Concept Paper

Rural electrification through grid-interactive micro/mini grids

Rural Electrification: Census 2011

- **55.3% households connected to the grid**
  - But, availability of electricity supply continues to remain poor; 75% get less than 6 hours supply.
  - Per capita consumption is only 8 kWh per month
- **44.2% use other energy sources for lighting**
  - ***72.4 million households ~ 350 million people, use kerosene***
  - **About 1.0 million households use solar for lighting**
- **1.2 million households go dark after sunset**
- **145 million households with no electricity or less than 6 hours electricity supply**

Rural electrification?

- **What role can mini-grids play in meeting this massive energy poverty challenge?**

Proposed RVEP Scheme

- **Draft scheme for 2012-13 on village lighting programme: March, 2012**
- **Objective is to provide basic lighting facility through RE:**
  - Unelectrified remote census villages and unelectrified hamlets of electrified census villages where grid in not feasible or not cost effective & is not covered under RGGVY
  - **Electrified village/hamlets where power availability is less than 6 hrs per day**
  - Street lighting systems for villages/ hamlets

Proposed RVEP Scheme

- Priority to power plants (mini grid) of 10-250 kW capacity per site, followed by micro grid of capacity up to 10 kW.
- If micro grid is not feasible, then only standalone SHS project to be considered
- Minimum 6 hrs of electricity to be provided through mini/micro grid
- Street lighting systems (11 W CFL) with number of streetlights restricted to 7% of the number of households
- Every household eligible for a maximum of 58 W connection (2 light points of 9 W each and 40 W socket)

Proposed RVEP Scheme

- Subsidy reflects prioritization
- Central Financial Assistance (CFA) of up to 90% of the cost of the system including 5 yrs AMC provided for mini/micro grid projects with maximum of Rs. 243/ Wp
- CFA for only 30% including 5 yrs AMC for standalone SHS
- Rest 10% to come from other sources; state govt. to contribute at least half of the rest and also give commitment for replacement of batteries

Proposed RVEP Scheme

- SNAs to select project developers through bidding.
- Developers to run mini/micro grid on BOMT basis for 5 yrs.
- Developers to charge tariff from beneficiaries. Tariff to be fixed by SNAs.
- For the grid connected villages or villages where grid reaches after the implementation of the programme; the state govt. can handover the project to discoms or make the developer discom.
- Power from mini/micro grid can be imported/exported from the grid

Proposed RVEP Scheme

- Two big ideas:
  - Near universalisation of lighting programme through RE
  - Grid-interactive mini/micro grid – potential to change the way we produce and consume electricity
- If the draft scheme is universally applied, following numbers emerges:

Proposed RVEP Scheme

- The scheme will be applicable to about 145 million rural households
- 50.4 million units of electricity is required each day to give 58W connection to each households
- 1.33 million units each day will provide streetlights to all villages without streetlights
- About 21000 MW SPV capacity will provide basic lighting for six hours and provide streetlight – **total target under JNNSM**
- At the rate specified in the draft scheme (Rs 243/Wp), it will cost **Rs 5.0 lakh crore**

Tweaking the draft scheme

- Draft scheme is 100% capital subsidy based – we can not afford it at near universal scale
- From capital subsidy, we propose feed-in tariff based scheme, similar to grid-connected solar under JNNSM
- How much will it cost?
- At Rs. 15/kWh, would need a annual feed-in tariff of Rs 30,000 crore.
- Big number????

Tweaking the draft scheme

- If we charge Rs 100 per month from each households – replacement cost of Kerosene for lighting – annual collection would be Rs 17000 crore
- The remaining Rs. 13000 crore can come from many possible sources – Rs. 0.2/ kWh cess on all fossil fuel electricity (green cess like Gujarat) or contribution from Clean energy development fund etc.
- The households should have the option to increase their consumption; they should be charged for consumption beyond 58 W connection.
- Extra electricity can be fed to the grid – RE FiT

RE revolution

- Thousands of small power producers would import and export power from the grid
- Help build local economy and create local jobs
- Model suitable for urban areas – rooftop power producers
- Big step towards moving Indian electricity sector to RE

Disclaimer

- Calculation done only using solar PV, but mini/micro grid can be based on all types of RE. Using other RE sources will bring down the costs
- Promoting mini/micro grid does not mean we forget thousands of remote villages where these will not feasible. There standalone solutions will have to provided.