Mini-Grid Development in Nepal

Approaches, Key Challenges and Requirements

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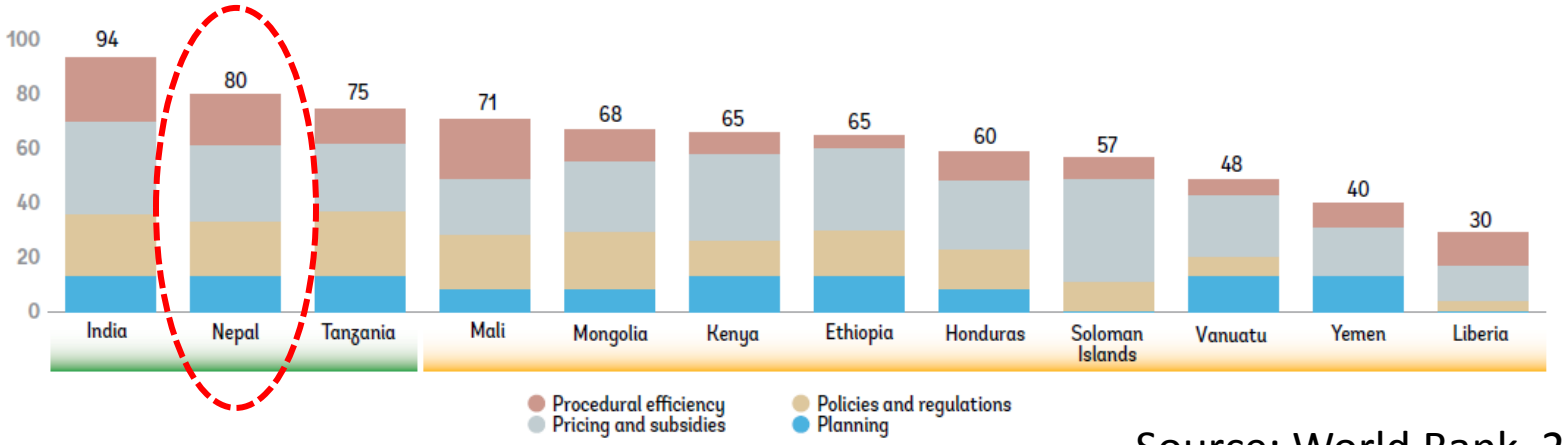
Background

- Nepal produced many best practices in the region for off grid mini grid development (mainly micro hydro)
  - More than 2500 numbers of micro hydro based mini grid system (few kW-100 kW);
  - > 25 MW of installed capacity (potential 100 MW);
- Policies, guidelines, standards in place for micro hydro based mini grid system



Source: World Bank ,2014

Background

- Off grid based mini grid system- will remain important for many years to come to achieve modern energy for all
    - Extreme Remoteness
    - Application for productive end use

- New sets of challenges need to be tackled.

Approaches/Issues

Mostly Based on Hydro Power

- Nepal Electricity Authority (NEA)- Built several mini hydro projects (>100 kW) for electrification of district headquarters
    - Operate and maintained by NEA
    - Limited engagement/interest in a later period
- Community based electrification
    - Less than 100 kW (few projects built in the range of 50 kW-100 kW
    - Mostly promoted by Alternative Energy Promotion Centre
    - Availability of Subsidy
    - Supported by various DPs and other stakeholders
    - Limited implementation and O& M capacity
    -

Private Sector Participation

- Mostly as equipment suppliers
- Not as energy service provider
- New Subsidy Policy 2016- Assume more roles of private sector, availability of subsidy

Planning and implementation

- Lack of distribution system master plan
- Poor readiness while implementation- longer period for completion
- Off grid V/S On-gird electrification
- Quality aspects- Not adequate (community executing major civil works such as headrace, forebay, dam)

Requirements

- Other forms of electrification options need to be promoted in rational basis
    - All locations do not have hydro power potential
- Scaling up-Critical needs in terms of size and numbers
- Shift from subsidy based model to credit based model
  - Increasing scarcity of grant resources
  - Recently approved subsidy policy moves in this direction
- More roles for private sector participation
  - From equipment suppliers to energy service provider
  - Clarity in policies and regulation (e.g. outlining rights of mini grid operators, grid connection of mini grid system, regulatory approvals-tariff setting, standards)
    - Regulatory mechanism (currently absent) shall not create burden for small projects.

Requirements: Connection of Mini Grid to National Grid

- Numbers of mini grid systems became redundant due to grid extension;

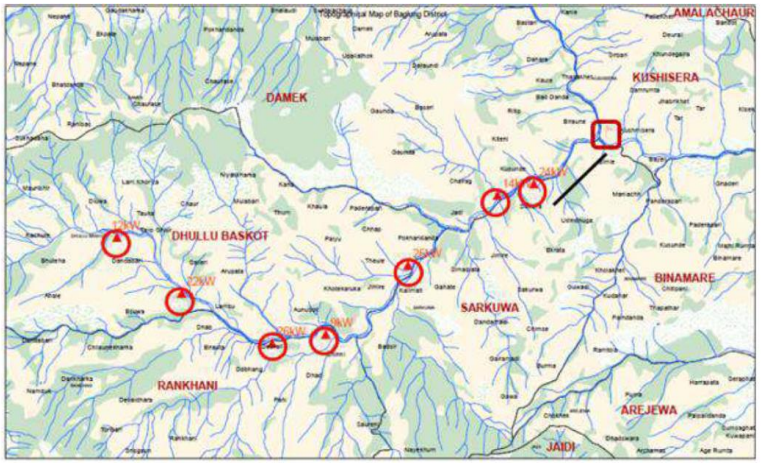
- NEA reluctant to connect MH in its grid
  - Not grid compatible design
    - Security Issues
    - Quality of Power
  - Managing expectation after grid connection- perceived risk by NEA

- Major concern of banks who wish to finance the mini grid project
  - Million dollar question- What will happen if grid comes in the project area?

- New mini grid system shall be grid ready.

Requirements- Interconnection of several Mini Grids

- Successfully demonstrated interconnection of several mini grids -in Baglung district of Nepal
  - 6 MHPs (107 kW benefiting 1200 HHs)

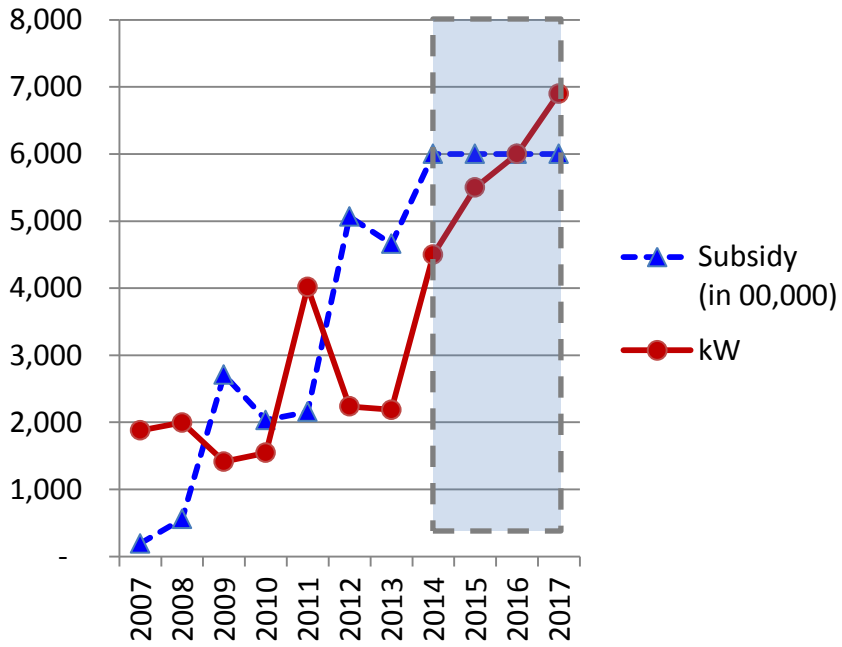


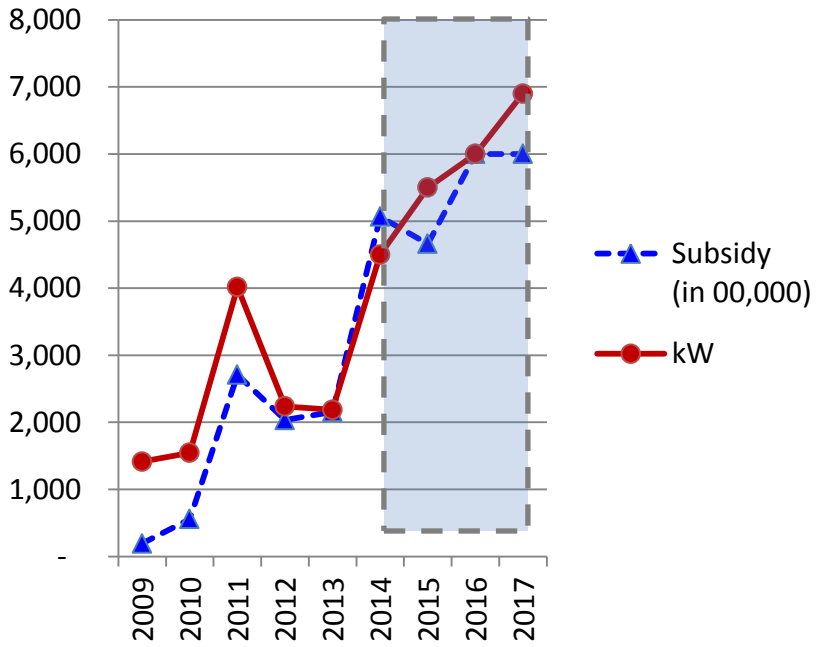
- Higher power availability
  - Increased Productive end use application

- Could be desired option for utility to connect to its grid
  - One connection instead of several

Requirement- Enhancing readiness

Identify projects and prepare them in advance



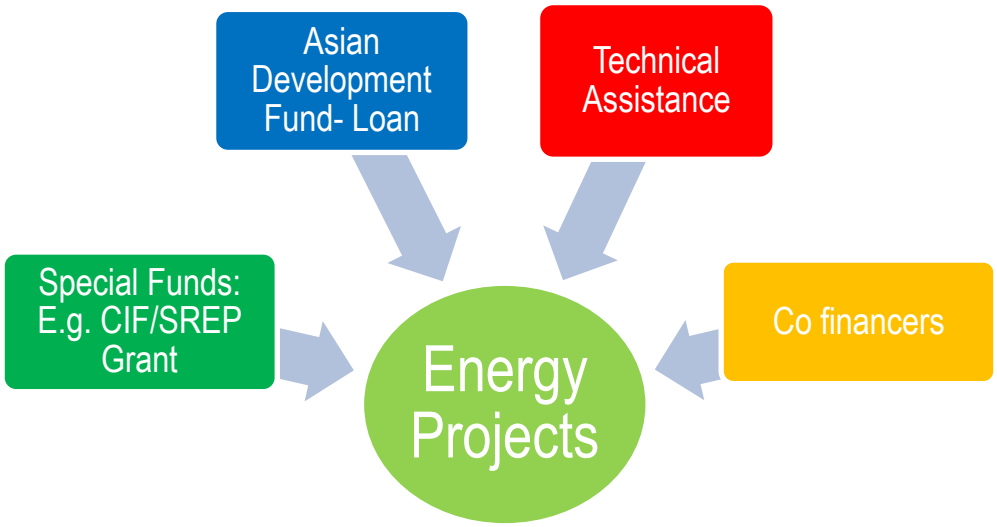


Impact of subsidy will be seen only after two years after the subsidy kicks in

Fig Source: A. Karki

ADB's Ongoing Efforts:

- Pilot Projects
  - Testing various Business Models
  - New technologies- wind/solar/wind solar hybrid mini grid
  - Integrating learnings into operations for scaling up
- Strengthening sector governance
- Private sector participation
- Leveraging different resources



Project Reference

- **SASEC Power System Expansion Project (2014)**
  - $ 180 million ADF loan + $120 million EIB loan + $ $60 million Norway Grant + $11.2 million SREP grant (at the time of approval)
  - Strong component of electricity distribution components – NEA's grid + AEPC's off grid
    - Coverage: 56/75 districts alone with NEA's component
    - Target : 30,000 HHs (AEPC component)
  - Preparation of Distribution System Master Plan
  - ADF loan as credit line to Cental Rural Energy Fund
  - Development of mini hydro (>100kW & < 1 MW), wind/ solar based mini grid system
    - Grid Ready system

Thank you

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