# Green Growth and Energy Transformation (GROW-GET)
# Solar for Education
# Event Report of Expert Consultation Meeting, Delhi
# Wednesday, September 27, 2017

**Background:**

CUTS International, in collaboration with Friedrich Ebert Stiftung had commenced a project called **Green Growth and Energy Transformation (Grow GET)** in April, 2016 in Jaipur, Rajasthan. The core idea of the project is to create an implementable strategy for energy transformation at state level by engaging all the concerned stakeholders into fostering a dialogue to identify common interests. To serve this purpose, long-term multi-stakeholder working groups or the 'Seed Communities' were set up at Rajasthan, West Bengal, National and the International (India- EU Cooperation) levels. The ultimate target of the project is in coherence with the national aim of increasing the share of renewable energy in the overall energy mix.

In the previous deliberation, i.e. Forum for Policy, the policy level challenges with respect to technology and finance were discussed with representatives from Bank of Baroda, Reserve Bank of India, Rajasthan Renewable Energy Corporation Ltd. (RRECL) which is the State Nodal Agency for renewable energy in Rajasthan, project developers, energy experts and seed community members. The key discussions of the session revolved around the concerns on mandates of Priority Sector Lending, concerns of bankers with respect to credit worthiness of rural borrowers, role of bank regulator (RBI) towards energy access, challenges associated with mechanism of channelizing capital subsidies and role of State Nodal Agency in promoting use of decentralised solar solutions. Decentralised Renewable Energy shall be crucial to the strategy to be adopted for solarisation of education in rural India. Solarisation of education cannot be looked in isolation. It can potentially help in improving the energy supply scenario of the entire community or a cluster. Therefore, in order to optimally utilise the scale of that solar energy can provide to a cluster, there is a need for an integrated approach which will also solarise households and other public amenities in a region like Primary Health care centre, public lighting. Microgrids

The agenda of the discussion was to understand the potential and technical and financial challenges in integrating Decentralised Renewable Energy (DRE) in the long term energy planning of the country such that access to reliable and quality power energy can be provided to the community at large. Among the numerous technologies present in the DRE space, Minigrids and advanced Microgrids have huge potential in contributing towards electrification targets of the State set in the Saubhagya Scheme.

The two major outcomes of the discussions of the expert group meeting are:

- In the rapidly changing energy landscape, DRE has an increasingly important role to play. Advanced microgrids can facilitate availability of reliable source of power to regions experiencing acute power outages and can help Distribution utilities reduce their transmission and distribution losses. This can be assisted by ensuring that there are policy mandates for sustainability of microgrids as a commercially feasible business model. Therefore, it shall be important to **create an Advocacy strategy advanced microgrids to be integrated into the overall energy planning of the nation**, after considering the concerns of all relevant stakeholders like Discoms, electricity regulators, policymakers, civil societies and end consumers.
- In order to understand the financing mechanisms and challenges in commercialisation of grid interactive microgrids, it is necessary to generate data regarding the location and feasibility of the plant in the particular location. Therefore, there is a need to **promote pilot studies for advanced microgrids to facilitate data generation**.

**What are Advanced Microgrids?**

Microgrids are the smaller versions of the national grid infrastructure which produces and distributes energy through wire infrastructure in a more decentralised form. Advanced microgrids use much more advanced software, controllers and sensors which facilitate better energy management. Following are the advantages of advanced microgrids:

- They can provide **greater flexibility to the national grid network** of the utility as they can work in both grid connected mode and off-grid mode, hence bringing reduction in Transmission and distribution losses of the Discoms.
- Usage of advanced controllers and sensors can ensure that **unplanned disruptions in energy supply could be reduced** substantially, and can also regulate transmission frequency even during natural disasters.
- Installation of microgrids near to substations in regions with higher power outages can potentially **defer infrastructure addition by discoms**. In other words, this can potentially **save money to be invested by the discoms for upgradation of power infrastructure**.

For instance, when the load is high in a region, a microgrid can be installed at a particular substation which will reduce cost of increasing the capacity of the transformer at that substation which will ensure continuous and reliable source of power to the region. This can be ideal for rural areas that experience poor quality of energy supply.

**Challenges in promotion of uptake of advanced microgrids in India:**

- **Microgrids are presently unsustainable business models for energy enterprises in India:**
  - **Microgrids are heavily dependent on grants**: Sustainability of mini-grids without subsidies is definitely questionable. Most of the microgrids (running as pilots) that are functional today are heavily dependent on the grants that are provided by the Centre.
  - **Lack of access to private capital**: Energy enterprises face challenges in accessing private capital in the sector. The sources for private capital can be commercial bank loans. However, due to lack of commercially viable business models of microgrids, there are apprehensions among the commercial banks to finance microgrids. Despite of exclusive funding available from multilateral agencies like World Bank for renewables, the commercial banks find it hard to deploy funds in the sector. Since funds of the multilaterals are long term funds and private commercial banks prefer investing money in sectors with returns in the short term, there is a conflict of interest between the multilaterals and private banks.
  - For energy enterprises, they are not commercially viable and they are barely able to cover the expenses incurred by them to operate and maintain the systems.
- **Lack of policy framework for ensuring grid-interoperability of microgrids**
  - There is a need for an integrated energy planning of a state in order to avoid duplication of infrastructure and efforts, it is needed for all the stakeholders (developers and regulators) to cooperate and move forward in one direction.
  - As per the Electricity Act, every distribution licensee (or a project developer of microgrids) must have its own wire infrastructure. This will lead to doubling of infrastructure which may prove to be even costlier than installing the plant.
  - Since the act is silent about the framework for integration and sharing of the wire infrastructure of the discoms with the microgrids infrastructure, this restricts uptake of microgrids in rural areas.

- There is a need to amend the Act to provide for infrastructure sharing among the project developers and discoms to provide for grid interoperability in future.

**Way Forward:**

- **Adopting VGF model rather than capital subsidy model**
  Rather than capital subsidy mode, Viability Gap Funding mode can be adopted so that a quality of power can be supplied to the consumer at an affordable rate. End users should be charged at tariffs set by the state and VGF can be used to cover the gap between the supply cost of the microgrid and state tariff. The capital subsidy provided for installation of microgrids can be diverted to provide VGF.
  The project developer can raise money from commercial banks either based on some quality framework or through Fixed Monthly Rentals Agreements between project developer and the banks with penalty clauses for lapse in services. This will ensure that there is more reliable energy source for the consumer from the developer and it shifts the risk of supply on to the developer. It builds greater accountability.

- **Data needed for policy advocacy for microgrids:**
  Conducting pilots is imperative to conduct economic evaluation of the microgrids and to understand challenges in commercialisation of microgrids. Promoting pilots will address the issue of lack of data to study their feasibility. Following are the data required for feasibility assessment:
  - **Asset cost data** (in the form of feeder and substation upgradation)can be provided by Discoms for both green field projects or brown field projects in order to conduct an economic cost analysis to understand whether installation of microgrids is feasible vis-a-vis upgradation of infrastructure. However, accessing such data is difficult.
  - **Village Identifiation Data**: Feasibility of installation of microgrids is dependent on location under consideration. Discoms, Regulators, state load dispatch centres and local Municipal Corporation can be consulted to provide habitation level, topography of a particular area.
  - **Cost estimation:** Cost of installation of microgrids can be accessed from tenders and RTI applications. Research institutes can be consulted for accessing the substation level data.
- **Demand of Energy**:
  While identifying cluster for installation of microgrids, energy demand for different consumer categories also should be evaluated.
- **Technology**:

Evaluation must be done for adopting the right kind of technology and storage capacity for a particular location selected by project developers.

- **Legal Mandate:**
  The Electricity Act should be amended to allow for infrastructure sharing between discoms and energy enterprises.

- **List of Participants:**

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