola		990				
Eklekunda	Dorkhu khola		990				
Electro com and res	Jhyadi Khola		998				
	Dhansi Khola		955				
		Sub Total =	102,350				

Annex 5

GOVERNMENT SUPPORT AND SUBSIDIES FOR RET

FOR RETs SELECTED FOR SREP ASSISTANCE

Government's support for the sector include the establishment of national, district, and community rural energy funds; provision of targeted subsidies; levy of concessionary or zero rated duty and taxes for selected equipment, and exemption of royalties and licensing requirements in the case of mini, micro and pico hydro systems. The main features of subsidies and fiscal incentives for RETs selected for SREP assistance are summarised below.

SUBSIDIES

RET	Subsidy	Payment Terms
Micro/Pico Hydro	1. NPR 97,500 per kW for new projects up to 5 kW (Pico), or NPR 12,000 per HH whichever is lower 2. NPR 125,000 per kW for projects >5 kW to 100 kW, or NPR 15,000 per HH whichever is lower 3. Rehabilitation project of >5 kW capacity: lower of NPR 62,500/kW or 50% of installation cost 4. Additional transportation subsidy of NPR 500 per km/kW for more than 10 km distance from road head, but not exceeding NPR 30,000 and NPR 30,000 per kW for the projects that are located in Karnali zone and nearby 5. NPR 12,000 for grinding and NPR 27,000 for other end use applications; for remote areas an additional NPR 2,000 for grinding and NPR 3,500 for other end use applications. Likewise, a transportation subsidy of NPR 3,000 for the first category and NPR 4,500 for remote areas	30 % at the time of agreement, against bank guarantee 30% after delivery of equipment against bank guarantee 20% after power output testing, followed by release of bank guarantee 10% after power output verification Remaining 10% after completion of one year warranty period
Solar PV	1. NPR 7,000 (10-18 Wp) and NPR 10,000 (>18 Wp) per SHS installed in very remote areas 2. NPR 6,000 (10-18 Wp) and NPR 8,000 per SHS installed in the remote hills 3. NPR 5,000 (10-18 Wp) and NPR 6,000 (>18 Wp) per SHS in other areas 4. Institutional solar PV: Lower of NPR 15,000 or 75% of cost	Max. 80% advance against bank guarantee, and the balance 20% after completion, or full payment after completion of the scheme
Biogas	1. For 4-6 m^3 capacity plants NPR 9,000 (Terai), NPR 12,000 (Hills) and NPR 16,000 (Remote hills) 2. Additional NPR 700 per plant < 6 m^3	NPR 2,000 advance against bank guarantee and the balance after completion, or full

	capacity for those installed in less penetrated districts; and NPR 2,000 in the Terai, NPR 2,500 in the Hills and NPR 3,500 in the Remote Hills respectively per plant for poor, deprived groups of people from the Poverty Alleviation Fund. 3. For institutional plants in the 4-8 m^3 capacity range that use biodegradable materials such as night soil, vegetable materials etc a subsidy of NPR 8,000 for plants installed in Terai, NPR 12,000 for plants installed in the Hills and NPR 16,000 for the plants installed in remote districts.	payment after completion of the scheme

FISCAL INCENTIVES

GoN has provided several fiscal incentives or the promotion of RETs. These incentives include tax concessions and exemptions, as detailed below:

- Upon the recommendation of AEPC, tax exemptions are provided on machinery and instruments used for generating energy from solar, biogas, and wind resources; as well as for tubular batteries used in solar PV systems
- Upon the recommendation of AEPC, zero VAT is levied on solar batteries produced locally
- A concessionary 1% custom duty is applicable on the imports of machinery and parts of the following alternative energy technologies:
    - Upon the recommendation of AEPC, the non-locally manufactured equipments, parts and accessories related to micro hydro power generation, transmission, and distribution
    - Raw materials imported for manufacturing micro hydro power related equipment, parts and accessories locally
    - Wind mills including related equipment, accessories and parts
    - Solar energy equipment, parts and accessories; tubular batteries for PV systems
    - Biogas related equipments and parts and accessories
    - Import of raw materials for the production of batteries used in solar PV systems
    - Bio-stove
    - Bio-energy related equipments, parts and accessories and chemicals.

For small hydro power projects: In addition to the existing provision of income tax exemption for the first 7 years and then 50% income tax for the next three years, as per the Budget Speech 2011it is also provided that: *"Income tax will be fully exempted for the first ten years for hydro power projects commencing their construction before 24 Aug 2014 and starting commercial production before mid-April 2018. Thereafter, 50% income tax exemption for the next five years".*

Annex 6

ROYALTY PAYABLE AND INCENTIVES FOR SHP

According to the 2001 Hydropower Policy, the applicable Royalty payments are as follows.

Project capacity	Up to 15 years		After 15 years from the date of commercial operation	
	Annual Capacity Royalty, per kW	Energy Royalty, per kWh	Annual Capacity Royalty, per kW	Energy Royalty, per kWh
Up to 1 MW	-	-	-	
1MW to 10 MW	NPR 100	1.75%	NPR 1,000	10%
10MW to 100MW	NPR 150	1.85%	NPR 1,200	10%
Above 100 MW	NPR 200	2.0%	NPR 1,500	10%
For captive use	NPR 1,500	-	NPR 3,000	-

Note:

The Capacity Royalty is to be increased according to the following formula:

Capacity Royalty = (Capacity royalty rate) x $(1+0.05)^{\text{Royalty paid year - Generation licence year}}$ x (Installed capacity)

For the above Royalty to become applicable, the Electricity Act has to be amended. [64]

Some of the incentives provided to IPPs include:

- Income Tax: 0% for first 7 years for power plants commissioned by 2075 BS. Thereafter, 10% tax for the next three years. After 10 years the tax applicable will be as per prevailing corporate income tax rate, which is currently 20% in the hydro sector
  10 year full income tax holiday and 50% income tax exemption for the subsequent 5 years will be given to power plants that can achieve commercial operation by April 13, 2019 (announced during the recent 2068-69 Fiscal Budget)

  Corporate income tax of 20% for SHP compared to 25-30% for other businesses
- Import of electromechanical equipment: 1% import duty and 0% VAT
- Import of steel for hydro-mechanical equipment: 1% import duty and 0% VAT.

[64] Once the proposed Electricity Act 2065 is ratified by parliament the royalty payment as per the Hydropower Policy of 2001 will become applicable.

Annex 7

Past and Ongoing RE Programs and Institutional Development Plan of AEPC

Past and Ongoing RE Programs

The **Energy Sector Assistance Program I (ESAP I)** was initially funded by the Governments of Denmark (DANIDA), Norway (NORAD) and Nepal from 1999-2004, and later extended to 2007, for providing subsidy support to the RET sector through a Rural Energy Fund (REF). Disbursements under ESAP I amounted to DKK 166.0 million from DANIDA, NoK 99.6 million from NORAD, and NPR 35.5 million from GoN. Activities supported under ESAP I included the preparation of a national subsidy policy, technical assistance to AEPC, technical support to the installation of 200,000 improved cooking stoves and financing of 1.8 MW of micro hydro power that benefited 40,000 HH, support for another 69,000 HH through Solar Home Systems (SHS) and the setting up of the solar test laboratory, establishment of the Interim Rural Energy Fund, and support for the Kailali Kanchanpur Rural Electrification Project (KKREP) which involved the extension of the transmission and distribution grid to add around 50,000 new consumers.

Energy Sector Assistance Program II (ESAP II) followed in 2007 and is expected to close in 2012. DANIDA, NORAD and GoN continued their support, disbursing DKK 95.0 million, NoK 101.4 million, and NPR 150.5 million, respectively, as of June 2010. In October 2009, the government of Germany (KfW) joined ESAP II with funds for solar energy. The UK (DfID), also joined ESAP II to support SHS. With REF financing, ESAP II had by mid-2010 had electrified 124,000 HH through SHS and another 5,800 through solar lanterns (*tukis*), 25,000 HH through micro hydropower, and supported the sale of 1,800 improved cooking stoves for HH.

The first phase of the **Rural Energy Development Programme (REDP)**, implemented during 1996-2002, was funded by the United Nations Development Programme (UNDP) and GoN. The WB financed the 2nd phase (2002-2007), and the 3rd phase (2007-2012) of the program is now named **Renewable Energy for Rural Livelihood (RERL).** REDP's focuses on micro hydro projects and on livelihood development through RETs, and has supported SHS on a small scale, typically for HH outside a micro hydro area and for domestic biogas plants with toilet extensions.

REDP/RERL has a delivery mechanism different from ESAP in that it channels funds through the DDCs and the Village Development Committees (VDC). Funds go from the AEPC to a District Energy Fund (DEF) at the DDC and the subsidy Fund goes to the Community Energy Fund (CEF) at the community level. The community is empowered to use the CEF to make payments to the supplier. The total budget for RERL (REDP III) is USD 35 million, of which the donors contribute USD 19 million, GoN contributed USD 4 million and the community contributed USD 11 million. The targets include 4.2 MW of community managed mini/micro hydro, 2,200 toilet connected biogas plants, 9,000 improved cooking stoves and 550 SHS in 40 districts.

The World Bank-funded **Power Development Project (PDP),** which includes a Micro Hydro Village Electrification Program is under implementation. PDP included support for private sector led small and medium hydropower projects through the Power Development Fund (PDF), thought the funds could not be used as planned and were reallocated to other related activities.

The **Khimti Neighbourhood Development Project (KiND),** a PPP project of the GoN, UNDP and Himal Power Ltd (NORAD supported), commenced in June 2007 and aims to electrify 3,750 HHs and provide community infrastructure. It is a component of REDP, and closes in 2011.

The **Renewable Energy Project (REP),** funded by the European Union (EU) and GoN (2004 to 2012) has a budget of EUR 15.6 million, including EUR 15 million from EU. REP supports the installation of institutional/community solar PV systems in unelectrified villages for health centres, schools, telecoms, agro-processing etc. REP subsidises the capital expenditure fully by paying direct to the suppliers. These installations are managed by community organisations or Community Energy Service Providers (CESP) that have received training through REP. The tariff collected by CESP is used to maintain the systems. As of July 2010 a total of 933 systems had been installed in 21 districts with a total capacity of 1.02 MWp against a target of 2.2 MWp.

The **Biogas Support Program (BSP)** commenced in 1992 with funding from the Government of the Netherlands and technical support from the Netherlands Development Organisation (SNV). KfW co-funded the program from 1997. SNV acted as the implementing agency under BSP Phase III and BSP Phase IV (July 2003 to December 2010), and the program was implemented by the **Biogas Sector Partnership-Nepal (BSP-N),** an NGO.The program is presently being implemented under an interim Phase from Jan 2011 to July 2012[65], with an agreement on an interim modality of operation that takes advantages of its primary stakeholders – AEPC as a regulatory body, and BSP-N and NBPA as the plan implementation partners. BSP IV and the interim Phase was/is co-funded by Global Partnership on Output Based Aid (GPOBA) of the WB, SNV and KfW. The BSP-N is also supported by carbon finance revenues from the WB managed Community Development Carbon Fund (CDCF).The budget for BSP IV was EUR 14 million with a target of 117,500 biogas plants. Biogas projects under BSP-N are eligible for a subsidy and credit via the Biogas Credit Fund (BCF) funded by KfW. BCF has established a credit delivery mechanism through some 163 MFIs in 34 districts[66]and over 4,525 biogas plants have been installed through this Fund.

Other programmes under implementation include the **Improved Water Mill Program** and **Nepal Ujyalo Program**, while the **Climate and Carbon Program** and **National Biofuel Program** are still in their infancy.

[65] The timing is appropriate in terms of the expected direction towards an integrated approach and a single program for renewable/rural energy promotion beyond July 2012 when all programs complete their implementation.

[66] Ibid

Institutional Development Plan of AEPC

Since its establishment on 03 November 2011, there have been programs for the institutional development and strengthening of AEPC. The Energy Sector Assistance Program (ESAP), which started in 1999, had as one of the components to strengthen the capacity of the AEPC. Before establishment of the AEPC, programs/projects were implemented with their own modality, policy and approach. After establishment of AEPC all major RE programs/projects came under the purview of AEPC and were subject to the same national policies. AEPC has successfully executed the ESAP I, REDP II and III, REP, BSP III and IV. It has supported the Government of Nepal to formulate the national subsidy Policy on RE, RE Subsidy Delivery Mechanism, Rural Energy Policy 2006, 9^{th} -10^{th} five year development plans, 3 Yrs Interim Plan and current 3 Yrs Plan. AEPC is the National Focal Agency for policy and plan formulation, coordination, resource mobilization, standardization of RETs, monitoring & evaluation.

The future plan for institutional development of AEPC will include the following activities:

1. AEPC Act

Initiative has been taken to establish an Alternative Energy Promotion Board (AEPB) through an Act of Parliament. The Act will also define a new governing body that has a fair representation from outside the government (including private firms and NGOs). According to the draft AEPC Bill, as the lead agency in the RE sector, AEPC will be mandated to undertake the following functions:

- To advise the Government in formulating policy, strategy, and plans
- Operate within the policy framework defined by GoN, develop plan/programs/ projects relating to RE
- Mobilize resources for RE development and expansion
- Expand the outreach of RE service programs to the village level involving the local bodies/governments
- Establish networks with national and international agencies engaged in RETs
- Undertake research on RETs
- Develop Management Information Systems and model (pilot) RET projects
- Develop a conducive environment to attract private sector investments and extend necessary support to enhance effectiveness of government grants
- Partner with relevant stakeholders and undertake their capacity building
- Undertake initiatives to extend credits from banks and Financial Institutions as per GoN directives
- Undertake third party (independent) evaluation of projects undertaken by the Board, handover the project to local users or UCs and provide necessary training to them for maintenance
- Approve policy, plans and programs of the Board
- Approve organisational structure and HR requirements
- Present the “Rules of the Board” to GoN for approval and approve “by-laws”
- Establish quality standards and fix price of RETs and inform the general public through appropriate means
- Undertake regular monitoring of REPs implemented through the support of the Board
- Operate as the designated National Agency for RE
- Work in areas relating to Carbon Trading
- Other works as directed by GoN

2. AEPC Strategic and Organizational Development Plan

To develop the organization, AEPC initiated the preparation of a strategic plan with support from ESAP/Danida in the year 2001. Further exercises were carried out in 2003 and 2004. It was in the year 2004 that the AEPC Board, for the first time, approved the strategic and organizational development (SOD) plan of AEPC. However, prior to its full implementation, a strong need was felt, by almost all stakeholders, to revise and update the strategic plan in order to reflect changes in the country and to restate the organization's commitment to mainstreaming renewable energy across the country. Accordingly, it was agreed that the revised plan would allow AEPC to define and deliver a Sector Wide Approach (SWAp) for RE development; and to identify and address the emerging needs of the federations to be proposed in the new constitution. It was in the year 2009 that AEPC put further efforts to develop a SOD Plan. SNV facilitated the planning process with financial support from ESAP. A detailed process was followed in order to analyze the current practices and set strategies through extensive consultations. The draft version of the Plan, which was prepared in November 2010, is being revised in line with the next two programmes "Rural and Renewable Energy Programme" starting from July 2012 and "Up-scaling of Renewable Energy Program" (SREP). The strategic plan envisages the AEPC to be the national focal agency for overall promotion and development of renewable energy technologies in Nepal.

3. Revision of the AEPC Formation Order

As the approval of the AEPC Bill by the Parliament can take time, AEPC is currently proceeding with the amendment of the AEPC Formation Order (2053) by the Cabinet in line with the proposed AEPC Bill and the Rural Energy Policy. The amendment would entail the following elements:

- Composition of the Board (encompassing a fair representation of members from outside-of-the-government) with inclusive and fair representation.
- Recruitment of ED for AEPC through a fair and competitive recruitment process and not appointed politically.
- Revising the AEPC Human Resource management system and the staff terms and conditions (including salary scale).
- In the process of drafting the bill and the amendment of the formation order, GSI aspects are to be given due consideration.

Annex 8

STAKEHOLDER CONSULTATIONS: SMALL HYDROPOWER

BARRIERS TO DEVELOPMENT OF RET & STAKEHOLDER CONSULTATIONS FOR SMALL HYDROPOWER

Barrier Analysis to Implementation of RET

Barrier	RET	Cause/Impact	Potential Mitigation Measures
Financial			
High capital cost	All	Remoteness of sites, difficult terrain and poor infrastructure for access and power evacuation	Tariff and subsidies to be adjusted accordingly
	SHP	High cost of obtaining right-of-way for transmission interconnection	strengthened policy to support land acquisition
	Solar PV	Inherent in current state of development of PV technology and balance of system components	Seek cheaper sources of supply, particularly technically certified 'plug and play' systems
Lack of risk insurance	SHP	IPPs are unwilling to purchase insurance to mitigate risks	Consider developing appropriate low cost risk insurance instruments
High transaction costs on a per kW basis, both upfront and operational	All	Due to the inherent characteristics of RE projects - small size, remote locations, dispersed off-grid HH	Bundling of projects where feasible to reap economies of scale
Perceived low power purchase price	SHP	IPPs regard the power purchase tariff as being too low	Conduct an independent study to review the power purchase price and its impact on consumer tariffs. (NEA's PPA prices for SHP were revised upwards in March 2011, but some SHP developers think this is inadequate)
Low retail tariffs	SHP	NEA faces mounting losses and is averse to purchasing SHP power at prices above its retail tariff	The ETFC is considering tariff increases.
Willingness to pay	Mini and micro hydro, solar PV	More expensive than grid supply for an equivalent level of service	Subsidies; income generating activities from end use
Limited availability of subsidy funds	All except SHP	Dependence on donors	Larger program through a common platform in which SREP will play a role; greater involvement of and contribution from DDCs and VDCs
Delays in subsidy payments to suppliers	All except SHP	Incomplete documentation from suppliers and administrative delays in release of funds	Capacity development for suppliers and improved internal operations and coordination
Lack of access to project financing from banks	SHP and mini hydros	Constraints in long-term fund mobilisation by banks; liquidity crunch; inadequate capacity to evaluate and structure project financing (reliance on collateral based lending)	Access to long-term and cheaper sources of funds by banks; training and capacity building on RETs and innovative project financing mechanisms including hedging against forex risks of IPPs
Technical			
Transmission grid coverage is	SHP	The transmission grid does not cover the entire country providing	DoED licensing process to be matched with NEA transmission

Barrier	RET	Cause/Impact	Potential Mitigation Measures
limited, no access roads		coverage to all SHP sites Lack of road access to project sites	expansion plans; More financing required to expand transmission grid Significant resources required to develop access roads – GoN could provide appropriate incentives to developers
Low load factors	SHP	Low output during dry season when power demand is high	Consider reservoir based projects based on technical and financial feasibility
Weak after sales service	Micro hydro, solar PV	Remoteness of site, weak consumer protection/awareness of rights and enforceability	Consumer education; tripartite agreement between supplier, lender and end user
Institutional structure/Capacity			
Project Development Agreement (PDA)	SHP	Small domestic SHP developers cannot obtain a PDA	Consider a standardised PDA, even for smaller projects
DoED's role as regulator	SHP	DoED provides licenses and thus cannot develop projects	NEA or another agency should be established to develop GoN projects
Power off-taker issues	SHP	(i) NEA is the only off-taker, and is not required to buy all IPP power if it refuses to sign PPA for wet season; (ii) NEA's creditworthiness is questionable, leading to higher financing costs to IPPs	(i) Consider open access markets which will allow IPPs direct domestic sales; power wheeling mechanism and greater access to export markets will also help (subject to impact on NEA revenues) (ii) Consider providing sovereign guarantees
No credible EPC contractors	SHP	Lack of capacity in the country	Consider multiple EPC contracts segregated by type of service, instead of a single EPC contract
Inadequate capacity of developers	SHP	Insufficient training and development	Capacity building on project development and bank due diligence process
Low awareness of opportunities and economic benefits in some areas	Mini and micro hydro, solar PV	Insufficient social preparation and awareness creation by developers and others	Awareness creation
Limited design capacity of manufacturers/ installers	Mini and micro hydro, large biogas	Lack of design experience in (i) grid interconnection for mini/national grids, (ii) large institutional biogas plants	Training programs
Limited capacity of suppliers to provide quality assurance	Mini and micro hydro	Lack of testing facilities	Introduce quality assurance standards and test methods; set up testing facility and certification
Weak capacity of end user for O&M	Mini and micro hydro, solar PV	Weak user training and follow up; capacity limitation of end users exacerbated by migration of trained manpower	Consider technical partnerships with nearby workshops/repair facilities not necessarily from the beneficiary group
Legal/policy/regulatory			
Multiple/conflicting laws	SHP	Multiple government agencies to deal with to obtain project clearances, sometimes with conflicting rules and regulations	Streamline policies and laws; single agency to deal with project developers to obtain necessary clearances (e.g. from MoE,

Barrier	RET	Cause/Impact	Potential Mitigation Measures
			MoEnv, MoF, MoD). NEA would continue to sign PPAs.
Absence of a fully functional regulator in the electricity sector	SHP	Absence of an independent regulator	Enact the regulatory law
Expensive land acquisition	SHP	Need to negotiate with land owners	Policy for land acquisition could be strengthened
VAT	SHP	Considered too high by IPPs	Evaluate impact and consider revising for qualifying projects
Loopholes in the licensing process	SHP	Companies without the required capacity holding on to licenses that were issues on a first come - first served basis	Licenses to have a time bar for project completion; consider changing the system to competitive bidding

Small Hydro Power: Stakeholder Consultations

To understand the context for the development and scale-up of SHP in Nepal, extensive discussions were held with various stakeholders. These discussions are the basis for the learning of the context for developing SHP, the barriers and risks to development of SHP, and lessons learned. The discussions have guided the TA Consultants in formulating the concept for developing a roadmap for the development of SHP, and have helped in the identification of options for structuring the SREP Fund for SHP. The discussion with these principal stakeholders to SHP development in Nepal is summarised below.

The **restructuring of the Department of Electricity Development (DoED)** is under discussion. It is proposed to establish three (3) regional offices around the country and three (3) offices in each of the river basins to develop People's Hydropower Projects (PHP). It is planned for the DoED to get more involved in the preparation of feasibility studies for hydropower and prepare request for proposals (RFPs) to invite competitive bids from project developers. The DoED believes that no new agency is required to develop SHP in the country and the DoED should develop these projects (as it will also be developing the PHPs). But the focus of DoED is on projects larger than 10 MW. DoED recognises that it needs to develop its capacity to develop smaller projects. Capacity development is also needed for equipment manufacturers and suppliers, O&M firms, etc.

There is a proposal to **revive the ETFC** and expand its mandate to regulate transmission tariffs (if a new Grid Company is formed) in addition to retail tariffs. However, the bill to establish an independent regulator is yet to be passed.

A new **Hydropower Investment Development Company (HIDC)** has been registered to invest in hydropower projects above 25 MW. The HIDC has an authorised capital of NPR 500 million, and paid up capital of NPR 100 million. HIDC has investments from GoN, Employee Provident Fund, National Insurance Company, and Citizen Investment Fund. HIDC will invest in hydropower projects above 25 MW. The Energy Crisis Commission is considering subsidies for specific hydropower projects.

The DoED believes that the **Power Development Fund (PDF)** failed because the Fund conditions were difficult to comply with given the situation in Nepal, and the board of the PDF was dominated by GoN personnel. Also, the Bangladesh-Nepal Bank was not an effective Fund Manager.

There is an urgent need to **update and revise the hydropower master plan**. In the absence of an updated master plan, hydropower projects are not being optimally allocated. The Water and Energy Commission Secretariat (WECS), which is responsible for hydropower policies, is non-operational due to lack of staff.

DoED is launching a **People's Hydro Power (PHP) scheme**. The GoN collects about NPR 1.0 billion annually in royalty payments, of which about 50% goes to District Development Councils (DDCs). DDCs are free to use the revenues as they see fit and may develop hydropower or other infrastructure projects. The PHP scheme plans to tap royalty payments made by IPPs and encourage DDCs to develop SHP Projects. The PHP program proposes to develop SHP projects entirely with equity and no debt. Since DDCs have no capacity to develop SHP, it is planned for the DoED to develop the project and then transfer it to the DDC after commissioning. The DDCs however wish to develop PHP projects on their own though they do not have the capacity to prepare good quality feasibility reports and meet due diligence requirements. DDCs also do not wish the DoED to issue licences to IPPs in their operational areas (or jurisdictions).

Under the PHP, people's participation in equity would have to be a minimum of 10%. DDC, FNCCI, and Cooperatives would also likely contribute money. The remaining required funds would be publicly funded (by the GoN), which would be initially treated as a grant and later converted to equity for the DDC. The modality of the share of DDCs etc. has not been fixed. Once the 10% contribution from the local body is confirmed, studies will be performed by the DoED and the plant developed by the DoED. After construction, the plant would be transferred to the DDC and a company formed to take over the operation and maintenance of the power plant.

PHP projects under 1 MW will attract a subsidy of 75%, projects in the 1-3 MW range will attract a subsidy of 50%. Subsidies for projects in the 3-25 MW are undecided.

PHP projects require that 10% of the electricity be used for rural development. Private sector will be given access to develop projects. There is also a possibility of developing projects on a PPP basis.

The implementation modality for development of PHP has not been finalised. Consultants will be hired to assist in developing the projects. Consultants will be hired at the central (DoED) level to support the program unit, and additional project-level consultants would also be hired to support the DDCs. A Project Facilitation Committee would coordinate activities. NEA system planners have not yet been consulted about the impact of PHP on the grid.

The 5-year plan of the PHP is to develop 4 projects in each of the three river basins. Projects would range from 5-25 MW with the average project size being about 15 MW. Thus a total of about 180 MW of PHP projects are to be developed during the 2011-2016 period. Project implementation would be phased – Phase I would implement six projects, and the remaining six projects would be taken up in Phase II.

DoED would prepare feasibility studies and prepare RFPs to competitively procure the services of IPPs to develop the projects. About NPR 2 billion are required for the first year of the program, but only about NPR750 million is being sought in the new financial year. It is estimated that the PHP program will require an estimated total outlay of NPR 34 billion for 12 projects, 150 km of transmission lines, and 50 km of roads. The goal is to develop 180 MW in 5 years.

There is also a new proposal to develop about 50 MW of SHP with contributions from civil servants. The implementation modalities for this scheme have not yet been finalised.

Alternative Energy Promotion Centre (AEPC)

AEPC's mandate is to develop projects up to 1 MW, but this is being revised upwards to 5 MW, and eventually to 10 MW. But it is not clear if the AEPC has the capacity to develop grid-connected SHP since their experience in hydropower thus far has been the development of off-grid micro hydro projects.

According to the AEPC, some of the principal barriers to developing SHP include:

- No integrated river basins
- Lack of funds
- Poor policies
- No law requiring the NEA to purchase non-conventional energy
- Low load factor of hydropower projects
- NEA's creditworthiness, since it is the only off-taker of power

SREP should learn from the PDF experience and design the Fund to be adaptable to the situation in Nepal. The Rural and Renewable Energy Program (RREP) is an NPR 180 million program with seed money under CREF, and could perhaps be merged with the SREP Fund.

Nepal Electricity Authority (NEA)

NEA faces a problem with **shortage of energy during the dry season, and surplus energy in the wet season** when it has to back out its own generation plants. NEA is thus not keen to purchase expensive IPP power during the wet season. Going forward, NEA plans to sign PPAs with SHPs only for supply of firm power during the dry and wet seasons. NEA will continue to honor the old PPAs but will not sign new PPAs for non-firm power. NEA contends that power shortages during the dry season will continue even in 2017. NEA suggests that IPPs obtain back-to-back PPAs for sale of power during the dry season to NEA and to PTC/India during the wet season.

Retail tariffs in Nepal have not been increased in some 10 years and **NEA losses are growing**. There is a wide discrepancy between cost of supply and cost of purchase, and NEA makes a loss of some 2.42/kWh, which amounted to NPR 5,351 million as total net loss for FY 2009/10. Accumulated losses at the end of FY 2009/10 reached NPR 19,469.75 million.

The **high Cost of Service for NEA** is principally due to the increased internal purchase at relatively higher tariff at generation point, annual escalation on purchase tariff, operation of thermal plants, import of very high cost seasonal energy from India, regular imports at relatively higher price, increased staff cost, increased maintenance cost and hike in prices of fuel and other commodities, all of which cannot be offset by the prevailing retail tariff.

Despite its financial troubles, NEA has been honoring PPAs with IPPs, while it is deferring or not making other payments.

NEA is in the process of **updating the 1998 transmission master plan**, which is expected to take 8-10 months once the study contract is awarded. The earlier transmission master plan covered lines up to 132 kV only, and the new system will include 220/400 kV lines. Large power projects developed primarily for exporting power will develop their own transmission lines, but NEA will have to develop transmission lines to off-take the free power.

NEA agrees that the **PHP concept** is good but foresees difficulties with implementing the scheme. NEA does not think that DoED has the capacity or the expertise to develop PHP. While the concept of public ownership is good, private sector should be contracted to operate and maintain the plants. NEA feels that a separate entity should be created to implement the PHP scheme.

The NEA has not been consulted about the PHP scheme and is concerned that the DoED's PHP plan is for a specific area and for a defined timeline, which does not consider NEA's transmission master plan. But over the longer timeframe, NEA believes that the transmission system will cover the planned PHP areas.

There is presently no clarity on the establishment of a **separate Transmission Company**, though there are plans to establish a grid company, which would be responsible for transmitting power at EHV and the firm would act as the system planner.

There are also plans to establish a **Power Trading Company** (PTC) to deal with exports and imports to and from India.

The **institutional structure for developing hydropower** is weak, and it is not clear how the AEPC would be able to develop SHP up to 10 MW since its mandate is to develop off-grid projects. Since AEPC receives government grants to develop projects, NEA believes that SHP developed by AEPC should not be eligible to receive the same tariffs as IPPs, which receive no grant and have higher financing costs.

NEA has notified 24 IPPs, which have received PPAs but have not implemented projects as scheduled.

The **SHP division at NEA has been disbanded** and its responsibilities handed over to regional offices of the NEA. NEA is of the opinion that the high cost of financing is a principal barrier to development of SHP. NEA contends that given the benefits of off-grid projects, SREP support for SHPs should focus on installations in remote off-grid locations. But NEA acknowledges that SHP in the 1-10 MW range would generally be connected to the 11-33 kV system and would improve grid stability. NEA's own priority is however to develop and promote hydropower projects above 50 MW.

Ministry of Energy (MoEn)

MoEn believes that financing is a key barrier to SHP development and SREP would help PHP and other IPP projects that have PPAs. MoEn is thus of the opinion that SREP financing for SHP should be a minimum of USD 25 million and perhaps even higher considering the need to alleviate financing problems.

The SREP Fund for SHP should be managed independent of the CREF, and with a Steering Committee at the National Planning Commission. SREP funding could be used as an equity fund for both public and private projects. MoEn estimates that some 30-35 projects in the 1-10 MW range should be available for making investments. PHP projects could also benefit from the SREP funds.

The MoEn is clear that government should not be developing SHP, and DoED does not have a mandate to develop projects. MoEn is of the opinion that the government should only be involved in developing hydro projects which include a reservoir since private sector has no appetite to develop reservoir projects.

The Hydropower Investment Development Company was originally meant to finance projects greater than 25 MW. But it is likely that the HIDC will also finance projects in the 1-10 MW range. The HIDC will need capacity building in several areas including conducting due diligence on project opportunities. Others believe that the HIDC should only finance projects larger than 50 MW.

IPPAN

IPPAN members welcome the availability of SREP funds to promote SHP, but they are of the opinion that for the Fund to be successful, it should be under private sector control with a professional Fund manager, and not under GoN control. IPPAN provided insights into the various barriers they face in the development of SHP. While many of these barriers are known, the discussions with IPPAN identified some critical challenges that need to be overcome if Nepal is to develop SHP with private sector participation.

Ministry of Environment (MoEnv)

The cabinet has provided in-principle consent to enhancing the mandate of AEPC to develop projects up to 10 MW. There is a move to give AEPC greater autonomy and responsibility to develop SHP. MoEnv is of the opinion that AEPC should take the lead with SHP development and utilisation of SREP funds.

Clean Energy Development Bank (CEDB)

CEDB is working with several IPPs to finance SHP in the 1-10 MW range. The bank considers these projects to be relatively low risk, and the bank has a strong due diligence team to evaluate SHP proposals. The capacity of entrepreneurs to develop good proposals is weak and the bank's due diligence team assists project developers.

IPPs are unable to raise equity of 20-30%, which is required by many Funds, and this poses a constraint. Fund structure should be developed with a clear understanding of the market situation in Nepal.

The bank is aware of the weak creditworthiness of NEA, the single off-taker of power. But the bank does not view this as a major risk since NEA is a government entity and the view in Nepal among IPPs and banks is that the GoN is unlikely to let IPPs take a loss in case of NEA payment defaults.

The CEDB is willing to make available project finance but the IPPs are unable to meet basic eligibility criteria including raising adequate equity upfront. Also, IPPs do not have insurance against many risks, nor do they have EPC contracts. The bank is thus forced to make term loans against personal guarantees. But this limits the ability of developers to implement multiple projects.

The typical term of loans is about 7-10 years including construction. The banks do not have access to long-term low-rate financing and access capital at floating rates. This results in high interest rates of 14-16%, or even higher.

The CEDB, along with other investors, has established a Hydro Fund of some NPR 240 million. No single commercial bank in Nepal has the ability to finance beyond 1 MW on a single project, and syndicated loans with multiple banks are the only option.

The SREP Fund, to be successful, should be managed entirely by the private sector with no involvement of GoN entities. It is unlikely that the banks will be able to leverage finances 1:4 as required by SREP. If SREP provides only 20%, it does not help alleviate the problems with liquidity and the cost of financing projects in Nepal. A leverage of 1:1 is more practical. Given the size of the proposed Fund, it should primarily serve as a Guarantee Fund and support interest rate fluctuations.

Local banks have a capacity to finance no more than 150 MW annually (others say it could be as low as 50 MW annually). Given the capacity of local banks, they will be unable to finance a single project of greater than 50 MW. Introduction of Forex risk instruments will help banks access cheaper capital from foreign banks.

Local banks would not favor PPP projects in which the public sector has a majority shareholding, but may be willing to finance projects where the private sector has majority stake.

Annex 9

ISSUES IN SMALL HYROPOWER PROJECT FINANCING

ISSUES IN SMALL HYROPOWER PROJECT FINANCING

Financing for SHP is a critical barrier to greater development of SHP in Nepal, and some of the key elements of this financing barrier are summarised in Section 4.3 of the Investment Plan. This note elaborates on some of the principal financing barriers to the scale up of SHP in Nepal.

Financing Gap Risk for Lenders

Insufficient supply of long term financing, whether to local banks as credit intermediaries or directly to SHP projects from traditional sources of long term credit (pension, insurance, and local bond capital market) is the predominant barrier to financing and scaling up of SHP projects. The Nepalese Commercial Banking sector is the primary credit intermediation mechanism and the pension and insurance sector has traditionally provided funds to banks rather than directly to projects. However, the Commercial Banks in Nepal rely largely on deposits, which are 1-Year or less to fund their loan books, introducing significant funding gaps when SHP project loans of 10-15 years are considered. The pension and life insurance markets are thus the main source for institutional demand for term funding for banks. Consultations with these market participants confirmed their interest in extending tenors for banks; however, the interest rates required for such term deposits were in excess of 12% per annum and considered too high by the banks. There is not a well-defined term structure for long-term rates in Nepal, but it appeared that such a rate was approximately 3-4% above the 1-Year GoN T-Bill rate. Due to the twin problems of high inflation imported via the pegged exchange rate and a credit crunch in Nepal which has given way to a liquidity crunch, the commercial banking sector has experienced significant withdrawals of savings deposits and flights to quality on fixed deposits from smaller banks (Figure A9-1) which, according to Commercial Bank stakeholders consulted during the Joint Mission, has continued into July 2011. Market interest rates for banks have soared which in turn has caused lending rates to do so as well. As seen in Figure A9-2 below, in January 2011, the 1-Year interbank rate was over 10% and commercial lending rates were approximately 14%. During consultations with market participants in July 2011, lending rates were approaching 17%. The funding problem was further aggravated by the announcements of various GoN sponsored infrastructure financing initiatives such as People's Hydro and the Hydropower Development and Investment Corporation. Although the funding plans for these initiatives are not yet clear, market participants indicated that the pension and insurance institutional investors were withdrawing additional bank deposits and shifting purchases to 5-Year Development Bonds being issued to fund the abovementioned hydropower initiatives (source: Nepal Investment Bank).

Figure A9-1: Commercial Bank Deposit Base in Nepal to Jan 2011

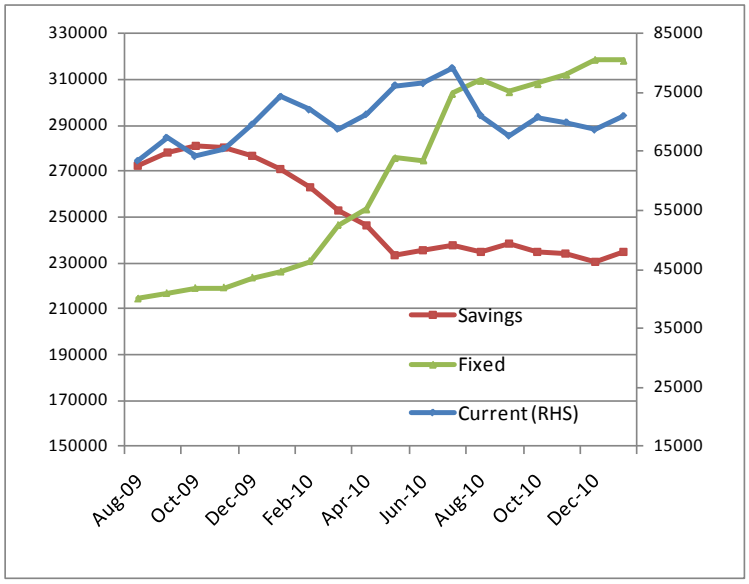
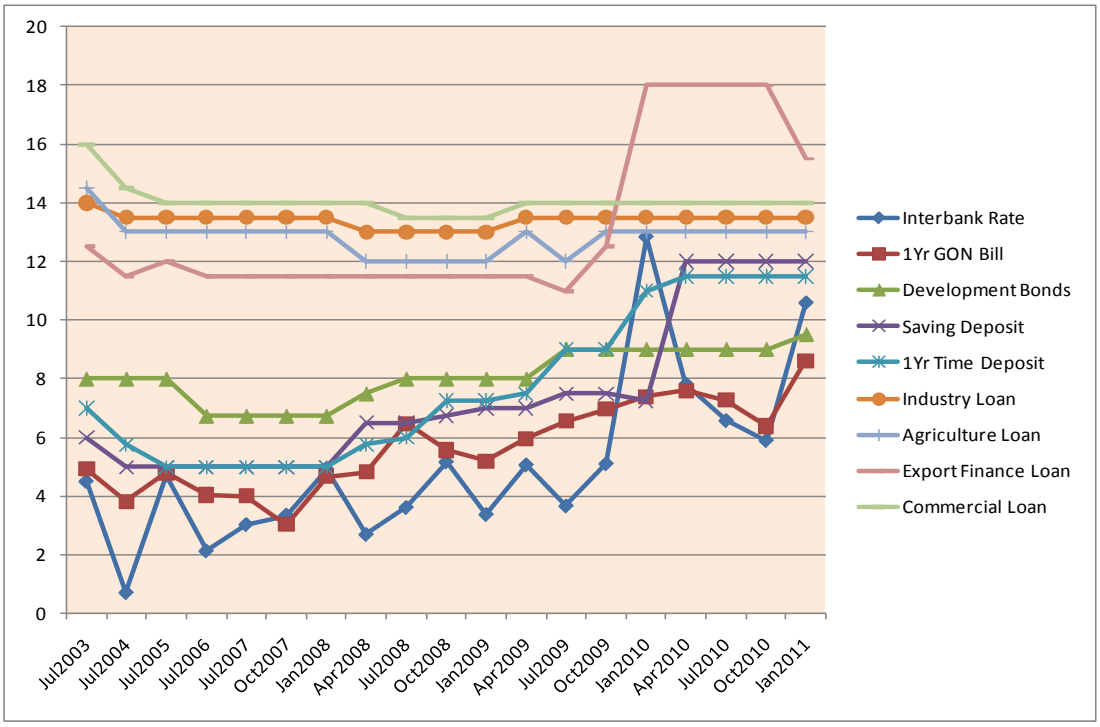


Figure A9-2: Interest Rate Indices in Nepal



Forex Risks

The total development costs of SHP projects in Nepal invariably include material "external costs" due to the need to source equipment and contracting services from overseas (less the case for micro-hydro). For larger SHP projects, the overseas development costs can exceed 50% of the total development costs. Based on the interest rate differentials between NPR and the major foreign currencies, there is significant foreign exchange pressure on the NPR-INR peg and the risk of devaluation is high. Lenders must mitigate or transfer this risk or face large cost overruns, which could undermine the creditworthiness of the SHP project.

Financial Restructuring Risks due to Inadequate Feasibility Studies

Consultations with banks and IPPAN members indicated that numerous initial feasibility studies conducted by or on behalf of SHP developers made optimistic hydrology assumptions, which translated into higher expected cash flow generation than actually realized. Additional sources of modeling error are from technical losses, generating asset availability, construction and maintenance cost budgeting, and grid connection delays. Subsequently, numerous SHP financing loans required maturity extensions and waivers. Such restructuring activity causes the lenders to post additional loss reserves and curtails lending to the SHP sector. Feasibility studies should be carried out in compliance with lender requirements to ensure that projects are not over-leveraged.

Preservation of Generating Asset Economic Life

Lack of adequate assurances that equipment, parts, asset servicing and repair are available to maintain the availability and preserve the projected economic lives of the SHP generating assets. Such factors as well as load balancing and interconnection/evacuation can have a significant effect on the economic

lives of the generating assets. These represent material risk factors to lenders that provide long term debt financing to such projects.

Rights of Way, Community, and District Issues for SHP Financing

Consultation with developers has indicated that community disputes are not only a key driver and risk factor during the licensing and construction phase for SHP projects, but continue to be a risk factor during the operational phase as well. During the dry months, water access rights are sometimes ignored by local communities who require water for irrigation and commercial uses. There is anecdotal evidence that indicates communities also employ such measures to renegotiate terms with SHP developers to obtain additional concessions beyond those negotiated during the development phase of the projects. Rights of Way issues also arise with penstock installations and transmission lines critical to SHP development. Such delays can erode the equity base of the project and expose the lenders to default by the developer due to cost overruns.

Availability of Equity and Mezzanine for SHP Developers

Consultation with banks and SHP developers has indicated that developers are often insufficiently capitalized to provide the 30% equity required by lenders. Developers have resorted to raising equity in the local equity market by listing with the Nepal Stock Exchange, to stretching the financing component by providing additional collateral and personal guarantees, and to lowering the cash equity requirement by contributing over-invoiced assets and attempting to avoid fixed or guaranteed maximum price EPC contracts to lower the development costs and assume more project risks. Given the long tenors of the licensing agreements, a mezzanine debt component may be feasible to increase the subordinated capital cushion for the lenders.

NEA & PPA Issues

The creditworthiness of the NEA and the terms of the NEA Standard PPA present material risks to SHP project lenders. The NEA is facing the risk of a liquidity event with its negative net current assets of (32.16) billion NPR (Source: NEA Annual Report 2011). Furthermore, when considering its ongoing operating losses and its obligations to develop transmission lines in respect of certain of its PPA's, the NEA is at risk of approaching technical insolvency. Although the NEA does not carry any explicit government support from GoN, the prevailing view among the financial sector and IPP developer respondents during the Joint Mission was that the GoN would not risk the financial and social adverse effects of an NEA default on PPA payments. However, any GON support would likely introduce appropriations risks and timing delays that could erode the equity base of SHP projects and lead to debt default. Furthermore, the NEA can also default on performance obligations such as with enabling grid connectivity and providing power transmission lines. There are numerous cases of delays from NEA performance default and a large percentage of potential SHP projects have such NEA performance risk (mainly transmission line requirements) and risk being deemed "not viable" by lenders. This problem is further aggravated by the terms of the NEA standard PPA, which provides inadequate compensation under NEA default scenarios. The penalties for the NEA amount to only 5% assessed on the Contracted Energy which itself is typically lower than the generating capacity of the underlying assets. Furthermore, in the event of an IPP default, termination of the PPA does not have adequate provisions to cover the lenders exposure. Although any successor buyer of the project must assume the PPA, there doesn't appear to be provisions for the assumption of existing debt. Hence, lenders need to rely on step-in rights and strong surveillance in order to mitigate this risk.

Legal and Enforcement Issues for SHP Financing

In order to develop a Project financing market for SHP, secured financing structures are required to give adequate assurances that lenders would be secured by the cash flows, assets, and contracts underlying project. Ordinarily in more developed legal systems, Special Purpose Entity or Trust law is utilized to set up specialized, bankruptcy remote financing vehicles to isolate such collateral beyond the reach of the developer's bankruptcy estate in the case of insolvency. Nepal lacks such legal structures and does not have a Trust law per se. Nepal does have a Securitization law allowing for security interests over various forms of collateral (modeled in part based on the Uniform Commercial Code in the USA. However, Nepal does not currently have a registry for perfecting such security interests, which introduces the risk of double pledges of collateral. Together, these issues introduce enforcement and repayment timing risks to lenders who may be subject to insolvency proceedings and lack of a truly perfected security interest in the collateral.

Insurance Market Issues

Local Insurance markets exist for SHP projects and are supplemented with reinsurance capacity from offshore reinsurance companies. The available insurance markets cover mainly the development period and consist of Contractors 'All-Risk'' policies which cover a broad set of risks as well as some policies for post-operations. However, the terms of such policies are short relative to the project development and operational tenors. This is due to the reinsurance market being generally on a 1-Year renewable term basis. The policies provided to the SHP projects therefore tend to be for 1 Year.

Annex 10

SELECTION OF TECHNOLOGIES FOR SREP FINANCING

1. Small Hydropower

Leverage:

Over the years Nepal has developed some 24 Small Hydropower (SHP) projects (range 1-10 MW) totalling 64.6 MW in capacity. Of this total, Independent Power Producers (IPPs) account for 47.3 MW, with individual plants ranging from about 1 MW to 6.2 MW. Additionally, IPPs are presently developing 18 SHP projects totalling 77.7 MW, with plant capacities ranging from about 1 MW to 9.9 MW. These projects have all achieved financial closure and are under various stages of completion. NEA has also issued Power Purchase Agreements (PPAs) to 29 IPP projects with a total capacity of 103.4 MW, which have not yet reached financial closure.

The SHP projects developed in Nepal have been developed primarily by domestic project developers with financing from local financial institutions. There is no subsidy provided for SMH in the range of 1-10 MW, and these projects benefit only from tax and other minor incentives.

SPEP financing of $20M will be leveraged 1:4 through additional funds from the private sector arms of the MDBs, who are expected to provide about $20M each. It is expected that commercial financing institutions and other investors will provide additional financing of $20M resulting in total financing of $80M, which along with equity from project developers is expected to develop about 50 MW of SHP.

Transformational Impact:
Development of 50 MW of SHP will have a transformational impact on the country, which is facing severe power shortages. The development of SHP will also have an impact on rural electricity provision, which is expected to spur economic growth. The development of innovative financing mechanisms and development of capacity of local credit institutions, IPPs and others will help transform the market for financing and development of SHP.

Sustainable Operations:
IPPs in Nepal have a long history of successfully developing and operating SHP. Financing is one of the principal barriers to greater development of SHP. The prevailing view among stakeholders is that long-term sustainability of SHP requires developing robust market implementation mechanisms that will favour sound investment projects, which in turn will attract generation licences and capital. This will allow debt finance providers to adopt suitable underwriting practices and expand the available financing to individual projects. There are several areas in which SREP can support SHP development while fostering a market-driven approach including but not limited to the following options. The development of cross border transmission linkages with India will open new export markets and SHP will no longer be dependent on sales of power to NEA.

2. Mini/Micro Hydropower

Leverage:

Mini (100 kW to 1 MW) and micro (> 5 kW to < 100 kW) hydropower projects serve communities through off-grid electricity. Micro hydro projects are typically community-owned and operated,

while the larger mini hydro projects may opt for more formal institutional arrangements. Given their better management structures, perceived low risk and acceptable transaction costs, mini/micro hydropower projects are in a stronger position than pico hydros and improved water mills to access commercial financing to leverage their own equity contribution. They are also eligible to avail of technical assistance and subsidies through established systems and procedures.

A Micro Hydro Debt Fund was set up recently by AEPC with EUR 500,000 funding from GIZ (formerly known as GTZ). These funds will be channelled through two commercial banks to develop micro hydropower projects in the range of 10-100 kW. Although the funding is relatively small, this initiative holds promise for further scaling up to address the paucity of long-term loans for mini/micro hydropower development in the country.

This Investment Plan envisages an SREP allocation of USD 5 million for mini/micro hydropower development which will leverage a total investment of about USD 133 million. The latter, in addition to the SREP contribution, includes funding from GoN, private equity, RREP, term loans from financial institutions, local government bodies and others.

Transformational Impact:

Mini/micro hydropower projects support GoN's plans to scale up rural energy access, thus transforming these areas and communities, and positively impacting livelihoods. Productive end use of electricity, particularly by day, will directly help in alleviating poverty in the community, while also stimulating the local economy through new opportunities for business. Access to electricity leads to the development of other related infrastructure such as clean water, better health care, education, employment creation, and information and communications technologies.

The country is presently experiencing a severe energy crisis, with regular load shedding by NEA. Grid penetration is low, with only 56% of HH having access to electricity, while 33% rely on kerosene for lighting. With access to electricity, households (HH) stop using kerosene lamps. This eliminates health risks arising from kerosene fumes, and fire hazards caused by toppled wick lamps; a benefit that largely affects women and children in the HH. Further, the elimination of kerosene lamps contributes to the mitigation of GHG emissions.

Experience shows that community-based micro hydro projects bring about improved social and gender inclusiveness and cohesion, as decisions are made in a consultative manner; many contribute 'sweat equity' during construction, and also later during operation and maintenance, thus establishing a stake in the venture. Local youth get an opportunity to build technical competencies and leadership skills.

This Investment Plan, catalysed through SREP funding, envisages electricity access to 250,000 HH through 30 MW of mini/micro hydropower, and GHG mitigation of about 69,000 t CO_2 per annum.

Sustainable Operations:

GoN, through AEPC, has promoted the development of mini and micro hydropower for well over a decade. Over 900 such projects are already in operation. The basic institutional structures, private

sector participants and business models are in place, but continue to evolve, duly supported by technical assistance and capacity building.

Renewable energy development is a priority agenda of GoN, and the annual budget has been progressively increased every year. AEPC, as the executing agency of the program, has developed in-house capabilities for program implementation, monitoring and evaluation.

At district and village levels, the DEEU/DEES that have been established provide support for planning and coordination. Survey, design, manufacturing and installation are done by pre-qualified firms. Independent follow up visits are carried out at the time of power output testing and power output verification. Sustainability is enhanced through a mandatory one-year guarantee provided by the supplier/installer on the plant and equipment.

Several donor-assisted mini and micro renewable energy programs have been implemented in the past, with many now in follow-on modes. However, most of these programs will be completed by 2012, and some even earlier. Hence, there is an urgent need for continued funding to maintain the momentum and scale up penetration. For instance, equipment manufacturers are looking for technical assistance to venture into low head applications, while project developers need access to affordable long-term credit to finance projects. The SREP initiative, which will be a part of GoN's larger renewable energy program, would thus play an important role in addressing these needs.

3. Solar PV

Leverage:

Stand alone solar home systems provide individual HH or institutions with off-grid electricity. As these end users are typically located in remote and isolated locations, conventional financing arrangements seldom work. While micro finance institutions (MFIs) play an important role in providing consumer financing, alternative business models too have been developed for areas beyond the reach of MFIs. An example is the credit delivery model through Local Financial Institutions under ESAP. Under the proposed SREP intervention, while continuing with the successful modalities developed so far, other business models such as the Sustainable Solar Market Packages (SSMP)[67] or Fee for Service may also be attempted to scale up financing and rural electricity access.

This Investment Plan envisages an SREP allocation of USD 5 million for solar home systems which will leverage a total investment of about USD 125 million. The latter, in addition to the SREP contribution, includes funding from GoN, private equity, RREP, lending institutions, local government bodies and others.

Transformational Impact:

Solar PV supports GoN's plans to scale up rural energy access, thus transforming these areas and communities, and positively impacting livelihoods. Although relatively low in energy output, solar PV does have applications for productive use of electricity, particularly in the areas of information

[67] The SSMP model was developed under the World Bank and GEF-assisted Philippines Rural Power Project

technology and communications as well as benefits that can be derived from extended hours after sunset for work or study.

Access to electricity eliminates health risks arising from kerosene fumes, and fire hazards caused by toppled wick lamps; women and children in the HH are those who are most affected. Further, the elimination of kerosene lamps contributes to the mitigation of GHG emissions.

Experience shows that the introduction of such technologies have spin off effects in rural communities. Local entrepreneurs set up or improve their businesses through value added services such as providing information and communication facilities, computer education and entertainment. Local youth get an opportunity to build technical competencies as service providers or users.

This Investment Plan, catalysed through SREP funding, envisages electricity access to 500,000 HH through 10 MW of solar PV, and GHG mitigation of about 62,857 t CO_2 per annum.

Sustainable Operations:

GoN, through AEPC, has promoted the development of solar PV for well over a decade. More than 230,000 HH use SHS, while other applications are also taking off. The basic institutional structures including a solar PV testing facility at Khumaltar, Lalitpur; private sector participants; and business models are in place. But they continue to evolve, duly supported by technical assistance and capacity building.

Renewable energy development is a priority agenda of GoN, and the annual budget has been progressively increased every year. AEPC, as the executing agency of the program, has developed in-house capabilities for program implementation, monitoring and evaluation.

At district and village levels, the DEEUs/DEESs that have been established provide support for planning and coordination. Sustainability is enhanced through a mandatory one-year guarantee provided by the supplier/installer on the plant and equipment.

As the technology is independent of terrain and is not site-specific (as in the case of hydro power), for many remote off-grid rural communities solar home systems provide the least cost electrification solution.

4. Biogas

Leverage:

Biogas is primarily used as a fuel for cooking, as a substitute for traditional forms of energy such fire wood and cow dung. Although this technology is well developed in Nepal, the high initial cost is a common problem faced by end users; while the remoteness and difficult terrain add to transaction costs of doing business with these communities.

The biogas program in Nepal is well established, commencing with the Biogas Support Program almost two decades ago. The sector is duly supported by a revolving fund for credit delivery, and the program is implemented by the Biogas Sector Partnership - Nepal.

This Investment Plan envisages an SREP allocation of USD 10 million for biogas development which will leverage a total investment of about USD 133 million. The latter, in addition to the SREP contribution, includes funding from GoN, private equity, RREP, lending institutions, local government bodies and others.

Transformational Impact:

Biogas plants support GoN's plans to scale up rural energy access through clean cooking fuel, thus transforming these areas and communities and positively impacting livelihoods. Productive use of biogas, particularly in the case of institutional plants, will directly help in alleviating poverty in the community, while also stimulating the local economy through new opportunities for business. For instance applications beyond direct heat energy hold promise, such as the use of biogas for small scale power generation.

The clean blue flame produced by biogas eliminates health risks arising from fumes arising from the incomplete and inefficient combustion of firewood or cow dung. More importantly, biogas for cooking relieves the burden of having to gather firewood, a chore traditionally assigned to women or even children in the HH.

The environmental benefits are many. Biogas uses a readily available waste product as feedstock, and therefore does not depend on firewood that may be sourced indiscriminately which leads to deforestation and related environmental damage. The output slurry from a biogas plant is a valuable by-product that is used as organic fertilizer. Prospects for commercialising the sale of the by-product is an area that will merit further investigation under the SREP intervention.

Biogas plants also provide opportunities for local youth to build technical competencies in construction, operation and maintenance, more so when additional applications such as power generation is included.

This Investment Plan, catalysed through SREP funding, envisages the construction of 160,000 biogas plants for HH to access clean cooking fuel, which will also result in GHG mitigation of about 800,000 t CO_2 per annum.

Sustainable Operations:

GoN, through AEPC, has promoted the development of biogas for well over a decade. More than 240,000 such plants are already in operation. The basic institutional structures, private sector participants and business models are in place, but continue to evolve, duly supported by technical assistance and capacity building.

Renewable energy development is a priority agenda of GoN, and the annual budget has been progressively increased every year. AEPC, as the executing agency of the program, has developed in-house capabilities for program implementation, monitoring and evaluation.

The Biogas Support Program (BSP) commenced in 1992, and is now in its fourth phase, and under the Biogas Sector Partnership, Nepal (BSP-N). Biogas projects under BSP-N are eligible to receive a subsidy and credit via the Biogas Credit Fund (BCF). BCF has established a credit delivery mechanism through some 163 MFIs in 34 districts and over 4,525 biogas plants have been installed through this Fund.

Design, manufacturing and installation are done by pre-qualified companies and firms. Independent follow up visits are carried out as required. Sustainability is enhanced through a mandatory one-year guarantee provided by the supplier/installer on the plant and equipment.

Annex 11

CAPACITY OF FINANCIAL INSTITUTIONS

CAPACITY OF FINANCIAL INSTITUTIONS

The size and structure of Nepal's financial sector indicates that, subject to adequately mitigating the various barriers to financing SHP projects in Nepal, local funding sources are available to leverage the SREP funds to meet the financing requirements of the representative SHP opportunity pipeline and thereby allow SREP to provide a transformative impact as required by the SREP donors.

Table A11-1 below provides the composition of the financial sector in Nepal and indicates that the commercial banking sector is the largest asset gathering and credit intermediation market in Nepal and therefore warrants the most attention. The Development Banks, although substantially smaller, have deposit taking and lending capabilities similarly to Commercial Banks (their Class B charter prohibits them from the letter of credit business lines) and, therefore, can be expected to participate in senior, mezzanine and asset management roles for any SHP financing initiatives alongside the Commercial Banks.

Among the other financial sectors, several are not oriented toward commercial and industrial exposures such as Finance Companies, Micro-Credit institutions and Cooperatives who lend primarily to the consumer sector. The pension and insurance sectors, especially in more developed markets, are a choice investor base for long duration assets such as SHP project loans. However, in Nepal, the pension and insurance sector is mostly invested in GoN instruments and in shorter term bank deposits and have, therefore, not entered the credit markets as significantly as in more developed country markets. For example, the Provident Fund Corporation, the Employees Provident Fund, and the Citizens Investment Trust are largely invested in member loans, bank deposits (typically one year or less), and GoN instruments such as T-Bills and Development Bonds (direct GoN obligations, typically 5 years, and largely used by financial institutions to maintain Statutory Liquidity Ratios (SLR) as per NRB regulation). This is also the case with the Life insurance companies whose investment portfolios are restricted by local regulations. The Pension and Insurance financial institutions are expected to participate in any SREP initiative by mobilizing funds to support longer term financing to the banking sector. The remaining financial sector participants have insufficient asset size to warrant being a primary source of financing for SHP initiatives.

Another source of SHP financing in developing countries is the local capital markets; however, in Nepal the local bond market is inadequately developed, except for GoN T-Bill, Note, and Development Bond issuance. Although the Nepal Stock Exchange has the infrastructure for the listing and trading in corporate debentures, local demand, and therefore issuance, has not been a material source of term financing for SHP. Rather, SHP developers have used the Nepal Stock Exchange to IPO shares of their development companies in order to raise equity capital and/or divest a portion of their holdings.

Table A11-1: Nepal Rastra Bank Reporting Financial Sector
(Source: Nepal Rastra Bank: "Quarterly Economic Bulletin", vol 45, Jan 2011)

	Number	Asset Size (NPR million)
Commercial Banks	30	793,747
Development Banks	87	125,709
Finance Companies	79	123,688
Micro-Credit Dev Banks	21	Unavail
Cooperatives (NRB)	16	Unavail
NGO's (NRB)	45	Unavail
Insurance Life*	8	43,451
Insurance Non-Life*	17	10,192
Nepal Industrial Development Corp	1	1,260
Agricultural Development Bank	1	25,526
Provident Fund Corporation	1	34,464
Deposit Ins & Credit Gty Corporation	1	494
Employees Provident Fund*	1	99,764
Citizens Investment Trust	1	24,415
** Predominantly Bank Deposit and GON exposure*		
Total		1,282,710

Commercial Bank Market

Table A11-2 below provides more detail on the Commercial Bank sector in Nepal. Although the aggregate domestic credit provided by the Commercial Bank sector is substantial relative to Nepal's SHP financing needs, the actual credit availability and extensions to SHP from the Commercial Bank market has been limited due to a number of contributing factors. Firstly, the Commercial Bank market is funded primarily on a short term deposit basis and therefore more inclined, for risk management and commercial reasons, to provide shorter term facilities with one to three year durations to industrial and commercial enterprises with higher turnover and shorter term receivables as collateral. SHP loan underwriting indicate that longer term, approximately 15 year, amortizing loan structures are needed to fully repay debt presenting a large financing gap risk to the banks. Secondly, the banks have numerous other risk factors to mitigate in any SHP underwriting. As a result, the banks focus on overall asset quality and require additional developer resources and personal guarantees (which are often joint and several among the developer shareholders), which introduces additional selectivity that is not based on the merits of the underlying SHP project. Thirdly, as per regulatory guidelines, the banking sector is subject to single corporate obligor and sector exposure limits. Of these, the single obligor limit is the most constraining. Single corporate obligor Limits are 50% of core capital (Tier 1). Banks currently are targeting around 25% due to liquidity and credit risk concerns. On an aggregate basis, the Commercial Banking Sector has approximately NPR 50 billion in paid-up capital. Although the Tier 1 core capital component is not separately reported, bank sector participants indicate that NPR of 300-400 million had been the typical exposure taken by lead banks due to the single obligor limits. Currently, lead banks and participating banks in SHP financing syndicates are committing NPR 100-200 million such that increasingly larger bank syndicates are needed to fund an SHP project. As an illustration, assuming

uniform NPR 150 million commitments from each syndicate member, a total of 11 banks; that is, a 36% local Commercial Bank participation rate, would be required to finance a 10.0 MW project.

Table A11-2: Nepal Local Commercial Bank Sector Highlights (Sept 2010)

NPR Millions	Deposit Base	Total Assets	Liquid Investments	Liquidity Ratio	Loans	Private Sector Loans	%-Deposit Base	%-Total Loans	Shareholder Capital
RBB	62,343	81,225	11,717	19%	33,140	32,085	51%	97%	(9,955)
ADBL	31,267	60,786	4,717	15%	39,311	38,449	123%	98%	8,976
NIBL	49,421	59,689	6,467	13%	41,908	40,478	82%	97%	3,918
NABIL	46,746	55,690	3,673	8%	33,769	32,869	70%	97%	4,269
NBL	40,515	53,996	13,449	33%	25,412	25,237	62%	99%	(4,495)
HBL	37,891	45,662	3,916	10%	30,034	30,034	79%	100%	3,949
NSBI	38,828	43,606	4,863	13%	18,089	17,199	44%	95%	2,534
EBL	37,160	42,776	5,578	15%	27,856	23,857	64%	86%	2,759
SCBNL	34,667	41,164	5,777	17%	17,383	17,136	49%	99%	4,139
BOK	19,815	23,793	2,290	12%	16,450	15,937	80%	97%	2,074
SBL	19,730	23,661	3,134	16%	16,686	16,686	85%	100%	1,956
KUMARI	17,356	21,983	3,679	21%	14,786	14,658	84%	99%	1,625
MBL	18,113	21,744	2,883	16%	15,037	14,562	80%	97%	1,829
NICB	16,002	20,925	2,345	15%	13,050	12,758	80%	98%	2,372
PRIME	16,892	20,311	2,408	14%	15,177	14,495	86%	96%	1,499
LAXMI	16,435	20,106	1,717	10%	14,729	14,281	87%	97%	1,913
KIST	15,994	19,125	2,621	16%	12,682	12,647	79%	100%	2,186
GLOBAL	14,859	18,104	2,324	16%	12,751	12,408	84%	97%	1,745
SUNRISE	13,665	17,076	1,894	14%	12,225	11,898	87%	97%	1,981
NBB	10,054	16,482	1,434	14%	9,008	8,636	86%	96%	2,434
CITIZENS	13,077	16,242	2,411	18%	11,122	10,972	84%	99%	1,308
BOA	12,790	15,907	1,336	10%	11,404	11,144	87%	98%	1,585
NCCB	10,853	14,839	1,149	11%	8,585	8,212	76%	96%	1,730
NMB	9,831	13,388	1,512	15%	7,652	7,185	73%	94%	1,661
DCBL	8,073	10,770	1,516	19%	7,597	7,577	94%	100%	2,033
LUMBINI	5,706	8,022	1,117	20%	5,328	5,328	93%	100%	1,456
Mega	1,618	3,863	944	58%	2,075	2,075	128%	100%	1,700
Janata	1,054	2,802	1,221	116%	1,229	1,229	117%	100%	1,468
	Deposit Base	Total Assets	Liquid Investments	Liquidity Ratio	Loans	Private Sector Loans	%-Deposit Base	%-Total Loans	Shareholder Capital
Aggregate	620,755	793,736	98,096	16%	474,474	460,030	74%	97%	50,650

Annex 12

INVESTMENT CONCEPT BRIEF: SMALL HYDROPOWER

Concept Paper on an SHP Investment Structure for Leveraging of SREP Funds by the Private Sector

I. Problem Statement

1. According to the DOED, there are more than 635 unique SHP Developers (1MW up to 10MW) in Nepal, representing approximately 3,300 MW in SHP projects that are potentially in need of financing. Identifying and supporting the subset of financially viable SHP projects from this list requires significant resources and risk underwriting skills. Furthermore, the capital intensity and duration of such SHP projects require long term project financing solutions which increases the perceived and actual risks faced by capital providers.

2. The Nepalese financial sector, dominated by the Commercial Banks, Pension, and Insurance companies have funds which can be mobilized to support a scaling-up of SHP development, but there remain significant financial barriers to mobilizing such funds, including i.) lack of sufficient long term financing on acceptable terms and interest rates; ii.) insufficient means of attracting participation of the pension and insurance sectors; iii.) exposure limits of Commercial Banks; iv.) inconsistent risk underwriting practices; v.) under developed local debt capital markets; vi.) inability to mitigate Foreign Exchange risk. The international capital markets have significant depth, appetite, and expertise to provide long term financing, but employ high standards for risk underwriting due to the lack of local knowledge required to structure and service SHP Project financing commitments. A solution is required for scaling-up SHP financing by deploying funds to build financing capacity and to mobilize private sector funding sources. Such a solution would combine the strengths and comparative advantages of local and international capital providers, such as the MDB's, to structure a platform for private capital and public/donor capital to work in partnership.

II. Proposed Contribution to Initiating Transformation

3. SREP funds will be utilized to develop a SHP Investment Structure, which leverages SREP funds by crowding-in the private sector to support the SHP financing activities of pre-selected Nepalese Credit Institutions ("Partner Banks") *(pre-selected by MDBs based on their selection criterion).* Capital commitments from the SHP Investment Structure to the Partner Banks would be designed to mitigate financial barriers faced by the Partner Banks by deploying innovative capital and risk-sharing solutions including but not limited to: Credit Facilities, Risk-Sharing Facilities/Guarantees, and Foreign Exchange and Interest Rate Risk Coverage Facilities/Guarantees.

4. SREP funds will be utilized to provide Technical Assistance in the form of advisory services and assistance in capacity building, SHP market information sharing, and developing SHP project financing expertise. SREP funds may be utilized to provide equity or mezzanine capital for eligible SHP developers, which have technically feasible and financially viable SHP projects but lack the necessary capital to meet the financing requirements of the Partner Banks.

5. The SREP-supported SHP Investment Structure will attract available sources of long term finance such as from the Pension and Insurance sectors and increase the aggregate amount of long-term financing available for SHP projects. The combination of capital, risk sharing solutions and technical assistance will demonstrate the viability of SHP project financing, promote financial intermediation for SHP, and provide SHP financing business models which can be replicated in Nepal.

III. Implementation Readiness

6. The potential demand for SHP financing is vast and SHP project pipelines of 100MW have been identified with relative ease. The Nepalese financial sector is highly constrained due to liquidity pressures and insufficient capital sources and is openly in demand of long term financing and risk-sharing solutions. The imbalance of supply and demand for long term SHP financing in Nepal is reaching crisis proportions. The MDB's have identified several candidate Partner Banks and have held numerous discussions on their existing SHP lending activities and needs.

IV. Rationale for SREP Financing

7. The significant demand/supply imbalance for long term financing has become a major barrier to scaling-up SHP development in Nepal, which necessitates interventions by the MDB's with SREP co-financing.

8. The global financial crisis has led to limited liquidity and ability by local Commercial Banks to provide long-term financing for SHP projects. The SREP co-financed SHP Investment Structure will rectify this market

dislocation by providing a platform to build financing capacity and to mobilize private sector funding sources to bring innovative financing solutions to the SHP sector. This will facilitate development and scaling-up of SHP development in Nepal.

9. The SREP co-financed SHP Investment Structure will provide systemic support to the Nepalese banking sector to enhance its ability to finance SHP investments and demonstrate the viability of project financing solutions for SHP. The success of the SHP Investment Structure will attract additional capital and resources from the private sector.

V. Financing Plan

10. An illustrative financing plan for the SHP Investment Structure is shown in the Table A12-1 below. The SHP Investment Structure will be funded by SREP funds providing a first-loss capital layer (the "SREP Participating Loan") above which the MDB's would commit a pro-rata share of additional financing capacity. Each MDB would raise additional capital from local financial institutions, such as Pension and Insurance companies, either on a senior basis or pari-passu with the MDB as local market appetite is developed.

Table A12-1: Illustrative Financing Plan for the SHP Investment Structure

	SHP Structured Facilities	
	ADB (US MM)	IFC (US MM)
Technical Assistance Grant	500,000	500,000
Total TA Grant	**500,000**	**500,000**
SREP First-Loss Participation	9,500,000	9,500,000
MDB Private Sector Window	20,000,000	20,000,000
Senior Participation Investors	10,000,000	10,000,000
Total SHP Structured Facility	**39,500,000**	**39,500,000**

11. The SREP Participating Loan would be structured as a non-interest bearing participation in the SHP Investment Structure up to the amount of USD 19 million Additionally, USD 1 million would be provided to the SHP Investment Structure for Technical Assistance grants. Each MDB will be allocated 50% of the SREP funds for the following intended uses: i.) USD 9.5 million: SHP Investment Structure participating loan; and ii.) USD 0.5 million: Technical Assistance grant. IFC and the private sector windows of the ADB would then procure capital commitments from their respective institutions to participate in the SHP Investment Structure. Each MDB would also have the option to raise additional funds from local financial institutions in the form of senior participating loans. The participating loans of each MDB and any senior investors would be interest bearing based on a market pricing of the risk inherent to the exposure of the Investment Structure. SREP funds for mezzanine lending to SHP Projects may also be considered during the implementation phase.

Table A12-2: Illustrative Example of Potential SREP Leverage with and without Mezzanine Financing

	No Mezzanine USD (MM)	15% Mezzanine USD (MM)
Senior Investors	20	20
ADB/IFC	40	40
SREP	19	19
Total Debt Funds	79	79
Project Equity (30%)	34	14
Total Sources	113	93
SREP Leverage	**5.64x**	**4.65x**
(Total Sources/SREP Funds)		
Project Leverage	**3.33x**	**6.67x**
(Total Sources/Project Equity)		

12. As an illustration given in the Table A12-2, if each MDBs procures USD 20 mn as capital commitment from its respective institutions and an additional USD 10 million each in the form of senior participating loans for the SHP Investment Structure, the leverage of the SHP Investment Structure exceeds the 4:1 SREP guidance, as measured by the total capital sources for SHP mobilized by the SREP donor funds. Furthermore, to the extent that any SREP funds are used to provide subordinated capital to SHP Projects, the financial leverage as measured by the Project equity capital would be augmented. The realized leverage of the SHP Investment Structure when implemented is subject to change and is highly dependent on several factors such as the investment committee requirements of each MDB, the investment appetite of local financial institutions, the financial strength of the Partner Banks, and the viability of their SHP Project target portfolios.

VI. Project Preparation Timetable

The estimated timetable for putting in place the SHP Investment Structure is shown in Table A12-3 below.

Table A12-3: Estimate Project Preparation Timetable

Estimated Project Preparation Timetable		6.25 Working Months
Duration	**Sequential**	**Description**
2 Weeks	✔	Country Risk Assessment
3 Weeks		Whitepaper: Capital and Risk-Sharing Solutions
2 Weeks		Selection of Partner Bank Candidates
3 Weeks	✔	Due Diligence of Partner Bank Candidates
3 Weeks	✔	Review of SHP Project Pipelines
2 Weeks		Market Pricing and Risk Management
4 Weeks		Capital Commitments Committee Process
8 Weeks	✔	External Capital Raising
4 Weeks		Execution of SHP Structured Facility

Note: The above timetable is subject to timely approvals from each MDB's respective management and Board. Also, above timetable assumes normal capital markets scenario and cooperation from the proposed partner banks and project developers

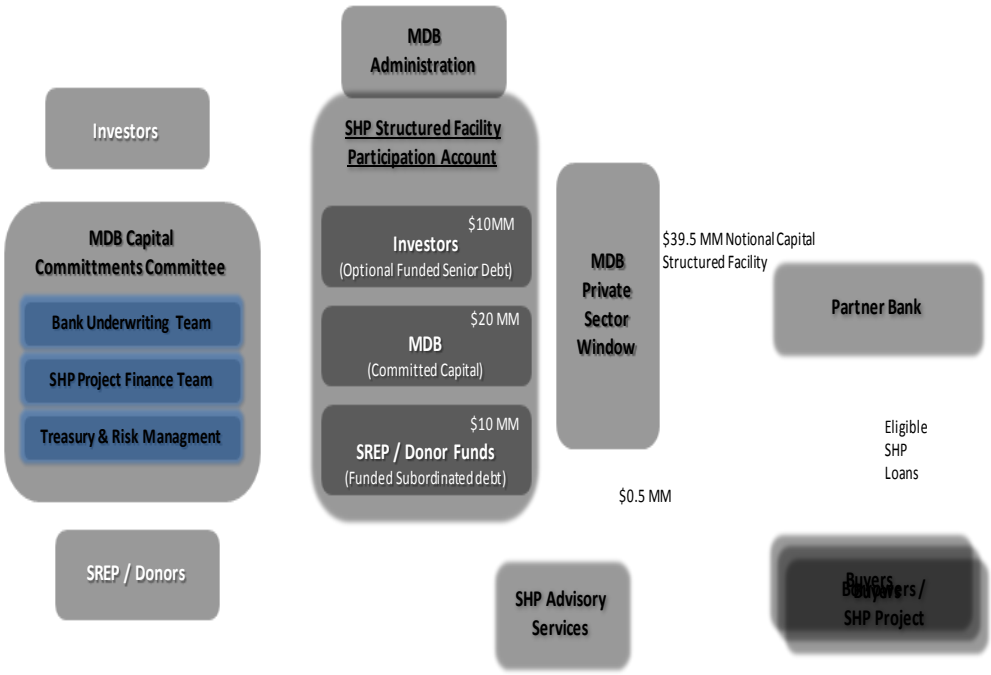
Annex 13

INVESTMENT ALTERNATIVES FOR PARTNER BANKS USING SREP FINANCING

INVESTMENT ALTERNATIVES FOR PARTNER BANKS USING SREP FINANCING

This Annex provides more detailed implementation and investment alternatives for the recommended SHP Investment Structure. The proposed Structure allows for a flexible execution by the MDB's. For example, the SHP Structure could be implemented on the balance sheet of each MDB or as a segregated account at the MDB or alternatively as a legally segregated special purpose fund. In each case, the MDB would perform the role of fund manager and implementing entity. Each such embodiment of the SHP Structure has its benefits: the on-balance sheet or segregated account implementation provides ease of execution while preserving the preferred creditor status of the MDB; whereas the segregated fund entity provides a robust platform for future private capital contributions to further leverage the facility. The segregated account structure is assumed as the preferred initial execution of the MDB structured facility as shown in Figure A13-1. The private sector windows of each MDB would serve as the origination and execution focal point for each Partner Bank facility. The private sector windows would coordinate the internal resources to take the SHP Structure to their respective capital commitments committees and to originate, negotiate, and consummate each Partner Bank facility.

Figure A13-1: Illustration of SHP Structured Facility Implementation



The allocations and intended use of SREP funds to SHP and the sub-allocations to each of the MDB's are shown in Table A13-1. SREP funds in the amount of USD 20 million are allocated to scale-up SHP in Nepal. Each MDB is then allocated 50% of the SREP funds for the following intended uses: i.) USD 19 million as a participating loan to the SHP Structure; ii.) a Technical Assistance grant of USD 1 million. SREP funds may be used though a variety of financing mechanisms including debt and mezzanine financing to SHP Projects, risk mitigation instruments , etc.

Table A13-1: SREP Allocations to MDB's for SHP Investment Structure Implementation

	SREP SHP Allocations	MDB Sub-Allocations ADB	IFC
Total SREP Allocation to SHP	**20,000,000**	50%	50%
Grant: Technical Assistance	1,000,000	50%	50%
SHP Structured Facility Participation	19,000,000	50%	50%
SHP Project Mezzanine Fund	-	50%	50%

An illustrative use and leveraging of the SREP funds by each MDB is shown in Table A13-2. The USD 9.5 million in SREP funds designated for the SHP Investment Structure would be in the form of a non-interest bearing participating loan to the SHP Investment Structure. The private sector windows of the MDB's would then procure capital commitments from their respective institutions (assumed as USD 20 million from each institution for illustration purposes). Each MDB would then also have the option to raise additional funds from financial institutions, in the form of senior participating loans to bear losses in excess of the respective MDB's participating loan (assumed to be $10m). The participating loans of each MDB and any senior investors would be interest bearing based on a market pricing of the risk inherent to the respective SHP Investment Structure exposures. The Technical Assistance grant funds would be deployed by each MDB on an as-needed basis.

Table A13-2: Illustrative Sizing of MDB SHP Structured Facility Implementation

	SHP Structured Facilities ADB (US MM)	IFC (US MM)
Technical Assistance Grant	500,000	500,000
Total TA Grant	**500,000**	**500,000**
SREP	9,500,000	9,500,000
MDB Private Sector Window	20,000,000	20,000,000
Senior Participation Investors	10,000,000	10,000,000
Total SHP Structured Facility	**39,500,000**	**39,500,000**

The investments in the Partner Banks may take the form of either participations in the underlying SHP Project Loans or contingent debt capital for the Partner Banks when project loan losses create funding pressures. In addition, the SHP Investment Structure can be used to support different stages of the SHP project loans; namely the permanent financing stage versus the construction financing stage. The MDB's have developed numerous risk underwriting and financing products to support development financing such as for SHP Projects in Nepal. These tools have been developed to address a broad array of risk factors such as project risks, credit, foreign exchange, liquidity, and political risk factors. The purpose of the SHP Investment Structure is to provide each of the MDB's with a pre-determined capital base (as shown in Figure A13-1) from which to structure and provide capital and risk-sharing solutions to the Partner Bank's for their SHP Project financing needs. Some of the capital and risk-sharing solutions available to the MDB's can be generally categorized as:

Credit Facility/Debt facility

Solutions in this category generally provide the Partner Bank with debt capital, whether funded up-front or provided as a committed credit facility, to finance its SHP debt portfolio. Such debt may be provided on an unsecured or secured basis. When provided to the Partner Bank as a committed credit facility, the SHP Investment Structure may allow conditional draws by the Partner Bank based on the performance of the Partner Bank's conditional SHP debt portfolio.

Risk Sharing Facility/Guarantees

Solutions in this category would generally expose the SHP Investment Structure to the underlying SHP Project loans of the Partner Banks. When executed in Guarantee form, the Partner Bank would fund the SHP Project exposure and receive a guarantee to cover a portion of the losses on the SHP exposure.

Foreign Exchange Risk Cover Facility

Solutions in this category generally cover market risk contingencies such as foreign exchange risk inherent to the Partner Bank's exposures in its SHP loan book. For example, the Partner Bank may secure hard currency financing on acceptable terms but require a foreign exchange hedge to cover its liability since its SHP loan portfolio is NPR-denominated. The SHP Investment Structure may provide a partial foreign exchange hedge or financing to cover losses on the Partner Banks foreign exchange exposure. The funds could also help project developers hedge foreign exchange risks for hard currency financing and equipment purchase.

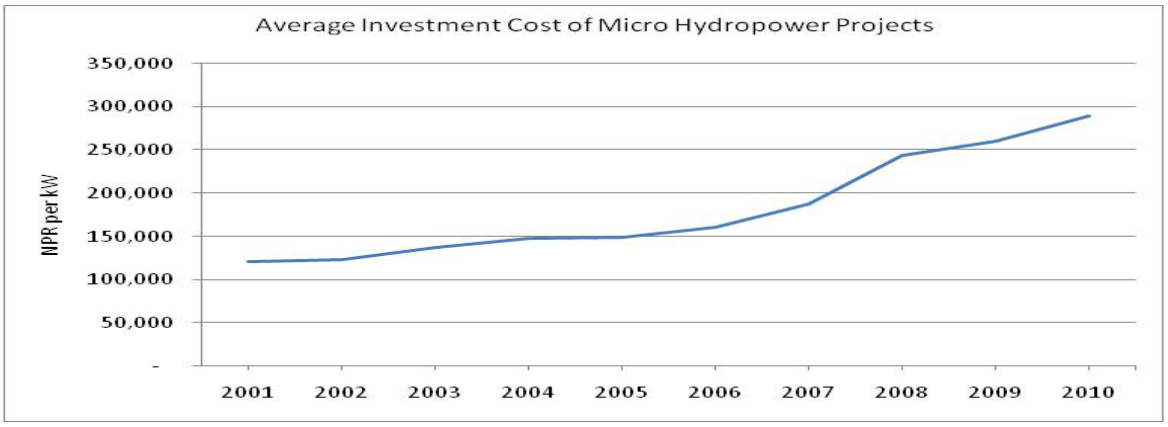
The MDB's would embed one or more of such solutions into each facility with the Partner Banks.

Annex 14

COST ESTIMATES FOR INVESTMENT PLAN

COST ESTIMATES FOR INVESTMENT PLAN

1. Mini and Micro Hydropower Projects

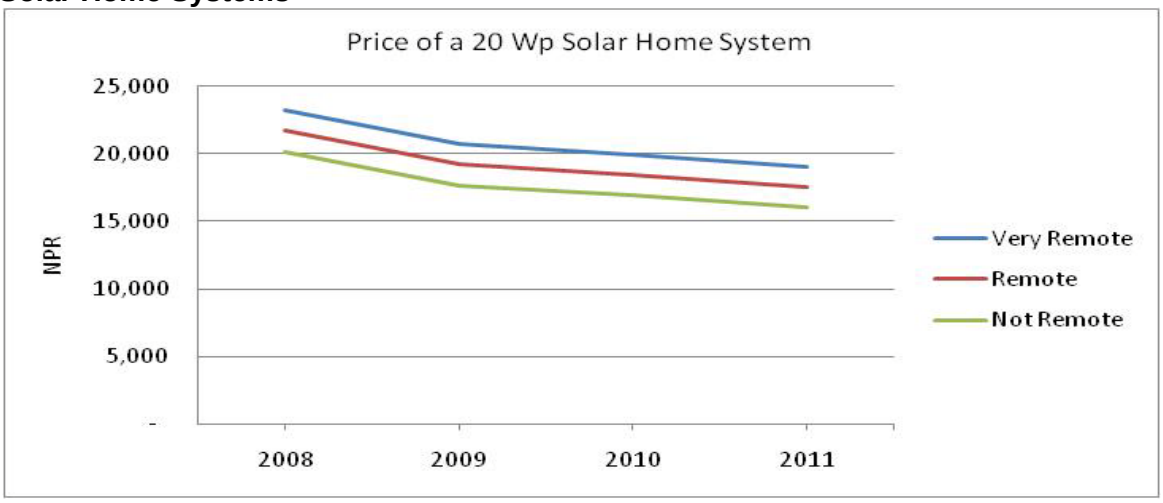


As seen from the above cost curve (data source: AEPC) the average investment cost of a micro hydropower project has increased over the years and reached NPR 289,593/kW in 2010. Possible reasons for the increase include commodity price increases, domestic inflation and the need to venture further afield to reach the more remote communities.

Reliable cost figures are not available for mini hydropower projects. Further, projects in this range (100 kW – 1 MW) have not been popular as they tend to be too large for small, dispersed communities, but not large enough to be economically connected to the national grid.

Hence, the bulk of the mini and micro hydropower projects under SREP are expected to be in the micro category. Further, the rising trend in unit prices is expected to ease somewhat with capacity building, volume growth and competition. Accordingly, a figure of NPR 320,000/kW (USD 4,444/kW) has been assumed in the SREP Investment Plan.

2. Solar Home Systems

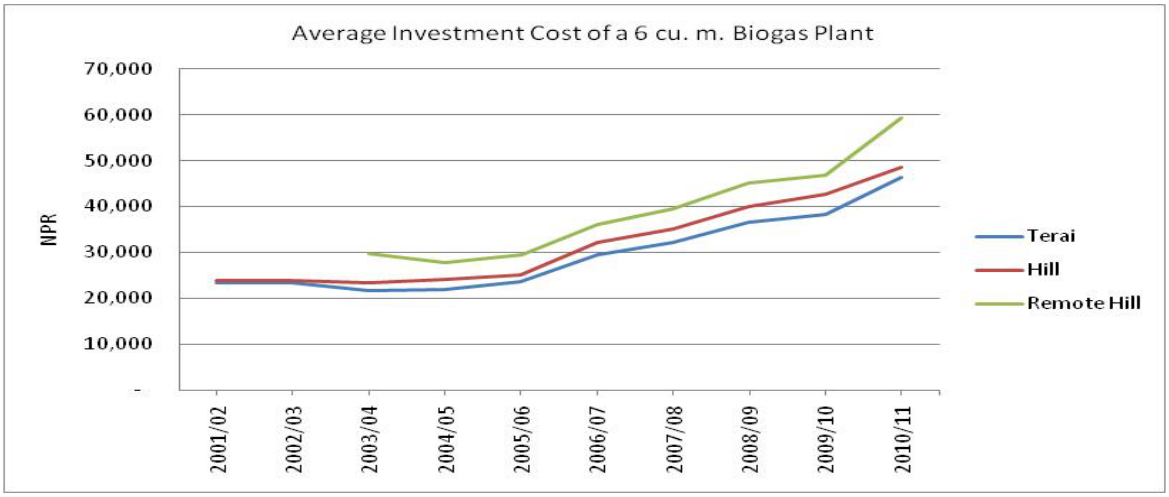


Although still one of the most expensive renewable energy technologies when measured in terms of investment cost per unit of power, solar PV is often the most practical and least cost solution for providing basic electricity services for those living in remote areas, particularly where other

resources are not available in the vicinity. Rapid technological advancement, innovative applications and increased competition have contributed to a steady decline in global prices. This trend is also evident in Nepal, as seen in the above cost curves (data source: Solar Electrical Manufacturers' Association of Nepal).

Taking the popular 20 Wp solar home system (SHS) as the basis, average unit prices in Fiscal Year ended 2011 ranged from NPR 16,050 (non-remote areas) to NPR 19,050 (very remote areas). As the bulk of the demand for SHS would be from the remote to very remote areas, and assuming a continued price decline (but at a slower pace), an average pre-subsidy market price of NPR 18,000 (USD 250) for a 20 Wp solar home system has been assumed in the SREP Investment Plan.

3. Biogas Plants



The cost of a typical 6 m^3 domestic biogas plant has increased steadily over the years. During Fiscal Year ended 2011 the average cost of such a plant ranged from NPR 46,484 in the Terai region to NPR 59,395 in the Remote Hill region (data source: ESAP). However, the steep rise seen in recent years is expected to ease somewhat with capacity building, volume growth and competition. Accordingly, a figure of NPR 60,000 (USD 833) per plant has been assumed in the SREP Investment Plan.

Annex 15

Investment Concept Brief
MINI AND MICRO HYDRO POWER

Investment Concept Brief
MINI AND MICRO HYDRO POWER

1. Problem Statement

Households that have no access to grid electricity rely on substitutes such as kerosene oil for their lighting needs. Kerosene lamps are not only a poor source of illumination, but are also polluting, unsafe and dependent on regular and reliable supply of fuel.

While mini and micro hydropower provide a viable alternative for energising such end users, who are typically remote, dispersed rural HH, these technologies too face barriers. They are site specific in that they require a stream or river in the vicinity with adequate flow and head for power generation. Further, the high initial cost and the absence of credit financing is a common problem faced by end users; while the remoteness and difficult terrain add to transaction costs of doing business with these communities.

2. Proposed Contribution to Initiating Transformation

Mini and micro hydropower mini grids support GoN's plans to scale up rural energy access, thus transforming these areas and communities, and positively impacting livelihoods. Productive use of electricity, particularly by day, will directly help in alleviating poverty in the community, while also stimulating the local economy through new opportunities for business. For instance mini grids attract the development of other related infrastructure that include clean water, better health care, education, employment creation, and information and communications technologies.

Access to electricity eliminates health risks arising from kerosene fumes, and fire hazards caused by toppled wick lamps; women and children in the HH are those who are most affected. Further, the elimination of kerosene lamps contributes to the mitigation of GHG emissions.

Experience shows that these community-based projects bring about improved social and gender inclusiveness and cohesion, as decisions are made in a consultative manner; many contribute 'sweat equity' during construction, and also later during operation and maintenance, thus establishing a stake in the venture; local youth get an opportunity to build technical competencies and leadership skills. In short, village reawakening through empowerment.

3. Implementation Readiness

GoN, through AEPC, has promoted the development of mini and micro hydropower for well over a decade. Over 900 such projects are already in operation. The basic institutional structures, private sector participants and business models are in place, but continue to evolve, duly supported by technical assistance and capacity building.

Renewable energy development is a priority agenda of GoN, and the annual budget has been progressively increased every year. AEPC, as the executing agency of the program, has developed in-house capabilities for program implementation, monitoring and evaluation.

At district and village levels, the DEEUs/DEESs that have been established provide support for planning and coordination. Survey, design, manufacturing and installation are done by pre-qualified companies and firms. Independent follow up visits are carried out at the time of power output testing and power output verification. Sustainability is enhanced through a mandatory one-year guarantee provided by the supplier/installer on the plant and equipment.

4. Rationale for SREP Financing

The country is presently experiencing a severe energy crisis, with regular load shedding by NEA. Grid penetration is low, with only 56% of HH having access to electricity. Fortunately, given the abundant availability of renewable energy resources in the country, for many remote rural communities RETs provide the least cost solution.

GoN envisages mobilising investments amounting to USD 1,076 million in renewable energy by 2020, which include mini, micro and pico hydro; solar home systems; and biogas plants. The Ministry of Energy is in the process of formulating a 20-year perspective plan for RETs.

Several donor-assisted mini and micro renewable energy programs have been implemented in the past, with many now in follow-on modes. The current annual budget for these programs is almost NPR 3 billion. However, most of these programs will be completed by 2012, and some even earlier. Hence, there is an urgent need for continued funding, and development partners are currently designing cooperation programs in consultation with GoN, with SREP financing adding value to the initiative by being a part of the larger scheme.

5. Results Indicators

Results	Indicators	Targets
1. Increase in the number of HH and enterprises supplied with electricity	No. of new HH connected to a mini grid	250,000
2. Productive end use of off-grid electricity	No. of new consumers using electricity for productive/income generating activities	TBD
3. Increase in renewable energy supply	Capacity addition through mini and micro hydro power	30 MW
4. Additional funding leveraged by SREP	Leverage factor, measured as SREP funding: all other sources	At least 1:4
5. Financing by banks for mini and micro hydro projects	Number of banks accredited as PFIs	TBD
	Number of loans disbursed	TBD
	Value of loans disbursed	TBD
6. GHG emission mitigated	Through mini and micro hydro power	69,000 tCO_2 p.a.

6. Financing Plan

The SREP-IP covers a five-year period. Being part of a larger renewable energy program to be implemented through a common platform (albeit still under development that will include RREP

and other yet to be identified projects and partners), the SREP inputs will be viewed as a complementary component supporting national targets.

Financing for mini and micro hydro power projects is estimated as follows:

Financing Plan, USD '000

Investment	GoN	SREP Initial Allocation	RREP	Others (To be determined)	Private Sector Equity	Total	% of Total Program
Mini & micro hydro	20,000	5,000	60,401	21,265	26,667	133,333	26

Notes:

- From the SREP USD 40 million initial allocation, USD 20 million allocated for mini and micro energy initiatives, duly leveraged, will be disbursed through CREF. It will be utilised as a grant for subsidies and technical assistance; and as loans through a revolving fund.
- An indicative sum of USD 5 million is allocated for mini and micro hydropower project from the SREP Initial Allocation.
- 'Others' represents the funding gap. It will be bridged through funds from other donors, bank financing, DDCs and VDCs etc. However, it is expected to be at least partially addressed through an allocation from the USD 60 million SREP Reserve.

7. Project Preparation Timetable

Project preparation activities will cover the period July 2011 to September 2012.

8. Requests, if any, for Investment Preparation Funding

SREP financial assistance will be required to develop the detailed design for implementation.

Annex 16

Investment Concept Brief
SOLAR PV

Investment Concept Brief
SOLAR PV

1. Problem Statement

Households (HH) that have no access to grid electricity rely on substitutes such as kerosene oil for their lighting needs. Kerosene lamps are not only a poor source of illumination, but are also polluting, unsafe and dependent on regular and reliable supply of fuel.

While stand alone solar home systems (SHS) provide a viable alternative for energising such end users, who are typically remote, dispersed rural HH, renewable energy technologies too face barriers. The high initial cost and the absence of credit financing is a common problem faced by end users; while the remoteness and difficult terrain add to transaction costs of doing business with these communities. Nevertheless, solar PV technology is advancing rapidly, and prices are expected to decline in the years to come.

2. Proposed Contribution to Initiating Transformation

Solar PV supports GoN's plans to scale up rural energy access, thus transforming these areas and communities, and positively impacting livelihoods. Although low in energy output, solar PV does have applications for productive use of electricity, particularly in the areas of information technology and communications as well as benefits that can be derived from extended working hours after sunset.

Access to electricity eliminates health risks arising from kerosene fumes, and fire hazards caused by toppled wick lamps; women and children in the HH are those who are most affected. Further, the elimination of kerosene lamps contributes to the mitigation of GHG emissions.

Experience shows that the introduction of such technologies have spin off effects in rural communities. Local entrepreneurs set up or improve their businesses through value added services such as providing information and communication facilities, computer education and entertainment. Local youth get an opportunity to build technical competencies as service providers or users.

3. Implementation Readiness

GoN, through AEPC, has promoted the development of solar PV for well over a decade. More than 230,000 HH use SHS, while other applications are also taking off. The basic institutional structures including a solar PV testing facility at Khumaltar, Lalitpur; private sector participants; and business models are in place. But they continue to evolve, duly supported by technical assistance and capacity building.

Renewable energy development is a priority agenda of GoN, and the annual budget has been progressively increased every year. AEPC, as the executing agency of the program, has developed in-house capabilities for program implementation, monitoring and evaluation.

At district and village levels, the DEEUs/DEESs that have been established provide support for planning and coordination. Sustainability is enhanced through a mandatory one-year guarantee provided by the supplier/installer on the plant and equipment.

4. Rationale for SREP Financing

The country is presently experiencing a severe energy crisis, with regular load shedding by NEA. Grid penetration is low, with only 56% of HH having access to electricity. Fortunately, given the abundant availability of renewable energy resources in the country, for many remote rural communities RETs provide the least cost solution.

GoN envisages mobilising investments amounting to USD 1,076 million in renewable energy by 2020, which include mini, micro and pico hydro; solar home systems; and biogas plants. The Ministry of Energy is in the process of formulating a 20-year perspective plan for RETs.

Several donor-assisted mini and micro renewable energy programs have been implemented in the past, with many now in follow-on modes. The current annual budget for these programs is almost NPR 3 billion. However, most of these programs will be completed by 2012, and some even earlier. Hence, there is an urgent need for continued funding, and development partners are currently designing cooperation programs in consultation with GoN, with SREP financing adding value to the initiative by being a part of the larger scheme.

5. Results Indicators

Results	Indicators	Targets
1. Increase in the number of HH and enterprises supplied with electricity	No. of new HH using SHS	500,000
2. Productive end use of off-grid electricity	No. of new SHS consumers using electricity for productive/income generating activities	TBD
3. Increase in renewable energy supply	Capacity addition through SHS	10 MW
4. Additional funding leveraged by SREP	Leverage factor, measured as SREP funding: all other sources	At least 1:4
5. Financing by banks for solar PV	Total number of banks accredited as PFIs	TBD
	Total number of loans disbursed	TBD
	Total value of loans disbursed	TBD
6. GHG emission mitigated	Through solar PV	62,857 tCO_2 p.a.

6. Financing Plan

The SREP-IP covers a five-year period. Being part of a greater renewable program implemented through a common platform (albeit still under development and will include RREP and other yet to be identified projects and partners), the SREP inputs will be viewed as a complementary component supporting national targets.

Financing for SHS is estimated as follows:

Financing Plan, USD '000

Investment	GoN	SREP Initial Allocation	RREP	Others (To be determined)	Private Sector Equity	Total	% of Total Program
Solar home systems	18,750	5,000	56,395	19,855	25,000	125,000	24

Notes:

- From the SREP USD 40 million initial allocation, USD 20 million allocated for mini and micro energy initiatives, duly leveraged, will be disbursed through CREF. It will be utilised as a grant for subsidies and technical assistance; and as loans through a revolving fund.
- An indicative sum of USD 5 million is allocated for solar PV from the SREP Initial Allocation.
- 'Others' represents the funding gap. It will be bridged through funds from other donors, bank financing etc. However, it is expected to be at least partially addressed through an allocation from the USD 60 million SREP Reserve.

7. Project Preparation Timetable

Project preparation activities will cover the period July 2011 to September 2012.

8. Requests, if any, for Investment Preparation Funding

SREP financial assistance will be required to develop the detailed design for implementation.

Annex 17

Investment Concept Brief
BIOGAS

Investment Concept Brief
BIOGAS

1. Problem Statement

Biogas is primarily used as a fuel for cooking, as a substitute for traditional forms of energy such fire wood and cow dung. Although this technology is well developed in Nepal, there are barriers to overcome, more so in respect of designing larger applications such as institutional plants. The high initial cost and the absence of credit financing is a common problem faced by end users; while the remoteness and difficult terrain add to transaction costs of doing business with these communities.

2. Proposed Contribution to Initiating Transformation

Biogas plants, both domestic and institutional, support GoN's plans to scale up rural energy access, thus transforming these areas and communities and positively impacting livelihoods. Productive use of biogas, particularly in the case of institutional plants, will directly help in alleviating poverty in the community, while also stimulating the local economy through new opportunities for business. For instance applications beyond direct heat energy hold promise, such as the use of biogas for small scale power generation.

The clean blue flame produced by biogas eliminates health risks arising from fumes arising from the incomplete and inefficient combustion of firewood. Equally, if not more important, biogas for cooking relieves the burden of having to gather firewood, a chore traditionally assigned to women in the HH.

The environmental benefits are many. Biogas uses a readily available waste product as feedstock, and therefore does not depend on firewood that may be sourced indiscriminately which leads to deforestation and related environmental damage. The output slurry from a biogas plant is a valuable by-product that is used as organic fertilizer.

Biogas plants, particularly the larger ones, also promote social and gender inclusiveness and cohesion, as construction often involves the local community. They provide opportunities for local youth to build technical competencies in construction, operation and maintenance, more so when additional applications such as power generation is included.

3. Implementation Readiness

GoN, through AEPC, has promoted the development of biogas for well over a decade. More than 240,000 such plants are already in operation. The basic institutional structures, private sector participants and business models are in place, but continue to evolve, duly supported by technical assistance and capacity building.

Renewable energy development is a priority agenda of GoN, and the annual budget has been progressively increased every year. AEPC, as the executing agency of the program, has developed in-house capabilities for program implementation, monitoring and evaluation.

The biogas program in Nepal is well established, commencing with the Biogas Support Program almost two decades ago. The sector is duly supported by a revolving fund for credit delivery, and the program is implemented by the Biogas Sector Partnership - Nepal.

At district and village levels, the DEEUs/DEESs that have been established provide support for planning and coordination. Design, manufacturing and installation are done by pre-qualified companies and firms. Independent follow up visits are carried out as required. Sustainability is enhanced through a mandatory one-year guarantee provided by the supplier/installer on the plant and equipment.

4. Rationale for SREP Financing

The country is presently experiencing a severe energy crisis, with regular load shedding by NEA. Grid penetration is low, with only 56% of HH having access to electricity. Fortunately, given the abundant availability of renewable energy resources in the country, for many remote rural communities RETs provide the least cost solution.

GoN envisages mobilising investments amounting to USD 1,076 million in renewable energy by 2020, which include mini, micro and pico hydro; solar home systems; and biogas plants. The Ministry of Energy is in the process of formulating a 20-year perspective plan for RETs.

Several donor-assisted mini and micro renewable energy programs have been implemented in the past, with many now in follow-on modes. The current annual budget for these programs is almost NPR 3 billion. However, most of these programs will be completed by 2012, and some even earlier. Hence, there is an urgent need for continued funding, and development partners are currently designing cooperation programs in consultation with GoN, with SREP financing adding value to the initiative by being a part of the larger scheme.

5. Results Indicators

Results	Indicators	Targets
1. Increase in renewable energy supply	Capacity addition biogas plants, mostly domestic	160,000 plants
2. Additional funding leveraged by SREP	Leverage factor, measured as SREP funding: all other sources	At least 1:4
3. Financing by banks for biogas projects	Total number of banks accredited as PFIs	TBD
	Total number of loans disbursed	TBD
	Total value of loans disbursed	TBD
4. GHG emission mitigated	Through biogas plants	800,000 tCO_2 p.a.

6. Financing Plan

The SREP-IP covers a five-year period. Being part of a larger renewable energy program that will be implemented through a common platform (albeit still under development that will include RREP and other yet to be identified projects and partners), the SREP inputs will be viewed as a complementary component supporting national targets.

Financing for biogas projects is estimated as follows:

Financing Plan, USD '000

Investment	GoN	SREP Initial Allocation	RREP	Others (To be determined)	Private Sector Equity	Total	% of Total Program
Biogas plants	20,000	10,000	56,703	19,963	26,667	133,333	26

Notes:

- From the SREP USD 40 million initial allocation, USD 20 million allocated for mini and micro energy initiatives, duly leveraged, will be disbursed through CREF. It will be utilised as a grant for subsidies and technical assistance; and as loans through a revolving fund.
- An indicative sum of USD 10 million is allocated for biogas projects from the SREP Initial Allocation.
- 'Others' represents the funding gap. It will be bridged through funds from other donors, bank financing etc. However, it is expected to be at least partially addressed through an allocation from the USD 60 million SREP Reserve.

7. Project Preparation Timetable

Project preparation activities will cover the period July 2011 to September 2012.

8. Requests, if any, for Investment Preparation Funding

SREP financial assistance will be required to develop the detailed design for implementation.

Annex 18

RISK MATRIX FOR SHP AND MINI MICRO ENERGY INITIATIVES

Risk Matrix for Development of SHP with SREP Funding

Potential Risks for SHP Development	Potential Risk Mitigation Measures	Risk Allocation
Political Environment		
Government in transition	Political risk insurance and guarantees	MIGA, ADB, Commercial insurance
Concerns about opposition to hydropower projects	Insurance and guarantees	Commercial insurance
Policy, Laws and Regulation		
Uncertainties about policies	Formulate clear policies, laws and regulations in support of SHP development	MoE, GoN agencies
Conflicting policies and multiple agency involved	Streamline policies and create single-window approval process	MoE, DOED, GoN agencies
Institutional		
Inadequate capacity of GoN agencies, private sector, and local commercial banks to promote SHP	Capacity building and strengthening of agencies and institutions	GoN, MDBs, private sector
Conflicting roles of regulator and project developer	Separate institutional functions of regulation and licensing from project development role	GoN
Need for a functional regulator for the electricity sector	Strengthen the role of ETFC to review retail tariffs as well as power purchase tariffs	GoN
Water management, power system planning and project development policies not in harmony	Strengthen capacity and authority of WECS, NEA or other water resource management and system planning agencies to harmonize planning functions	GoN
Single off-taker of power in the country which may decline power purchase	Open access for IPPs to sell directly to consumers, and facilitate power wheeling and access to export markets	GoN, NEA
Financial		
Poor liquidity of local commercial banks reduced ability to finance multiple SHP projects	Create funds such as SREP, extend credit lines and revolving funds to commercial banks for on-lending	MDBs
Commercial banks cannot access long-term low cost financing from international markets	Develop Foreign exchange risk mitigation instruments	MDG, commercial banks
IPPs cannot obtain low cost financing from foreign sources since PPAs are in local currency	Develop Foreign exchange risk mitigation instruments	MDG, commercial banks
Project finance options not available and only term loans available with low tenor, high cost requiring	Adapt due diligence to suit local market conditions, develop flexible approaches to	Commercial banks, IPPs, MDBs

Potential Risks for SHP Development	Potential Risk Mitigation Measures	Risk Allocation
collateral guarantees – limits scale-up of SHP	EPC contracting, educate IPPs and banks	
Low power purchase price reduces return to investors and limits scale-up of SHP	Develop REFIT for SHP based on return on investment, introduce or improve other fiscal incentives for SHP development	GoN, NEA, MDBs
Single off-taker of power is not creditworthy increasing risks for scale up of SHP	Create open market access, provide PRG and PRI risk mitigation instruments	GoN, NEA, MDBs
SREP Fund Structure		
Rigid Fund requirements may constrain ability of IPPs to access Fund benefits (as with WB's Power Development Fund)	Adapt Fund structure and requirements for local market conditions and needs, building flexibility without increasing default risks	MDBs, commercial banks, IPPs
Access to the Fund may be limited or difficult	Fund under commercial bank control with adequate controls and protections	GoN, MDB, commercial banks
Failure of SREP to leverage complementary funds in the ratio 1:4. Given high local financing cost, leverage of 1:4 does not alleviate SHP financing issues or improve commercial bank liquidity	Take flexible approach to leveraging of Funds. Complement with credit lines and other financing options. Use SREP Fund as guarantee Fund or to mitigate interest rate fluctuations	MDBs. Commercial banks
Technical		
Lack of transmission capacity to evacuate power from remote SHP locations	Integrate SHP planning with transmission system planning for optimal SHP scale-up strategies	NEA, DoED, MoE
Lack of access roads to SHP project sites	Provide incentives to developers to build access roads which may also benefit the local rural community	MoE, MoF, Min of Rural Development
Low load factor of SHP with low generation during high power demand period forcing NEA to rethink PPAs with SHP	Improved water resource management and SHP project design and approval process.	WECS, DoED, NEA, IPPs
	Create open market access for direct sales to consumers, and facilitate exports	NEA, MoE, IPPs
Environmental& Social		
Forest land use policies, forest land compensation, and related permits take long time	Streamline and simplify policies for SHP up to 10 MW, and create one-stop window	GoN, MoEn, MoF, DoED
IPPs expected to develop schools, hospitals and other facilities for local	Balance social obligations with financial returns required by	IPPs, DDC, VDC, GoN agencies

Potential Risks for SHP Development	Potential Risk Mitigation Measures	Risk Allocation
communities which increases projects costs and distracts from project development and scale up of SHP	IPPs through greater interaction with DDCs and VDCs Increase SHP power purchase price to cover eligible and verified investments	
Local community resentment towards projects that do not benefit them and are seen as "stealing of local resources" for benefits of others	Greater engagement with local communities to improve understanding	DDCs. VDC, IPPs, GoN agencies

Risk Matrix for Development of Mini-Micro Energy Initiatives with SREP Funding

Risk	RET	Mitigation Measures
Political/Economic/Institutional		
Shifting economic priorities of Government	All	Economic stability; annual budgetary allocation of required funds by GoN, particularly for mini/micro RETs
Failure of SREP to attract the expected amount of complementary funds from donors and others	All	Political stability; visible and timely action by line agencies in meeting SREP milestones; resolution of constraints faced by financial institutions (see below) and others; continuity of GoN's subsidy policy.
Faulty design and/or delays in the setting up of the required systems, controls and governance structures for the proposed Central Renewable Energy Fund (CREF)	All	Effective segregation of the technical/advisory function of AEPC from its CREF secretariat role in the CREF management structure; CREF to be administered by an independent and professional fund manager who operates under guidelines specified by the CREF Board.
Fiduciary capacity of AEPC to function as the Secretariat for the CREF Board, duly separated from its technical advisory role	All	To be assessed by DANIDA as part of RREP development; capacity building through TAwhere required
Financial		
Limited access to capital by developers as financial institutions face liquidity problems, asset-liability mismatch on tenors, and a general lack of expertise in structuring project finance - the last	Mini hydros	GoN and MDB to facilitate access to affordable long-term funds through a line of credit and/or a revolving fund; training on project evaluation, project finance structuring and risk sharing

Risk	RET	Mitigation Measures
leading to perceived higher risks and the consequent imposition of high collateral requirements		mechanisms for lending institutions
Delays in the release of subsidies/TA funds due to budgetary constraints.	All	Mechanism for timely annual budgetary allocations and disbursements; clarity of purpose and simplified procedures when drafting the Project Operating Guidelines; adequate delegation of decision making powers with accountability
Environmental		
Deforestation and soil erosion caused by site clearing, construction etc; non-sustainable harvesting of forest resources for fire wood.	All hydros, biogas	Enforcement of compliance with environmental safeguard rules and regulations by all concerned (e.g., evidence of compliance a pre-condition for loan/grant approval and subsequent disbursements); improved public awareness
Resource constraint, particularly caused by upstream diversion and/or climate change	All hydros	Enforceable water rights; global action on climate change
Social		
Disruption within community based organisations (CBO) during project implementation due to loss of skilled personnel, disputes etc	Community based micro hydro	Effective social preparation and team building during project formulation; follow up assistance where required; leadership training and succession planning
Constrained ability to pay by the targeted community, mainly due to high upfront costs and irregularity of income streams	Mini and micro hydro, solar PV, biogas	End use applications for income generation activities[68]; group lending schemes for risk sharing; compulsory savings scheme to meet contingencies & component replacements
Technical		
Uncertainty of product reliability and service backup	Mini and micro hydro, solar PV	Technical standards with effective mechanism for enforcement and remedial action
Lack of technical or commercial skills by end users, lenders and the bureaucracy leading to delays in decision making	All	Capacity building
Demand growth exceeding installed capacity after project commissioning	Mini and micro hydro, solar PV	Remove the limit of 120 W/HH for micro hydros, consider enforcing the use energy efficient loads such CFLs and not incandescent lamps; design a scheme to support the financing of SHS upgrades, as these systems are modular

[68] This could be programmed without leaving it entirely for the market to determine. A possible approach could be through an 'innovation solicitation' window for developers to attempt new initiatives, supported by cost-shared grant funds, as in the WB and GEF-assisted Sri Lanka Renewable Energy for Rural Economic Development Project

Annex 19

EXTERNAL REVIEWER'S COMMENTS ON SREP INVESTMENT PLAN FOR NEPAL: RESPONSE MATRIX

Independent Technical Review

1. Title of the investment plan - SCALING-UP RENEWABLE ENERGY PROGRAM INVESTMENT PLAN FOR NEPAL

2. Program under the SCF - SREP
3. Name of the reviewer - Drona Upadhyay
4. Date of submission - 23 September 2011

5. Part I: General criteria

General

Criteria	Reviewer Comments
complies with the principles, objectives and criteria of the relevant program as specified in the design documents and programming modalities	The investment plan (IP) generally complies with the principles, objectives and criteria of the SREP.
takes into account the country capacity to implement the plan	The IP provides a detailed analysis of the capacity of the financial institutions in the country to provide the support that will be necessary for SREP to achieve its goals, and in general has a positive assessment of the capacity. The IP should take into consideration the required infrastructure that needs to be in place for the 4,000 MW to be produced (as per the GoN plans). Even though the SREP component is small, due to the nature of intervention (i.e. complementing the existing initiatives), the IP should consider this aspect. New roads and transport infrastructure and facilities will be required as a precondition to installing the anticipated amount of hydro and other RETs. Existing transmission and distribution systems will need to be upgraded, and new ones will need to be built, as also indicated in paragraph 107. A more thorough consideration of this aspect should be given in the IP so that any risks are identified and right investment decisions are made. Barriers analysis does not seem to address the above adequately. This aspect is important if SREP is to work in unison with the government targets. Section 5.0 of the IP sets out Roadmap for the development of SHP. It is not clear whether the roadmap is the existing GoN plan or it is SREP roadmap, as the language used in the section is ambiguous. It becomes apparent that it is an existing GoN plan and the GoN seems to have set an ambitious target – i.e. 4000 MW in the next 16 years. It should be noted that only 700 MW of total electrical power has been installed in the last several decades, and less than 200 MW of RETs have been installed in the last two decades (Ref table 4.1 of IP).
has been developed on the basis of sound technical assessments	The investment plan uses several selection criteria (please refer to Table 4.2) based on impact, but technical criteria are limited. Additionally, it is not clear in some cases why the impact of a technology related to a particular criterion is low, medium or high for each technology, and may appear to be arbitrary. For example, it can be argued that improved watermill should have a high impact on gender/social effectiveness. Additionally, it is not clear how the overall impacts are arrived at from the individual impacts.

	Regarding selection of technologies for SREP support (section 4), availability of accessible and sustainable resource should be given a proper consideration. It is clear that Nepal has a vast hydropower resource, but a consideration of sustainable use is important. This is more important for biogas technology, as there may not be enough resource available to generate the target amount of power/energy or there may be competing uses of the resource.
provides for prioritization of investments, stakeholder consultation and engagement, adequate capturing and dissemination of lessons learned, and monitoring and evaluation and links to the results framework	The IP has clearly demonstrated that it has prioritized investment in certain areas of RETs, even though investment could be made into a multitude of technologies. There is a clear and comprehensive monitoring and evaluation plan. Referring to paragraph 33, Independent Power Producers' Association Nepal (IPPAN) seems to have cast some doubts about allowing government institutions the management of the funds. IP should provide clear justification as to why the fund should be managed by a government agency and not by private agencies as suggested by IPPAN.
adequately addresses social and environmental issues, including gender	"Gender/social inclusiveness" is one of the criteria used while selecting the technologies to support. However, it doesn't provide adequate analysis as to why a particular technology addresses this criterion. Climate Change mitigation is also chosen as one of the criteria in selecting the technologies to support.
supports new investments or funding is additional to on-going/planned MDB investments	There are multitudes of ongoing and planned initiatives and programmes, including several donor/MDB led initiatives, supporting the promotion of RETs including a major GoN initiative (see para 82-95 of the IP). Analyses of every such initiative have been provided in the IP document (section 3.6). The IP is very clear on how SREP funds will be an integral part of the overall national RET programme, and it clearly shows that it is a complimentary activity, and has clear plans about where and how it will support the RET promotion in the country, along with other initiatives. The IP also provides very detailed and elaborate financing mechanisms to deliver the capacity additions proposed.
takes into account institutional arrangements and coordination	IP should highlight how all the initiatives are coordinated and SREP support is able to leverage all the support that is available.
promotes poverty reduction	Poverty reduction is one of the criteria chosen while selecting the technologies for support by the SREP. However, it should be noted that about one quarter of the SREP funding is proposed to be spent on Solar Home Systems (SHS). Due to the power output limitation and storage requirements (for 24 hour supply), SHS are not best suited for direct income generating activities and hence are likely to have a limited poverty reduction impact. However, SHSs are suitable for remote areas where the requirement for electrical power is limited to lighting, and hence contributes to energy access. IP should make this point clear to avoid any confusion.
considers cost effectiveness of investments	The selection of technologies for investment has been based on the impact of the intervention, and hence cost effectiveness is indirectly achieved. Also, the support programme is designed to leverage other investments – this will also help in achieving cost effectiveness.

6. Part II: compliance with the investment criteria or business model of the relevant program

Criteria	**Reviewer Comments**
Catalyze increased investments in renewable energy in total investment	As also highlighted earlier, there are a number of support programmes for RET in place in Nepal, and SREP is designed to work in tandem

	with the rest of the initiatives, with government agencies acting as focal points. The SREP contribution needs to be complemented by other funding sources (e.g. MDBs, GoN initiatives and private sector equity), some of which are not in place at this time. Approximately 50% of the total planned investment is expected to come from the private sector equity and other sources. However, there are several aspects in the IP that aim to promote leveraging of investments from other players in the sector. For example promotion of SHP is a key component of SREP in Nepal and the financing mechanism for this has been designed to include funds from other sources, with SREP funds acting as a complementary fund. A number of alternatives have been suggested – each of the alternative will leverage funds from other sources. The IP suggests that some of this shortfall can come from a reserve SREP fund, which may not be in keeping with the objective of catalyzing increased investments. This point needs to be clarified.
Enabling environment	One of the key aspects of SREP support in Nepal is that the programme will support the existing and planned initiatives. GoN is a major player in the RET promotion in the country, and SREP will work with the GoN in order to assist the sector. One of the key aspects of working with the government is strengthening of the existing institutions and assistance in policy development. For example, the SREP technical assistance component is planned to assist in the restructuring of AEPC to create the new AEPB, with a new mandate of developing RETs of up to 10MW. AEPB will maintain a high profile Central Renewable Energy Fund (CREF). The funds from SREP will be channelled through CREF.
Increase energy access	The IP deals with increase in energy access, not least in setting the targets for the number of households connected in the monitoring and evaluation section of the document. Energy access is one of the key motivations behind selecting micro/mini energy initiatives.
Implementation capacity	Major part of the SREP funding support will be channelled through government agencies including AEPB, and SREP fund will help set up AEPB. Referring to Para 75 – the IP ought to address the manufacturing capacity and the whole supply chain support available in Nepal to deliver the proposed power output from Hydro, PV and biogas. If there are gaps, appropriate support should be provided through SREP and other sources.
Improve the long-term economic viability of the renewable energy sector	The SREP IP does not adequately address the issue of how the required infrastructure and supply chain support will be provided for a long term sustainability of the RET sector. Also, operation and maintenance and other services are the key to long term economic viability, and the IP does not provide much detail on how these aspects are going to be supported.
Transformative impact	Transformative impact of the SREP is something that is dealt with adequately throughout the IP.

7. Part III. Recommendations

1. Referring to Para 151, there should be in place proper support structure and mechanisms to identify and undertake feasibility studies for the potential sites.

2. Programme Targets (Section 6.4) and Financing Plan (section 6.6) show a significant investment in Solar Home Systems (SHS). SHSs generally only provide light and smaller loads such as TVs and Radios, fundamentally non-income generating. IP/SREP should support rigorous assessment of suitable alternatives (e.g. hydro) that can be effective in generating income by allowing end uses of electricity. Additionally, it is not clear if there will be a real demand for 500,000 units of Solar Home Systems. Similarly, it's not clear whether there is a real demand for 150,000 biogas units.
3. A one-stop shop is not necessarily the best approach for promotion of RETs (refer section 3.2). The roles of existing institutions need to be clarified so that there is no competition and confusion between agencies.
4. There is not enough coverage and support provided under SREP on tariff setting (such Feed in tariffs) and PPA. Competitive and attractive tariff and a transparent PPA are key factors to encourage investment. SREP should assist in these areas.

Government Response to Review

Part I: General criteria

Criteria	Reviewer Comments	Response to Comments
Complies with the principles, objectives and criteria of the relevant program as specified in the design documents and programming modalities	The investment plan (IP) generally complies with the principles, objectives and criteria of the SREP.	No response needed
Takes into account the country capacity to implement the plan	The IP provides a detailed analysis of the capacity of the financial institutions in the country to provide the support that will be necessary for SREP to achieve its goals, and in general has a positive assessment of the capacity. The IP should take into consideration the required infrastructure that needs to be in place for the 4,000 MW to be produced (as per the GoN plans). Even though the SREP component is small, due to the nature of intervention (i.e. complementing the existing initiatives), the IP should consider this aspect. New roads and transport infrastructure and facilities will be required as a precondition to installing the anticipated amount of hydro and other RETs. Existing transmission and distribution systems will need to be upgraded, and new ones will need to be built, as also indicated in paragraph 107. A more thorough consideration of this aspect should be given in the IP so that any risks are identified and right investment decisions are made. Barriers analysis does not seem to address the above adequately. This aspect is important if SREP is to work in unison with the government targets. Section 5.0 of the IP sets out Roadmap for the development of SHP. It is not clear whether the roadmap is the existing GoN plan or it is SREP roadmap, as the language used in the section is ambiguous. It becomes apparent that it is	No response needed The need for strengthened infrastructure including transmission systems, road access and related infrastructure has been acknowledged and addressed in the barrier analysis and the risk assessment matrix. SHP Projects selected for SREP support are primarily projects, which already have a PPA from NEA – in which case, NEA has already made a commitment to provide transmission access. There are two parts to the SHP Road map – the objectives and strategies are GoN plans. The elements of the road map necessary for implementing the

Criteria	Reviewer Comments	Response to Comments
	an existing GoN plan and the GoN seems to have set an ambitious target – i.e. 4000 MW in the next 16 years. It should be noted that only 700 MW of total electrical power has been installed in the last several decades, and less than 200 MW of RETs have been installed in the last two decades (Ref table 4.1 of IP).	GoN strategy is a recommendation of the IP. This has been clarified in the IP.
Has been developed on the basis of sound technical assessments	The investment plan uses several selection criteria (please refer to Table 4.2) based on impact, but technical criteria are limited. Additionally, it is not clear in some cases why the impact of a technology related to a particular criterion is low, medium or high for each technology, and may appear to be arbitrary. For example, it can be argued that improved watermill should have a high impact on gender/social effectiveness. Additionally, it is not clear how the overall impacts are arrived at from the individual impacts. Regarding selection of technologies for SREP support (section 4), availability of accessible and sustainable resource should be given a proper consideration. It is clear that Nepal has a vast hydropower resource, but a consideration of sustainable use is important. This is more important for biogas technology, as there may not be enough resource available to generate the target amount of power/energy or there may be competing uses of the resource.	Evaluation of RE technologies is based on criteria suggested in the SREP design document. All the technologies selected for the IP have been proven in Nepal. The selection of technology is also discussed in Annex 10. Section 3.3 indicates a potential of another 1.1 million domestic biogas plants, with an average of 18,500 plants per annum during the last three years. The SREP is targeting 160,000/5 = 32,000 per annum as part of a scale up. This is a well-established industry and AEPC is pushing hard for biogas development (USD 10m of SREP is for biogas). The revised Investment Concept Brief provides more. SREP is targeting 160,000 domestic units, that require the resource input (human and animal waste) from just 160,000 HH.
provides for prioritization of investments, stakeholder consultation and engagement, adequate capturing and dissemination of lessons learned, and monitoring and evaluation and links to the results framework	The IP has clearly demonstrated that it has prioritized investment in certain areas of RETs, even though investment could be made into a multitude of technologies. There is a clear and comprehensive monitoring and evaluation plan. Referring to paragraph 33, Independent Power Producers' Association Nepal (IPPAN) seems to have cast some doubts about allowing government institutions the	No response needed SREP support for SHP is to be directed and led by the IFC and the private sector arm of the

Criteria	Reviewer Comments	Response to Comments
	management of the funds. IP should provide clear justification as to why the fund should be managed by a government agency and not by private agencies as suggested by IPPAN.	ADB. These agencies cannot participate in public projects. Indeed, the IP makes clear that there should be little GoN involvement (other than enacting enabling policies), and SREP support should directly be to approved financial institutions or SHP developers. The PDF failed in part due to too much Government control
Adequately addresses social and environmental issues, including gender	"Gender/social inclusiveness" is one of the criteria used while selecting the technologies to support. However, it doesn't provide adequate analysis as to why a particular technology addresses this criterion. Climate Change mitigation is also chosen as one of the criteria in selecting the technologies to support.	The individual Investment Concept Briefs, the new Annex 10 on Selection of Technologies, and the Section 5.4 on Co-benefits addresses this.
Supports new investments or funding is additional to on-going/planned MDB investments	There are multitudes of ongoing and planned initiatives and programmes, including several donor/MDB led initiatives, supporting the promotion of RETs including a major GoN initiative (see para 82-95 of the IP). Analyses of every such initiative have been provided in the IP document (section 3.6). The IP is very clear on how SREP funds will be an integral part of the overall national RET programme, and it clearly shows that it is a complimentary activity, and has clear plans about where and how it will support the RET promotion in the country, along with other initiatives. The IP also provides very detailed and elaborate financing mechanisms to deliver the capacity additions proposed.	No response needed
Takes into account institutional arrangements and coordination	IP should highlight how all the initiatives are coordinated and SREP support is able to leverage all the support that is available.	The central role of AEPC and its stronger successor AEPB has been well described in the IP, as well as the role of CREF. The SHP support is to be led by the MDB along with local credit institutions as noted in the IP
Promotes poverty reduction	Poverty reduction is one of the criteria chosen while selecting the technologies for support by the SREP. However, it	Only USD 5m is for solar home systems (which is the, same as mini/micro, and biogas gets

Criteria	Reviewer Comments	Response to Comments
	should be noted that about one quarter of the SREP funding is proposed to be spent on Solar Home Systems (SHS). Due to the power output limitation and storage requirements (for 24 hour supply), SHS are not best suited for direct income generating activities and hence are likely to have a limited poverty reduction impact. However, SHSs are suitable for remote areas where the requirement for electrical power is limited to lighting, and hence contributes to energy access. IP should make this point clear to avoid any confusion.	USD 10m.) The Investment Concept Brief and the new Annex 10 address this. While solar PV may have limited scope for "poverty alleviation" it scores strongly on other fronts. It is the least cost solution for HHs in remote, dispersed locations with just basic needs such as lighting, communications, and entertainment. A bundling approach for solar PV is also suggested, for PV installations in public facilities, which is better suited for income generating activities
Considers cost effectiveness of investments	The selection of technologies for investment has been based on the impact of the intervention, and hence cost effectiveness is indirectly achieved. Also, the support programme is designed to leverage other investments – this will also help in achieving cost effectiveness.	No response needed

Part II: compliance with the investment criteria or business model of the relevant program

Criteria	Reviewer Comments	Response to Comment
Catalyze increased investments in renewable energy in total investment	As also highlighted earlier, there are a number of support programmes for RET in place in Nepal, and SREP is designed to work in tandem with the rest of the initiatives, with government agencies acting as focal points. The SREP contribution needs to be complemented by other funding sources (e.g. MDBs, GoN initiatives and private sector equity), some of which are not in place at this time. Approximately 50% of the total planned investment is expected to come from the private sector equity and other sources.	The MDBs will be taking the lead in developing the SREP project as indicated in the report. The MDBs are quite likely to make the contributions indicated in the SREP. The commercial banks, private sector firms, etc. are expected to put in significant funds. In the case of CREF which will take the lead to implement mini-micro initiatives, some donor commitments have already been made. These aspects are discussed in the IP

Criteria	Reviewer Comments	Response to Comment
	However, there are several aspects in the IP that aim to promote leveraging of investments from other players in the sector. For example promotion of SHP is a key component of SREP in Nepal and the financing mechanism for this has been designed to include funds from other sources, with SREP funds acting as a complementary fund. A number of alternatives have been suggested – each of the alternative will leverage funds from other sources. The IP suggests that some of this shortfall can come from a reserve SREP fund, which may not be in keeping with the objective of catalyzing increased investments. This point needs to be clarified.	The IP states that it is Reserves will plug only a small portion of the gap which is 119,833. 15m from reserve is a small amount. This aspect has been identified as a possible risk
Enabling environment	One of the key aspects of SREP support in Nepal is that the programme will support the existing and planned initiatives. GoN is a major player in the RET promotion in the country, and SREP will work with the GoN in order to assist the sector. One of the key aspects of working with the government is strengthening of the existing institutions and assistance in policy development. For example, the SREP technical assistance component is planned to assist in the restructuring of AEPC to create the new AEPB, with a new mandate of developing RETs of up to 10MW. AEPB will maintain a high profile Central Renewable Energy Fund (CREF). The funds from SREP will be channelled through CREF.	No response needed. Comments are reflected in the discussion of the IP
Increase energy access	The IP deals with increase in energy access, not least in setting the targets for the number of households connected in the monitoring and evaluation section of the document. Energy access is one of the key motivations behind selecting micro/mini	No response needed. Comments are reflected in the discussion of the IP

Criteria	Reviewer Comments	Response to Comment
	energy initiatives.	
Implementation capacity	Major part of the SREP funding support will be channelled through government agencies including AEPB, and SREP fund will help set up AEPB. Referring to Para 75 – the IP ought to address the manufacturing capacity and the whole supply chain support available in Nepal to deliver the proposed power output from Hydro, PV and biogas. If there are gaps, appropriate support should be provided through SREP and other sources.	This aspect has been explained in sections on Suppliers, Barrier analysis, TA and capacity Building, and Investment Concept Briefs. Improving the implementation capacity needs capacity building for manufacturers of equipment for low head hydros and institutional biogas plants, and these are planned in the IP. Equipment suppliers in the supply chain are in the marketplace and are selling equipment and supplies.
Improve the long-term economic viability of the renewable energy sector	The SREP IP does not adequately address the issue of how the required infrastructure and supply chain support will be provided for a long term sustainability of the RET sector. Also, operation and maintenance and other services are the key to long term economic viability, and the IP does not provide much detail on how these aspects are going to be supported.	SREP will finance capex, not O&M. But TA support for cap bldg is available to assist O&M. Also, Nepal has a track record of successfully implementing several RE projects which continue to be operational. The SHPs are developed by IPPs with a PPA from NEA and have a track record of good O&M of their long-running projects.
Transformative impact	Transformative impact of the SREP is something that is dealt with adequately throughout the IP.	No response needed

7. Part III. Recommendations

5. Referring to Para 151, there should be in place proper support structure and mechanisms to identify and undertake feasibility studies for the potential sites.

Answer: Section 5.3 on TA and Capacity Building identifies this need. AEPC/AEPB will support such activities.

6. Programme Targets (Section 6.4) and Financing Plan (section 6.6) show a significant investment in Solar Home Systems (SHS). SHSs generally only provide light and smaller loads such as TVs and Radios, fundamentally non-income generating. IP/SREP should support rigorous assessment of suitable alternatives (e.g. hydro) that can be effective in generating income by

allowing end uses of electricity. Additionally, it is not clear if there will be a real demand for 500,000 units of Solar Home Systems. Similarly, it's not clear whether there is a real demand for 150,000 biogas units.

Answer: The investment in SHS is only $5m out of $20m of SREP funds. The targets for RE are well below the sector potential and are in fact AEPC's targets, which can realistically be achieved.

7. A one-stop shop is not necessarily the best approach for promotion of RETs (refer section 3.2). The roles of existing institutions need to be clarified so that there is no competition and confusion between agencies.

Answer: one stop shop is a GoN policy decision, and is also a facility that project developers and stakeholders are seeking. The one-stop shop would greatly ease the process of obtaining approvals from various agencies, and reduce transaction time and costs.

8. There is not enough coverage and support provided under SREP on tariff setting (such Feed in tariffs) and PPA. Competitive and attractive tariff and a transparent PPA are key factors to encourage investment. SREP should assist in these areas.

Answer: The ETFC will be reviewing and approving any revisions to the tariffs. And NEA issues PPAs. Given the small magnitude of SREP support, it was decided to concentrate on project development. In the case of SHP, their industry association, IPPAN, regularly interacts with NEA to revisit PPA terms. The mini-micro initiatives are to be implemented in off-grid applications where tariffs are not an issue.

Annex 20

MDB Request for Payment of Implementation Services Costs

Template for MDB Request for Payment for Project Implementation Services (MPIS)[69] [70]

PILOT PROGRAMS FOR CLIMATE RESILIENCE **FOREST INVESTMENT PROGRAM** **SCALING UP RENEWABLE ENERGY PROGRAM IN LOW-INCOME COUNTRIES**[71] **MDB Request for Payment of Implementation Services Costs**			
1. **Country/Region**:	NEPAL	2. **CIF Project ID#**:	(Trustee will assign ID)
3. **Project Title:**	*Scaling Up Small Hydro Promotion Nepal*		
4. **Request for project funding (USDmill.)**[72]**:**	*At time of country program submission (tentative):$10million*	*At time of project approval:*	
5. **Estimated costs for MDB project implementation services (USDmill.)**[73]**:**	*Initial estimate - at time of Country program submission: $740,000* *Final estimate - at time of project approval:*	*MDB: Asian Development Bank* *Date: October 19, 2011*	
6. **Request for payment of MDB Implementation Services Costs:**	☐ First tranche: 50% of the total ($370,000) ☐ Second tranche: 50% if the total		
7. **Project/program financing category:**	a - Investment financing - additional to ongoing MDB project ☐ b- Investment financing - blended with proposed MDB project ☐ c - Investment financing - stand-alone ***YES, stand alone*** √ d - Capacity building - stand alone ☐		
8. **Expected project duration** (no. of years):	Six years		
9. **Explanation of final estimate of MDB costs for implementation services:**	***If final estimate in 5 above exceeds the relevant benchmark range****, explain the exceptional circumstances and reasons: n.a*		
10. **Justification for proposed stand-alone financing in cases of above 6 c or d**[74]**:** There will be efforts to add MDB and other cofinancing to the project which will be explored during the preparation of the project**.**			

[69] The term "project implementation services" refers to MDB support throughout project life-cycle.

[70] A separate template needs to be presented for each project and program preparation grant request listed in the SPCR, the FIP Investment Strategy and the SREP Investment Plan.

[71] Pick one program and delete others that are not applicable.

[72] Including the preparation grant request

[73] If the final MDB cost estimate exceeds the relevant benchmark, it needs to be supported by (i) a breakdown of costs of inputs required (staff/consultant time, travel, number of missions, etc) and (ii) by an explanation of the particular aspects of project design and implementation that drive MDB costs to exceed the benchmark (Item 9 in template).

[74] The justification should include an explanation of (i) why no linkages to ongoing or planned MDB financing have been possible or pursued, and (ii) the expected effectiveness of the proposed stand-alone SCF project in addressing the objectives and priorities of the country investment plan/strategy; and a confirmation that the proposed project forms part of the MDB's agreed country assistance strategy.

Annex 1: Template for MDB Request for Payment for Project Implementation Services (MPIS)[75] [76]

PILOT PROGRAMS FOR CLIMATE RESILIENCE **FOREST INVESTMENT PROGRAM** **SCALING UP RENEWABLE ENERGY PROGRAM IN LOW-INCOME COUNTRIES**[77] **MDB Request for Payment of Implementation Services Costs**			
11. **Country/Region**:	NEPAL	12. **CIF Project ID**#:	(Trustee will assign ID)
13. **Project Title:**	*Scaling Up Access to Electricity in Rural Nepal*		
14. **Request for project funding (USDmill.)**[78]**:**	*At time of country program submission (tentative):$10million(for small and micro hydro and solar PV systems)*	*At time of project approval:*	
15. **Estimated costs for MDB project implementation services (USDmill.)**[79]**:**	*Initial estimate - at time of Country program submission: $740,000* *Final estimate - at time of project approval:*	*MDB: Asian Development Bank* *Date: October 19, 2011*	
16. **Request for payment of MDB Implementation Services Costs:**	☐ First tranche: 50% of the total ($370,00) ☐ Second tranche: 50% if the total		
17. **Project/program financing category:**	a - Investment financing - additional to ongoing MDB project ☐ b- Investment financing - blended with proposed MDB project ☐ c - Investment financing - stand-alone ***YES, stand alone*** √ d - Capacity building - stand alone ☐		
18. **Expected project duration** (no. of years):	Six years		
19. **Explanation of final estimate of MDB costs for implementation services:**	***If final estimate in 5 above exceeds the relevant benchmark range***, *explain the exceptional circumstances and reasons: n.a*		
20. **Justification for proposed stand-alone financing in cases of above 6 c or d**[80]**:** There will be efforts to add MDB and other cofinancing to the project which will be explored during the preparation of the project**.**			

[75] The term "project implementation services" refers to MDB support throughout project life-cycle.

[76] A separate template needs to be presented for each project and program preparation grant request listed in the SPCR, the FIP Investment Strategy and the SREP Investment Plan.

[77] Pick one program and delete others that are not applicable.

[78] Including the preparation grant request

[79] If the final MDB cost estimate exceeds the relevant benchmark, it needs to be supported by (i) a breakdown of costs of inputs required (staff/consultant time, travel, number of missions, etc) and (ii) by an explanation of the particular aspects of project design and implementation that drive MDB costs to exceed the benchmark (Item 9 in template).

[80] The justification should include an explanation of (i) why no linkages to ongoing or planned MDB financing have been possible or pursued, and (ii) the expected effectiveness of the proposed stand-alone SCF project in addressing the objectives and priorities of the country investment plan/strategy; and a confirmation that the proposed project forms part of the MDB's agreed country assistance strategy.

Annex 1: Template for MDB Request for Payment for Project Implementation Services (MPIS)[81] [82]

PILOT PROGRAMS FOR CLIMATE RESILIENCE FOREST INVESTMENT PROGRAM SCALING UP RENEWABLE ENERGY PROGRAM IN LOW-INCOME COUNTRIES[83] **MDB Request for Payment of Implementation Services Costs**			
21. **Country/Region**:	NEPAL	22. **CIF Project ID**#:	(Trustee will assign ID)
23. **Project Title:**	*SUSTAINABLE HOUSEHOLD ENERGY SOLUTIONS*		
24. **Request for project funding (USDmill.)[84]:**	*At time of country program submission (tentative):$10million*	*At time of project approval:*	
25. **Estimated costs for MDB project implementation services (USDmill.)[85]:**	*Initial estimate - at time of Country program submission: $428,000* *Final estimate - at time of project approval:*	*MDB: World Bank* *Date:October 15, 2011*	
26. **Request for payment of MDB Implementation Services Costs:**	☐ First tranche: $200,000 ☐ Second tranche: no second tranche because this project is proposed to be prepared on a fast track		
27. **Project/program financing category:**	a - Investment financing - additional to ongoing MDB project ☐ b- Investment financing - blended with proposed MDB project ☐ c - Investment financing - stand-alone ***YES, stand alone; SREP funds will be blended with additional cofinancing*** ☐ d - Capacity building - stand alone ☐		
28. **Expected project duration** (no. of years):	Six years		
29. **Explanation of final estimate of MDB costs for implementation services:**	***If final estimate in 5 above exceeds the relevant benchmark range***, *explain the exceptional circumstances and reasons: n.a*		
30. **Justification for proposed stand-alone financing in cases of above 6 c or d[86]:**			

[81] The term "project implementation services" refers to MDB support throughout project life-cycle.

[82] A separate template needs to be presented for each project and program preparation grant request listed in the SPCR, the FIP Investment Strategy and the SREP Investment Plan.

[83] Pick one program and delete others that are not applicable.

[84] Including the preparation grant request

[85] If the final MDB cost estimate exceeds the relevant benchmark, it needs to be supported by (i) a breakdown of costs of inputs required (staff/consultant time, travel, number of missions, etc) and (ii) by an explanation of the particular aspects of project design and implementation that drive MDB costs to exceed the benchmark (Item 9 in template).

[86] The justification should include an explanation of (i) why no linkages to ongoing or planned MDB financing have been possible or pursued, and (ii) the expected effectiveness of the proposed stand-alone SCF project in addressing the objectives and priorities of the country investment plan/strategy; and a confirmation that the proposed project forms part of the MDB's agreed country assistance strategy.