



Energy Security Dialogue

Rural electricity access and distributed generation

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Distributed generation (DG) is defined as installation and operation of small modular power generating technologies primarily based on local renewable energy sources. These technologies can be combined with energy management and storage systems to improve the operations of the electricity delivery systems at or near the end user. Modern electronics have made it possible to integrate these technologies with grid-based large power plants. Biomass gasifiers, solar photovoltaic systems, wind-electric generators are some of the commonly used DG systems for rural electricity supply and distribution. Despite a rich history of renewable energy technology-based DG options on a pilot scale in the country, these are yet to be tried on a large scale in rural electrification projects. There are various reasons linked to non-implementation of large scale DG projects in the country:

- Limited experience of using DG technologies for rural electrification
- Lack of standardisation and appropriate packaging of DG systems for optimised performance
- Lack of an efficient network for DG systems supply and after-sales service
- Variation in renewable resource availability etc.
- Feed-in tariff for grid connected DG projects (lack of regulatory framework)
- Institutional issues related to implementation of renewable energy-based technologies (Assuming that renewable energy is meant for remote inaccessible habitations and are to be promoted by the concerned ministry and departments only)
- Un-addressed “last mile” connectivity under the rural electrification programme of Government of India.

To discuss the potential of DG for enhancing rural electricity access in the country and some of the key challenges, TERI in association with SR Corporate Consultant, organised a multi-stakeholder dialogue. The discussion focused on addressing the questions indicated below:

- What should be the standardisation guidelines of the various components of DG technologies so that performance is highly reliable and efficient?

- How do we build local technical capacity so as to ensure highly reliable performance and build confidence in the local population?
- How should technical barriers of intermittent power supply and quality of power be addressed so that DGs can be integrated with the main grid?
- What should be the tariffs for various renewable energy-based DGs? Should we use the Feed-in Tariff system adopted in the European Union?

The Working Group on Power for 11th Plan has estimated a potential of 10,000 to 15,000 MW capacity additions through DG in 11th and 12th Five Year Plan. DG programme is relevant for India to meet the target of cent percent village and household electrification, to meet peak load shortages and to supply quality power at economical rate on cost to serve basis. Both off-grid and grid inter-connected DG could be considered, not only from the point of view of rural electricity access but in the larger context of sustainable development of the country, as these are carbon neutral technologies.

Key takeaways

- The discussion brought forth issues with regard to standardisation and packaging of DG technology. Particular emphasis was laid on standardisation of gasifier systems (in the case of solar technologies, specific quality and specific standards are already being maintained). It was suggested that well known certified manufacturers/suppliers of DG systems should be consulted for developing standards for the benefit of both users and suppliers; and quality checks should be put in place.
- There is a need for capacity development (through systematic and extensive training modules) to develop a strong local technical base that ensures effective deployment and functioning of DG technology. The approach followed by CREDA for capacity building and successful field performance of DG systems, 'GOLD' (Group partners, Organise local skills, allocate Load, and Deliver service) was shared at the discussion. It was suggested that manufacturers/suppliers may tie up with local service providers and develop the local maintenance network.
- The need for grid connectivity and inter-connection standards was also highlighted. There are currently no inter-connection standards in the country. Grid inter-connection will improve earning opportunities for renewable energy systems and increase their viability.
- With regard to financing and tariff issues, the importance of feed-in tariffs was discussed and it was suggested that since the capital costs of DG systems are higher than conventional power systems, competitive evaluation of DG systems vis-à-vis grid extension should be carried out for electrification of virgin remote villages.

Some areas of intervention discussed by the stakeholders are:

- Compilation of all available designs and packages of DG technologies being implemented by state nodal agencies, National Thermal Power Corporation and others.
- Development of standardisation guidelines for design and packaging especially of biomass gasifiers and solar photovoltaic systems.
- Development of manuals or packages of information on DG technology for large scale dissemination to all stakeholders involved in rural electrification projects.
- Development of testing and certification facilities
- Development of regulations for grid interconnectivity and declaration of feed-in tariffs by state electricity regulatory commissions.