Mini-Grid Development in Nepal

Approaches, Key Challenges and Requirements

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Rural Energy Access in Nepal

- Nepal produced many best practices in the region for off grid mini grid development (mainly micro hydro)
    - Guidelines, standards, subsidy delivery policy and mechanism, institutional set-up, RE Policy are already in place
    - > 25 MW of installed capacity (potential 100 MW);
- Off grid based mini grid system- will remain important for many years to come to achieve modern energy for all
    - Extreme Remoteness-Grid Expansion Less Viable
    - 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
- 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
- Use of modern technologies
    - Smart grid-allowing close consumer interface
- 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;

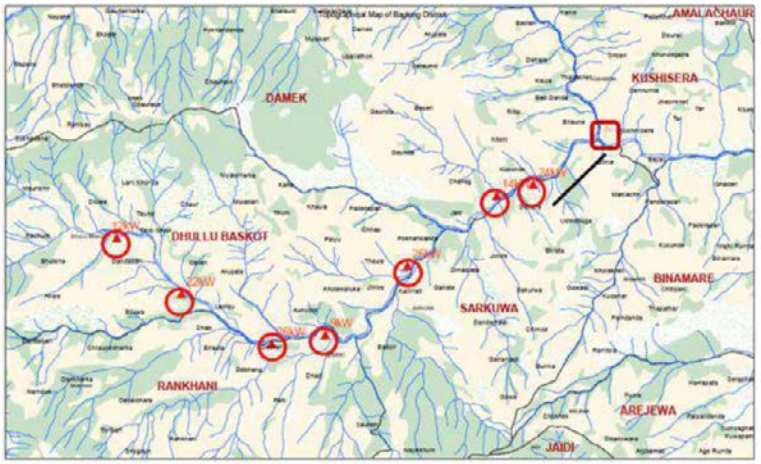
- NEA reluctant to connect MH in its grid
  - Not grid compatible design
    - Security Issues
    - Quality of Power
  - Managing expectation after grid connection- perceived risk by NEA

- 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.

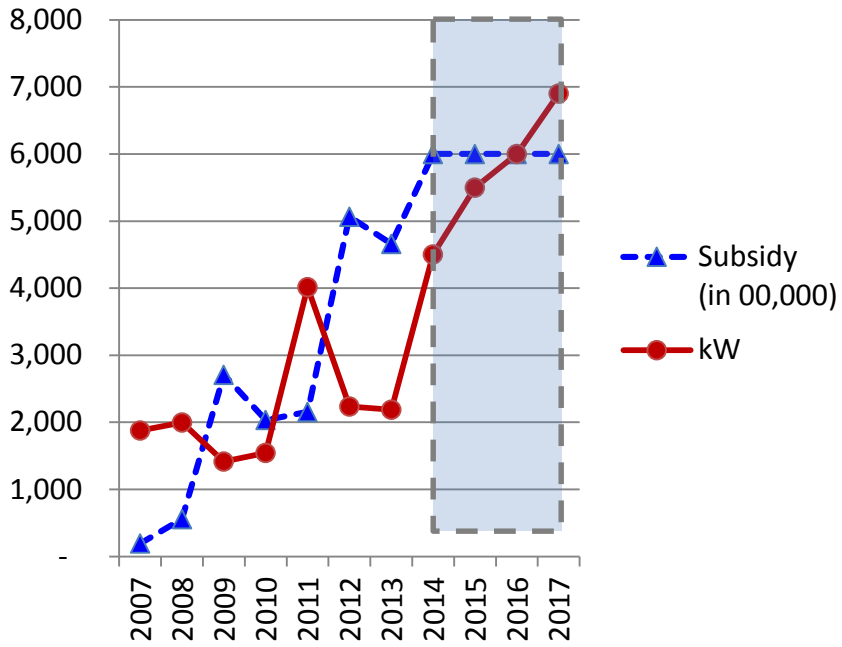
Requirements- Interconnection of several Mini Grids

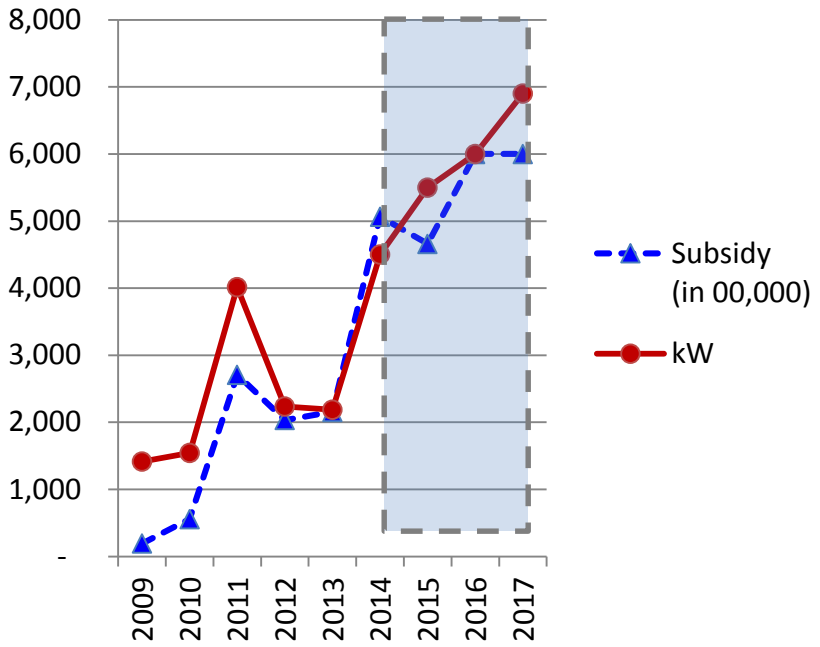
- Successfully demonstrated interconnection of several mini grids -in Baglung district of Nepal
  - 6 MHPs (107 kW benefiting 1200 HHs)
- Higher power availability
  - Increased Productive end use application
- Could be desired option for utility to connect to its grid
  - One connection instead of several
- Complex system
  - Limited skills- both technical and non technical (in community and national level).



Requirement- Enhancing readiness

Identify projects and prepare them in advance



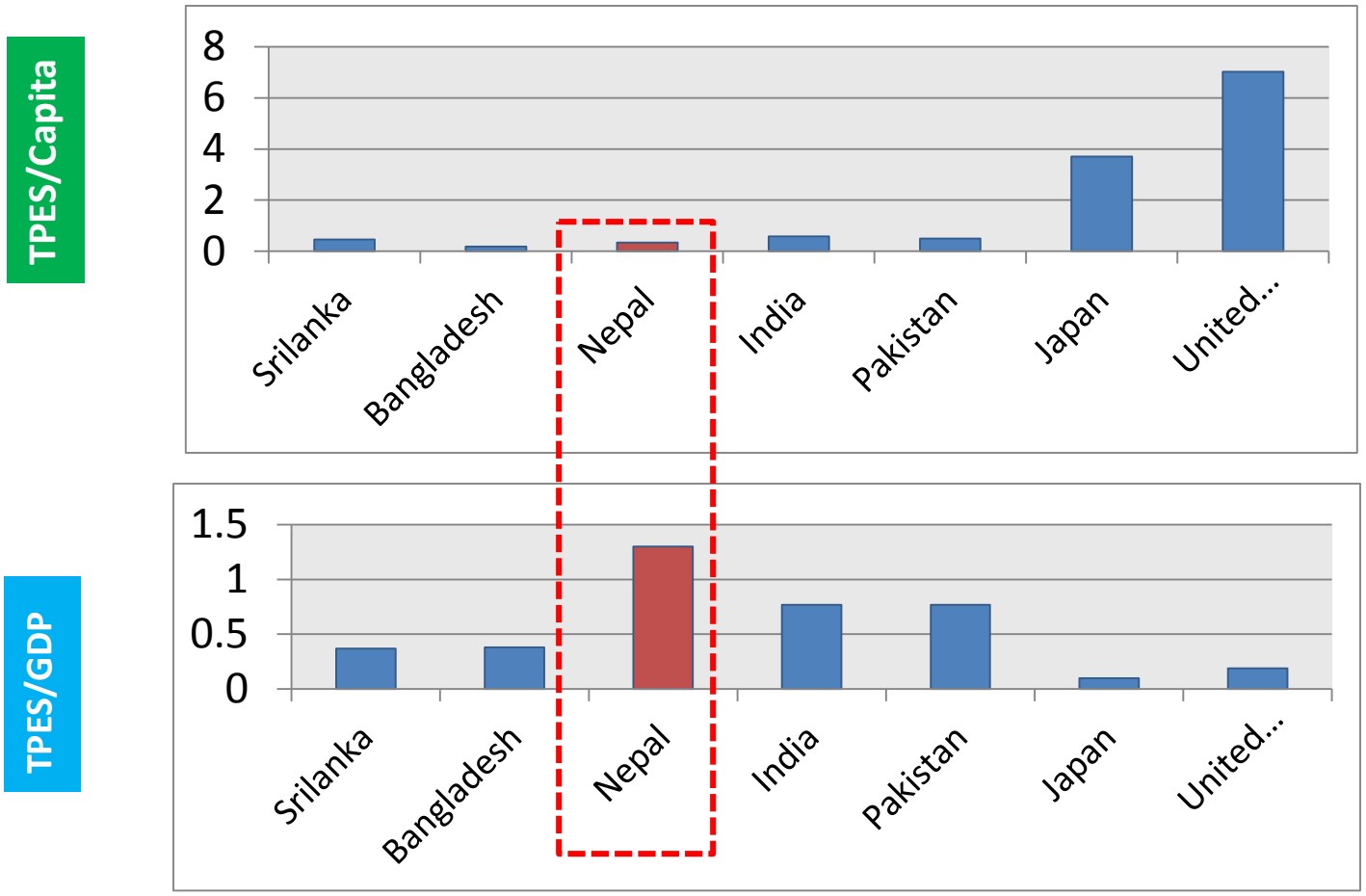


Impact of subsidy will be seen only after two years after the subsidy kicks in

Fig Source: A. Karki

Energy Efficiency- Low hanging fruit and fantastic GESI entry point

TPES/Capita (toe/capita) VS TPES/GDP

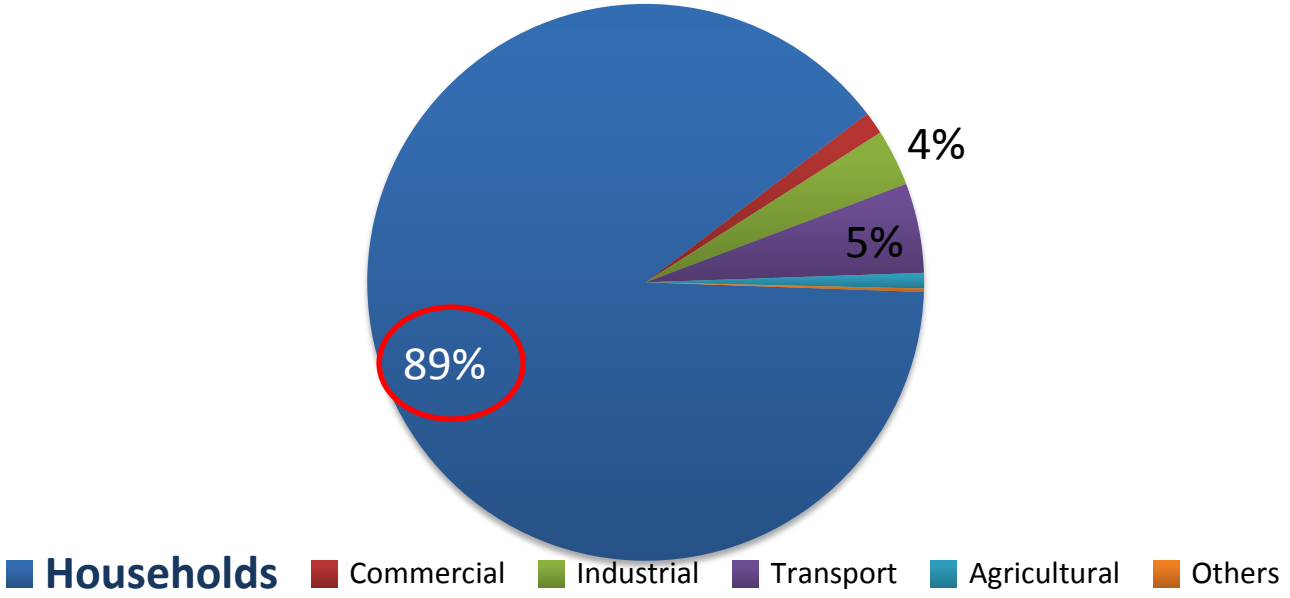


TPES/Capita in toe/capita; TPES/GDP in toe/000 USD

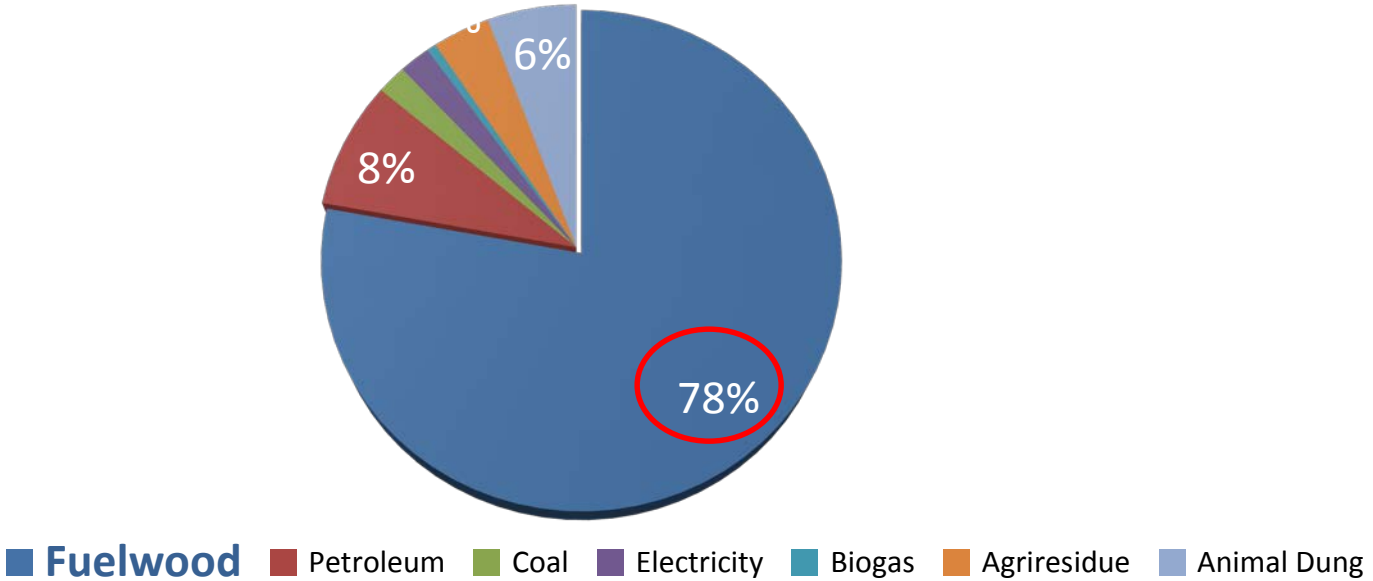
Source: IEA,2011

Total energy consumption by sector and fuel type

By Sector



By Fuel Type



Cooking: Largest energy consuming activities in Nepal

Types of cook stoves	: Three stone or iron tripod stoves
Efficiency	: 5-8%
Associated Problems	: High fuel consumption, Low efficiency (<10%), high level of indoor air pollution

Challenge

How to resolve issue of overreliance on fuel wood & meet cooking energy demand efficiently?

- To reduce exploitation of forest resources.
- To reduce drudgery- especially women who collects the fuel-wood.

Direct relevance to GESI

Investing in gender-aware energy infrastructure & Claiming the right to adequate energy services needs support

Thank You