Enhancing sustainability of rural energy projects: Pro-Poor Public Private Partnership (5P) Approach

Presented by:
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Energy Section, UN ESCAP
Presentation Objective

To share a high-level overview on ESCAP’s multi-stakeholder approach to enhancing the sustainability of rural energy projects through private sector engagement and community mobilization based on the experience of Cinta Mekar and Dubung, Nepal.

Programme Framework

• 455 million people do not have access to modern electricity in Asia-Pacific developing region, while 2.06 billion rely on wood or other biomass to cook and heat their homes.

• This programme is aligned with the Secretary General’s Sustainable Energy For All (SE4All) initiative and Sustainable Development Goal 7 to “ensure access to affordable, reliable, sustainable and modern energy for all”.

“Energy is the golden thread that connects economic growth, increased social equity, and an environment that allows the world to thrive.”

– UN Secretary General
Ban Ki-moon
Past experience in Nepal has shown that community based rural energy utilities, micro-hydro in particular, tend to fail in long term operation...
■ Develop replicable business model project cycle based on private partner engagement for long term technical and financial sustainability of rural energy utilities.

■ Model works to establish multi-level stakeholder partnerships, including PPPs, in which community mobilization and co-ownership of the energy utility has proven to be key to 5P project sustainability.

■ To utilize the 5P approach to enhance rural productivity and create income generating opportunities to increase rural livelihood(s) and community development.
THE 5P MARKET SEGMENTATION

- **Commercial**
  - Profit oriented
  - "Business as usual"

- **Hybrid**
  - Cost recovery
  - "Pro-Poor-Public-Private Partnership"
    - Community ownership
    - Awareness and education
    - Social development

- **Non-commercial**
  - Community Empowerment
  - "Social-Project Driven"

- **Grant Based**
  - Electrification based on local Resources
AT ITS CORE, THE 5P APPROACH IS FOCUSED ON DEVELOPING A SUSTAINABLE AND REPLICAABLE MODEL. TO ACHIEVE THIS THE FOLLOWING KEY APPROACHES WERE UNDERTAKEN:

2. Policy analysis/gap analysis and Counterpart coordination – agency collaboration on policies such as feed-in-tariff, energy subsidy mechanisms, etc.
3. SPV/Energy utility formation – focused on community ownership, and private sector innovation, investment and system management.
4. Community fund establishment – utility revenue for community empowerment, managed by community.
5. Supporting productive uses of energy – irrigation for agriculture, income generating activities, etc.
PROJECT STRUCTURE

**How It Works**

**Special Purpose Vehicle**

- Established with private sector and community co-ownership;

- Private Sector Investment; Utility ownership and investment equity decoupled-increased incentive for private sector and financial sustainability.

- Revenue is used for O&M, operator salary, and remaining is shared between community and private sector as ROI;

- Community responsible for managing share of revenue through a community fund to local development.
PROJECT CYCLE OVERVIEW

5P Partnership Phase
- National concept awareness, working group establishment, community engagement

Incubation Phase
- Business planning, rural enterprise planning and community mobilization

Design Phase
- Stakeholder consultations and power system design

Implementation
- Power system construction, rural enterprise development, electrification and policy development

Evaluation
- Impact evaluation and scalability assessment

Up-Scaling
- Creation of an enabling environment for development: policy action, financial mobilization, business incubation and network development
**STAKEHOLDER ENGAGEMENT**

Partnership and counterpart collaboration has been a major component to effective project implementation and potential scalability

<table>
<thead>
<tr>
<th>Government</th>
<th>Community Mobilizer</th>
<th>Private Sector</th>
<th>Resource Advisors</th>
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</thead>
<tbody>
<tr>
<td>1. Policy support and enabling framework</td>
<td>Works with the community to build capacities, ensure project ownership and understanding, ensure stakeholder understanding and voice</td>
<td>1. Can be an investor and/or co-owner/operator depending on the model and preference</td>
<td>Agencies that fill capacity gaps</td>
</tr>
<tr>
<td>2. Overall project monitoring</td>
<td>- Policies for model scale-up; - Financial mechanism support.</td>
<td>- Technical sustainability/operation monitoring - Training and community support</td>
<td>1. Resource and technical assessment; system design/build and operator training</td>
</tr>
<tr>
<td></td>
<td>- Ensure community ownership; - Socio-economic studies/Business Surveys</td>
<td></td>
<td>2. Legal framework for utility establishment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Assist and provide expertise in capacity building activities on an as needed bases</td>
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125kW Micro-hydro utility for 125 Households

Community Revenue Prioritization

<table>
<thead>
<tr>
<th></th>
<th>During the first 17-months</th>
<th>After the first 17-months</th>
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<tbody>
<tr>
<td>Electrification for poor households</td>
<td>62.5%</td>
<td>0%</td>
</tr>
<tr>
<td>Education for kids from poor families</td>
<td>8%</td>
<td>65%</td>
</tr>
<tr>
<td>Health care</td>
<td>8%</td>
<td>16%</td>
</tr>
<tr>
<td>Seed capital for income-generating activities</td>
<td>10%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Village infrastructure</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Village operational contribution</td>
<td>2.5%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Cooperative operational cost</td>
<td>5%</td>
<td>5%</td>
</tr>
</tbody>
</table>
CASE STUDY: BAIDI SOLAR-PV MICRO GRID

- Dubung, Baidi VDC, Makwanpur District
- 119 Households
- 18kW solar PV micro-grid (First of its kind Nepal!)
- Lights-On in October 2015
BAIDI SOLAR-PV MICRO GRID OVERVIEW

**Stakeholders/Partners**
- Grant: ESCAP/IFAD
- Government: AEPC (Alternative Energy Promotion Centre)
- Private Sector: Saral Urja Nepal
- Community Mobilizer: RESDTN and SUN

**Basic Technical Specification**
- Solar Module (18 kWp)  
  Mono Crystalline silicon solar cells  
  Efficiency: 15.83%
- MPPT Charge Controller (21 kW)
- Solar Tubular Battery (115,200 Whr)
- Inverter (20.4 kW)
- Distribution Line: 3-phase line
- Grid connection capability
STAKEHOLDER ROLES IN DUBUNG

5P attempts to define the role of stakeholders in rural energy projects...

In Dubung, the private partner took the lead in community engagement, with the support of mobilizer.

Private Sector:
- Investor and developer
- Co-owner
- Community mobilizer
- Operation and maintenance oversight

Community:
- Co-owner and customer
- Operation
- Day-to-day maintenance
- Tariff collection/ basic banking

Community Mobilizer: Can act as a neutral third party during community negotiations.

Government/AEPC: Provides overall guidance and support in scale-up through policy intervention.
SPV STRUCTURE

OWNERSHIP AND MANAGEMENT OF SPV

60% - Private Sector: Saral Urja Nepal (SIMPLE ENERGY)
40% - Baidi Community

Three member management board
- 1 appointed from Community;
- 2 appointed from SUN

Agreement on the
Management, Ownership and Operation of the
Special Purpose Vehicle (SPV) for the
Solar Micro-Grid in Baidi Village Development Committee (VDC) Ward 2 and 3, Tanahun District under the pro-poor public private partnership (PP) project

1. Agreement is made between:
   a. Alternative Energy Promotion Centre (AEPC), an Institution of Government of Nepal under the Ministry of Science, Technology and Environment, acting partner to the United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP) for the Pro-Poor Public Private Partnership (PP)
   b. SaralUrja Nepal Private Limited, Registration Number: 113245/69/070, with registered office in Bishnu-2, Budhanilkantha, Nepal
   c. Village Electricity Committee, an informal community users' group representing the community of Dubung, Nepali-Thar and Mauthas of Baidi Village Development Committee (VDC) ward number 2 and 3 of Tanahun district; the village electricity committee is currently represented by the following working committee:
      i. Chairman – PadamBahadurThapaMagar
      ii. Vice Chairman – BhabinavaSarki

Infrastructure Investment Requirements: 133,745 USD

Investment structure for Dubung
- 112,304 USD Grant financing
- 21,441 USD Private Sector investment (in-kind and financial)

Private sector rate of return - 15% return on investment at 7 years.

Additional incubation fund for private sector to support SPV establishment support and community engagement activities.
## TARIFF STRUCTURE

<table>
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<tr>
<th>Tariff Package</th>
<th>Number of HH sign-ups</th>
<th>Cost per month (NRs)</th>
</tr>
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<tbody>
<tr>
<td>Starter (Basic use)</td>
<td>10</td>
<td>250</td>
</tr>
<tr>
<td>A: Lighting</td>
<td>87</td>
<td>400</td>
</tr>
<tr>
<td>B: Lighting + entertainment</td>
<td>20</td>
<td>700</td>
</tr>
<tr>
<td>C: Commercial</td>
<td>2</td>
<td>1,000</td>
</tr>
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COMMUNITY BASED APPROACH: TOOLS

- Continuous community engagement meetings
- “Energy Week” – Weeklong community event with demonstration house and tariff negotiations
- Safety training
- Villager operation training (2 members)
All households in village have signed up for service and 100% tariff payment has been attained;

Households have moved to higher tariff packages since “lights-on”

Communication strategy among stakeholder is essential throughout lifecycle;

Risk of loss of knowledge- e.g. Trained operator(s) leave the community for children's education;
Private sector co-ownership can enhance rural energy utility sustainability. Utility failure or mismanagement impedes the company’s ability to receive return on investment;

**Technological innovation**: Private sector inclined to use more modern technology to streamline operation and cut transaction costs— for example, remote operations monitoring from Kathmandu;

**High quality project implementation**: Construction of powerhouse, distributions system, solar panel installation, grid connection compatible. More resilient to nature disaster.
Training of community member(s) to maintain and operate the project. Members of the community are employed by the project (SPV) to maintain and operate the system.

Technical operation oversight- While day-to-day operation is community based, any major disruption is responsibility of private sector.

Good energy service resulting from good operation and maintenance decreases the risk of non-tariff payment by consumers.
• Private partner selection is critical phase in project cycle; must consider private sector motivations- social business and profit orientation

• Project financing has fixed components, specifically the tariff rate and connection fees- negotiated with the community- large grant component necessary to meet expected rate of return and cash flow for private sector;

• Often weak incentive policies for private sector investment- for example person guarantee required for bank loan to cover viability gap and unclear institutional arrangement policy (e.g. cooperative)

• Coordination among stakeholders- in particular, low levels of communication across nodal ministries.
Strong public sector support and understanding on the role of the private sector as an investor and provider of energy services is critical, particularly in terms of SPV development.

Strong policy frameworks which enhance the ease of doing business for private investors such as:

• Subsidies and tax incentives on technology;
• Credit guarantees or interest rate subsidies;
• Feed-in-tariff, net metering policies;
• Investment law and community institutional policies.
QUESTIONS?

IMPLEMENTING PARTNERS
- Alternative Energy Promotion Centre (AEPC)
- Institute of Renewable Energy Promotion

FUNDING AGENCIES
- United Nations Development Account
- International Fund for Agricultural Development

Investing in rural people