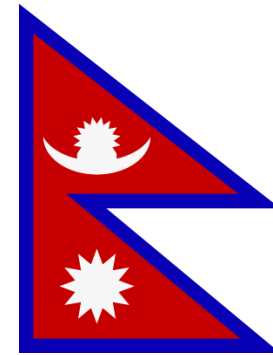




Government of Nepal



SCALING-UP RENEWABLE ENERGY PROGRAM Investment Plan of Nepal

Washington, D.C., Nov 1, 2011

With support from:

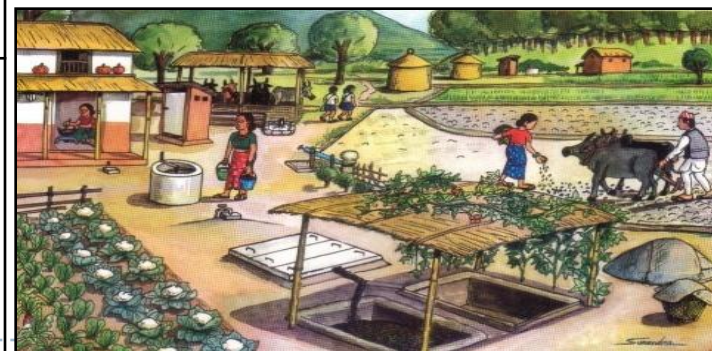


Outline

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- ▶ Policy Imperatives on Nepal's Energy Development
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 - ▶ Off-Grid - Mini / Micro Hydropower and Solar PV
 - ▶ Cooking - Domestic Biogas
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- ▶ SREP - Institutional Set up

Summary of IP

	Program	SREP Financing
Component I: Small hydropower Development	SHP	\$20m
Component II: Mini / Micro Initiatives: Off grid Electricity	Solar PV	\$5m
	Mini/micro hydro	\$5m
Component III: Mini / Micro Initiatives: Biogas for Cooking	Biogas	\$10m



Nepal's Challenge

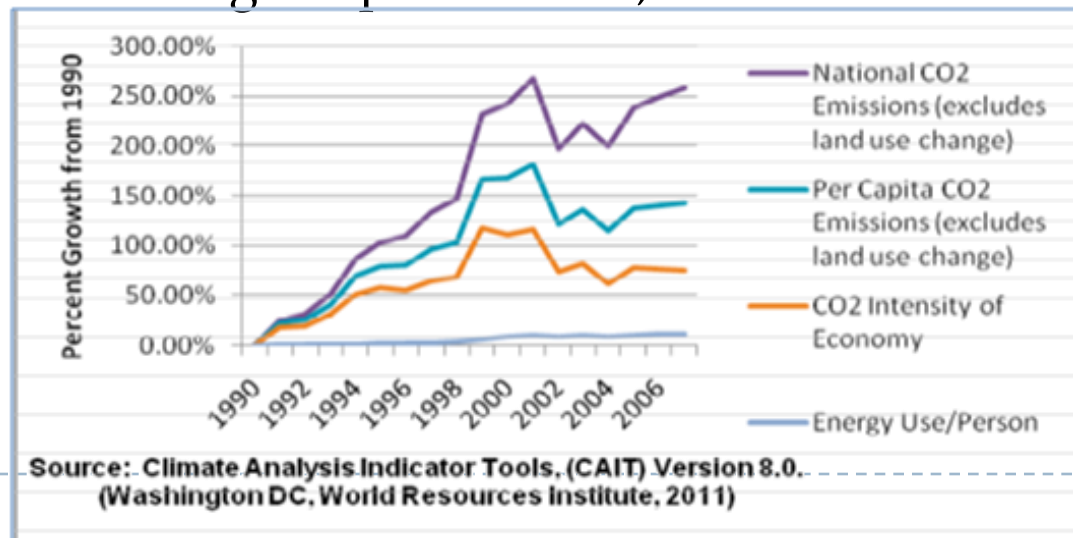
- ▶ Nepal is a low income country struggling with a different set of low-carbon development challenges compared to middle income and developed countries:
 - ▶ (i) greenhouse gas (GHG) emissions are low;
 - ▶ (ii) access to commercial energy services is low;
 - ▶ (iii) transport infrastructure is limited;
 - ▶ (iv) agriculture, livestock management, forestry, and other land use and land use changes account for a significant portion of GHG emissions ; and
 - ▶ (v) public financing is limited, financial institutions are stretched , & 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.

Nepal's GHG Emissions

- ▶ Nepal's GHG emissions are low, with total emissions estimated to be about 3.4 Mt CO₂e per year, of which about 3.2 MtCO₂e are from energy utilization

Activity	GHG Emissions (million tCO ₂ e/y)
Manufacturing and construction	1.2
Transport	0.9
Other fuel combustion	1.2
Industrial	0.2
Total	3.4

- ▶ Carbon intensity of the economy and per capita emissions exhibited a somewhat stable trend during the past decade, while total GHG emissions increased



Nepal's Energy Consumption Pattern

- ▶ Total annual energy consumption 401 million GJ (2009)
- ▶ Per capita energy consumption : 14 GJ
- ▶ Traditional biomass contributes 87% of total energy supply and residential sector consumes about 90% total energy
- ▶ Renewable energy contributes only about 1% of total energy
- ▶ About 2/3 of population use firewood as their main source of fuel for cooking leading to negative impacts & additional burden on women & children.



Nepal's Electricity Generation and Access

- ▶ About 56% of households in the country have access to electricity (including off-grid solutions)
- ▶ Urban areas have better access to electricity relative to rural areas (93% versus 49%)
- ▶ The supply of electricity not enough to meet the growing demand leading to increasing power cuts
- ▶ Nepal built its first hydropower plant in 1911 and has an estimated economically feasible hydropower potential of 42,000 MW but much of this has not developed yet

Nepal's Electricity Demand and Supply

- ▶ 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 (excluding off-grid electrification)

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

- ▶ Domestic generation accounted for 3,157 GWh, and 694 GWh was met with net imports from India
- ▶ Thermal power generation represents less than 8% of grid-connected capacity

The power sector presents the most severe infrastructure constraint for economic growth.

GoN's Policy and Targets for the Energy Sector

- ▶ GoN's goal for the next 20 years is to increase the share of modern RE from less than 1% to 10% of the total energy supply and increase the access to electricity from renewable energy sources from 10% to 30%
- ▶ Nepal has about 42,000 MW of hydropower (including small, mini and micro); 2,100 MW of solar power; 3,000 MW of wind power; 1.1 million domestic biogas plants as potential to be installed
- ▶ The government plans to mobilise investments amounting to USD 1.1 billion 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 financing institutions, private equity, users contribution, carbon revenue.
- ▶ The current Three Year Plan (2010-2013) envisages an addition of 15 MW of mini/micro hydro power; 225,000 solar home systems; 90,000 domestic biogas plants; 1 MW of wind power; and 4,500 improved water mills

RE is a priority program of government as it provides a least-cost solution to remote, sparsely populated areas even not viable for grid extension, while being clean, safe and environment-friendly

SREP Program in Nepal:

▶ Objectives:

- ▶ leverage complementary credit, grant and private sector equity co-financing,
- ▶ bring about transformational impacts through scaling up energy access using renewable energy technologies (RETs), poverty reduction, gender and social inclusion and climate change mitigation, and
- ▶ ensure sustainable operations through technical assistance and capacity building.

▶ Areas of Engagement:

- ▶ Grid based small hydropower (up to 10 MW)
- ▶ Off-grid mini and micro hydropower (up to 1 MW) and solar PV
- ▶ Biogas for cooking

Priority Sectors

Criteria	On-Grid SHP	Off-Grid					Biogas for Cooking
		MMHP & Solar PV					
		Mini HP	Micro HP	Pico HP	Improved Water Mill	Solar PV	
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



Summary of Proposed IP (in 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

Note: * - Incl. sers' contribution; ** - Incl. carbon revenue, reserve fund

Nepal is seeking \$40 million grant from SREP to implement a well-conceived and structured program to scale up Renewable Energy

Expected Results from Investment Plan

Results	Indicators	Baseline, 2010	Tent. Targets* (additional)
Project Outputs and Outcomes			
1. Increase in the number of new connections	No. of HH accessing electricity from mini/micro hydropower	200,000	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	6.4 MW	10 MW
	Biogas (domestic), Plants	238,587	160,000
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	Small hydropower, '000 tCO ₂ p.a.		120
	Mini/micro hydropower, "000 tCO ₂ p.a.	65	69
	Solar PV, '000 tCO ₂ p.a.	33	63
	Domestic biogas plants, '000 tCO ₂ p.a.	506	800,

Note: * - To be finalized during project preparation stage

SREP Investment- I: On-Grid Small Hydropower

- ▶ Structured Financing Facility: \$20 M
 - ▶ Services may include:
 - ▶ credit/ debt facility
 - ▶ Risk sharing facility/ Guarantees
 - ▶ Foreign exchange risk cover facility
 - ▶ risk coverage to domestic financial institutions including Technical Assistance
- ▶ 50 MW new SHP capacity, selected from immediate pipeline of 100 MW

(i) Additional electricity to Grid

SREP Investment- II : Off-Grid

~~Mini and Micro Hydropower and Solar PV~~

- ▶ Central RE Fund (under AEPC): \$10 M
 - ▶ Services may include:
 - ▶ Revolving credit
 - ▶ Results based financing (grant)
 - ▶ Technical assistance
- ▶ Mini- and micro-hydro: \$5.0 M for 30 MW
- ▶ Solar Home Systems: \$5.0 M for 500,000 systems

(i) Building social capital , (ii) Users' participation & ownership, (iii) Productive end-use of electricity (iv) (vi) Local entrepreneurship

SREP Investment-III: Cooking Domestic Biogas

- ▶ Central RE Fund (under AEPC): \$10 M
 - ▶ Services may include:
 - ▶ Revolving credit
 - ▶ Results based financing (grant)
 - ▶ Technical assistance
- ▶ Biogas: \$10.0 M for 160,000 biogas systems

(i) Beneficiaries' participation & ownership (ii) Local entrepreneurship (iii) Gender and social inclusion

How IP meets objectives of SREP?

SREP Objectives	Actions planned in IP
-Increasing clean energy access -Transformational change to low carbon energy pathway	-Promotion of Small/Mini/micro hydro, Solar PV & biogas - Reduce use of fossil fuel & inefficient biomass
Scale up private sector investment and confidence	Support to minimize financing risk of National/local bank, Scaled up credit fund , capacity building support
Minimum of 1:4 leveraging ratio	From end users, Government, local banks/FMIs, MDBs and other development partners
Blending co-financing of MDBs	Co-financing from IFC, ADB private sector as well as from ADB & World Bank Public sector
Reducing GHG emissions, contributing to climate resilience, & enhancing energy security	Promotion of clean and more reliable RETs to reduce the use of imported fossil fuel and reduce deforestation
Gender & social inclusion	Reduced work load of women (inc. girl child) & opportunity of participating in economic & social tasks
Enhance local economy	Productive end use of RETs



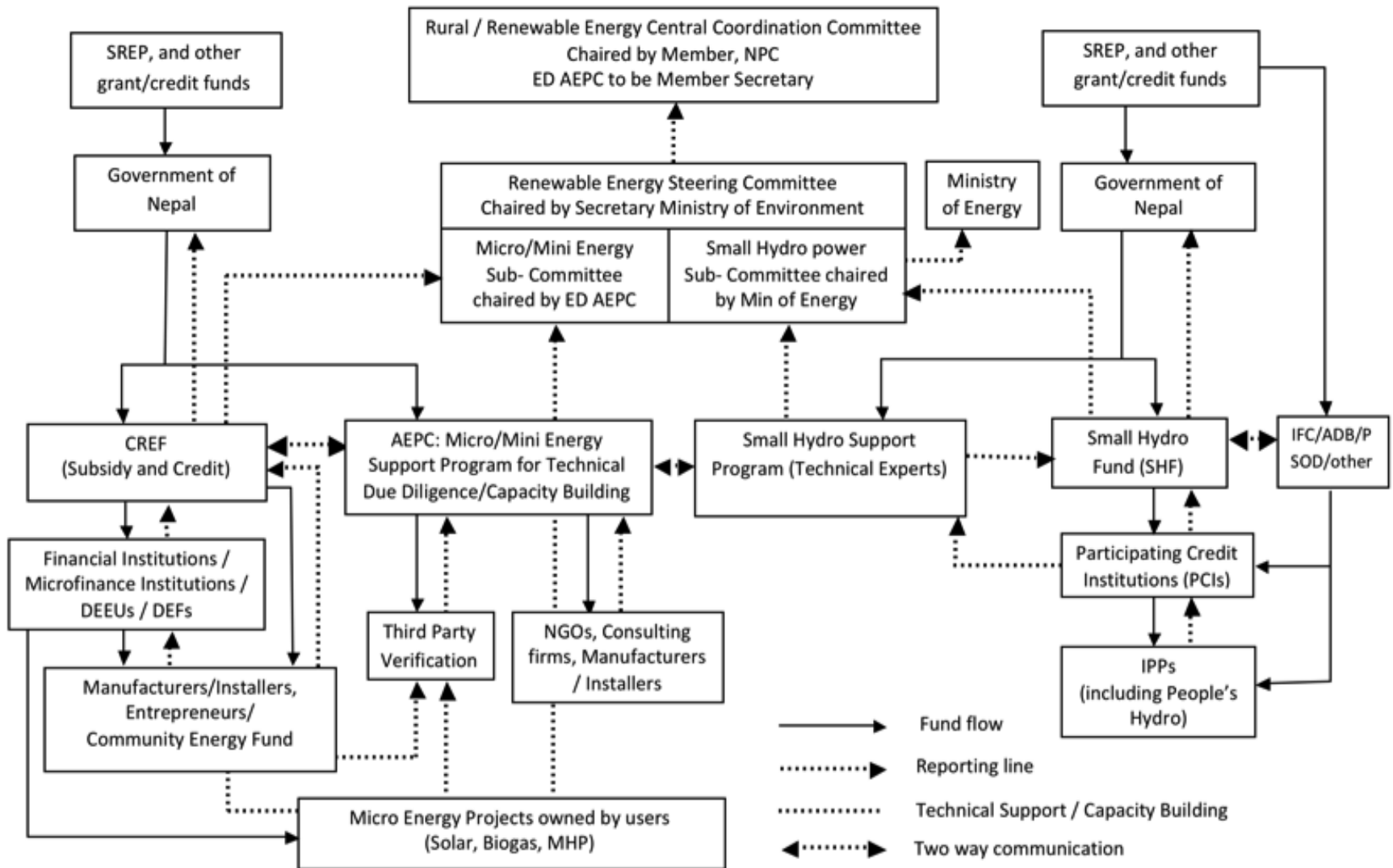
SREP Investment: MDB Partner

	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

Transformational Impact of SREP

- ▶ Programmatic approach by creating common platform
- ▶ Institutional restructuring of AEPC & creating independently managed fund (CREF)
- ▶ Scaling-up of result based financing
- ▶ Mobilizing private sector and enhancing local entrepreneurship
- ▶ Enhancing credit financing in RE Sector
- ▶ Climate change mitigation and gender mainstreaming

Proposed Institutional Arrangement for SREP in Nepal



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.

The Government of Nepal

SREP Country Investment Plan Proposal

Stakeholder Consultation

Joint MDB Scoping Mission: 3 – 8 Feb 2011

Joint MDB Programming Mission: 4 – 11 Jul 2011

Stakeholder Consultation Workshops: 6 Jul 2011 and 9 Sep 2011

- Ministry of Finance
- Ministry of Environment
- Ministry of Energy
- Alternative Energy Promotion Centre
- Department of Electricity Development
- Nepal Electricity Authority
- Water and Energy Commission Secretariat
- National Planning Commission
- Commercial Banks
- Civil Society Organizations
- Non-government Organizations
- Research institutes
- Development partners (donors)
- UN agencies
- Private Sector (IPPs, suppliers etc.)
- Industry associations (FNCCI, CNI)