Grid-Tied Mini-Grids in India

Center for Study of Science, Technology and Policy
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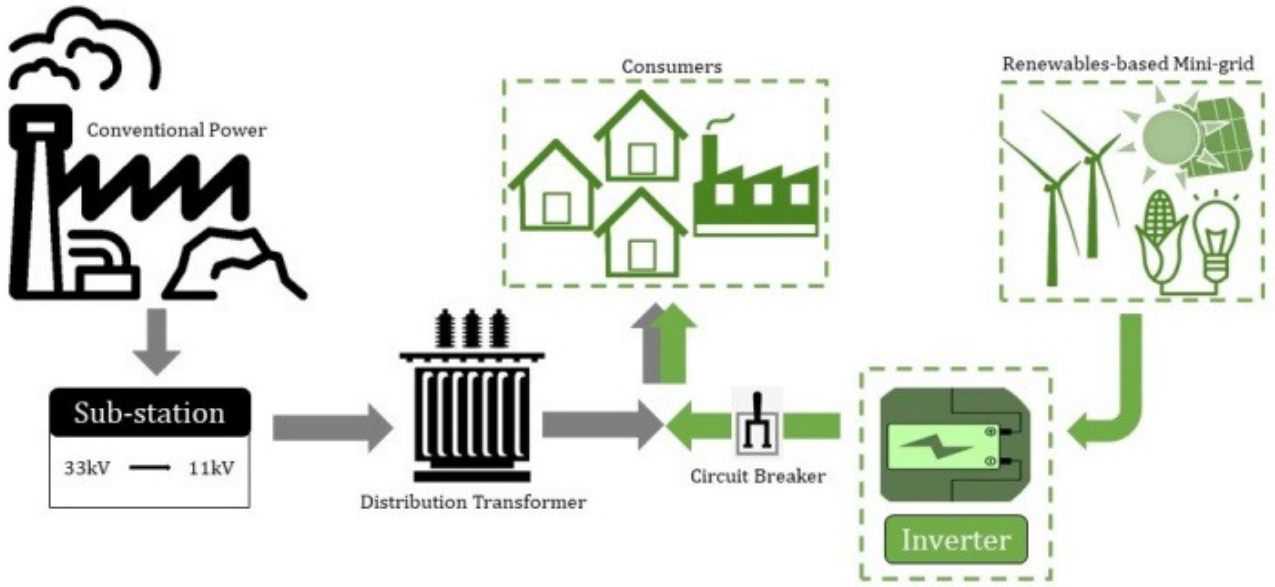
India has taken a conscious step towards high Renewable Energy (RE) deployment by signing the Paris Climate Agreement at the Conference of Parties (COP) 21. Under the Saubhagaya Initiative, the government aims to light up India's 572 un-electrified villages and improve the household-level penetration of power, which is currently 8% (GARV Dashboard, 2018).

Mini-grids can play a pivotal role in achieving these targets, by providing decentralised power to remote areas, using RE. They can help invigorate the socio-economic status of rural societies by generating employment and improving the quality of life through energy access. Mini-grids also help reduce the government's expenditure on high

capital investments, which would be required for expanding the central grid for last-mile energy supply.

Mini-grids exist in India as off-grid RE systems, or in parallel with the central grid, although rapid expansion of the central grid has derailed off-grid RE systems in the past. However, with the right policy framework, grid-tied mini-grids can be a promising solution. Grid interconnection obviates the need for operating mini-grids with large storage systems; the grid is available for top-up support. It allows small and medium enterprises to work with anchor loads and promotes local entrepreneurship, such as irrigation pumps, husk and rice mills, RO water systems, etc. Grid-tied mini-grids also provide higher system reliability by isolating themselves from the central grid during times of failure or natural calamity.



Interaction between Central Grid and Mini-grid

Despite such observable potentials, multiple challenges exist for the mini-grid sector. Some of them are lack of investor-friendly policies, un-structured tariffs, un-regulated nature of businesses, and lack of standards and mechanisms for grid interconnection. Many of these problems can be attributed to the lack of a national policy to promote mini-grids in India. Such is the status of the sector, despite the Ministry of New and Renewable Energy's (MNRE's) draft policy of 2016 and its mandate to formulate state-level policy frameworks within six months.

The need of the hour is to develop a proper regulatory framework for grid-connected mini-grids. This will help clarify issues like types of workable models, ownership models, safety and technical features, and interconnection points. A detailed study

must be undertaken to find viable business models for the mini-grid sector in India. Solving these issues may help us evolve a roadmap for the deployment of state-level schemes in the near future.

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Further Reading

The Center for Study of Science, Technology and Policy (CSTEP) published a policy brief in 2017, discussing the techno-economic feasibility of grid-connected mini-grids, which also includes recommendations for policymakers.

Energy Mini Grid Power Sector Solar Energy Climate Change