Driving the Off-Grid Revolution

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The country still has several pockets where conventional power needs to be transmitted hundreds of kilometers through inefficient transmission infrastructure. The highways of Rajasthan or the winding roads of Northeast India are often spotted with villages that are not connected to the grid and need special support to be electrified. An often-quoted world-bank statistic is that over 400 million people in India do not have access to electricity. While this number may be misleading as a lot of good work has been done under various rural electrification schemes over the past 10 years, it is of no doubt that much more is required to be done. There is a significant gap in the technically electrified villages and the villages where electricity is available for a minimum of 6-8 hours in a day. Moreover, transmission of electricity over such long distances through transmission lines is often extremely inefficient. It is for these reasons that off-grid electrification needs to be taken up in a serious manner.

Section 5 of the Electricity Act mandates the Central Government to formulate policy for rural electrification, thereby empowering panchayat institutions and local communities to purchase power, and manage distribution in rural areas. In order to make rural electrification effective, it is stipulated that the policy measure focus on decentralized distribution of electricity involving panchayat institutions, users' association, cooperative societies, non-governmental organizations or franchisee.

Further, section 4 of the Electricity Act mandates the Central Government to formulate policies for stand-alone systems for rural electrification and utilize renewable or non-conventional energy resources. Further, Section 2(63) of the act defines stand-alone systems as electricity systems set up to generate power and distribute electricity to specified areas without connection to the grid.

In compliance with Section 4 and 5 of the Electricity Act, the Government of India had notified Rural Electrification Policy (REP) on August 23, 2006. The REP aimed to provide quality and reliable power supply at reasonable rates to all households by year 2009. Further, it also envisaged provision of minimum lifeline consumption of 1 unit per household per day by the year 2012.

However, it is unfortunate that the REP-recommended grid connectivity and development of substations and augmentation of the network is considered as the primary way of electrification of villages. This triggered a wave of creating inefficient and leaky transmission infrastructure to the smallest of villages.

Thankfully though, the policy also states that where grid connectivity is neither feasible nor cost-effective, off-grid solutions based on stand-alone systems be developed for supply of electricity, so that every household gets access to electricity. Further, where neither stand-alone systems nor grid connectivity is feasible, isolated lighting technologies such as solar lanterns etc., may be adopted.

In case of a mini-grid, the policy suggests that facilities including the local distribution network be developed using either conventional or non-conventional methods of electricity generation, whichever is more suitable and economical. The REP also advocates utilization of non-conventional sources of energy, even where grid connectivity exists, after evaluating its cost-effectiveness. The REP mandates state governments to prepare and notify a Rural Electrification Plan to achieve the goal of providing access to all households, mapping the electrification delivery mechanisms (grid or stand-alone) considering available technologies, environmental norms, availability of fuel, number of un-electrified households and distance of the village from the existing grid.

Recent schemes like the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) and its successor, the Deendayal Upadhyaya Gram Jyoti Yojana (DUGJY), have taken up various facets of rural electrification and given them priority. For instance, where the RGGVY focused on modernizing rural electricity infrastructure by providing 90 per cent capital subsidy, the DUGJY shifted focus to feeder separation between agricultural and non-agricultural feeders.

While the various schemes have focused on the government as the "giving hand" to enable rural electrification, there has also been scope for the private sector to enter the role of rural electricity distribution and play the role of a rural utility. In a model that is akin to the micro-electricity distributor, the private sector has been looking at setting up micro-grids and supplying reliable power to isolated villages in the hinterland of India. There is also tremendous interest from impact investors in scaling up their presence in the off-grid space in the country. However, this article focuses on the various policy aspects of off-grid systems.

Are stand-alone systems provided in the Electricity Act?

Section 4 of the Electricity Act requires the Central Government to prepare and notify a national policy permitting stand-alone systems including those based on renewable sources of energy and other non-conventional sources of energy for rural areas in consultation with the state government. For this purpose, the term 'stand-alone systems' has been defined under Section 2(63) of the Electricity Act:

"(63) 'stand alone system' means the electricity system set up to generate power and

distribute electricity in a specified area without connection to the grid;"

Section 5 of the Electricity Act also requires the Central Government to formulate a national policy for rural electrification and management of local distribution in rural areas through panchayat institutions, users' associations, co-operative societies, non-Governmental organizations or franchisees in consultation with the state governments and the state commissions.

Should off-grid networks be compatible with the grid?

The REP, which was formulated by the Central Government on August 23, 2006, as mandated under Section 4 and 5 of Electricity Act, states in paragraph 3.2 that for villages/habitations where grid connectivity is feasible or cost-effective, off-grid solutions based on stand-alone systems may be taken up for supply of electricity, so that every household gets access to electricity.

As per para 3.3 of the REP, de-centralized distributed generation facilities together with local distribution network may be based either on conventional or non-conventional methods of electricity generation, whichever is more suitable and economical. Non-conventional sources of energy could be utilized even where grid connectivity exists provided it is found to be cost-effective.

Now, both the NEP and REP recognize the setting up and operation of off-grid electricity systems for generation and distribution of electricity in rural areas where grid connectivity is not feasible or economical. Moreover, such off-grid systems based on non conventional sources of energy like wind and solar are also allowed to co-exist with the grid system as long as the off-grid system is found to be cost effective.

Hence, off-grid systems based on non-conventional sources of energy like wind and solar for generation and distribution of electricity in rural areas of India need not be compatible with grid connection so long as the system is found to be cost-effective.

Should the micro-grid follow grid standards?

Section 7 of the Electricity Act allows any generating company to establish, operate and maintain a generating station without obtaining a licence under the Electricity Act if it complies with the technical standards relating to connectivity with the grid referred to in section 73(b).

The CEA has issued CEA (Technical Standards for Connectivity to the Grid) Regulations, 2007 (Grid Regulations) as technical standards under section 73(b) of the Electricity

Act. As per regulation 3, the regulations are applicable to all users, requesters, the central transmission utility and the state transmission utility. Grid regulations, however, are applicable only to those entities that are seeking connection or are connected to the grid. Since the proposed power stations will not be connected to the grid, grid regulations will not be applicable to these stations. A reading of the provisions appears to state that there is no requirement to comply with the grid regulations, i.e. technical standards related to connection with the grid, under section 73(b) as referred to under section 7 of the Electricity Act so long as the power station does not come within the definition of a 'user' or 'requester' under the grid regulations.

Is a license required to operate a Micro-Grid?

Section 12 of the Electricity Act prohibits a person to distribute electricity unless he is authorised to do so and has a license issued under section 14, or is exempted from obtaining a distribution licence under section 13 of the Electricity Act. Hence, a person seeking to supply electricity shall not require a distribution license if he/she generates and distributes electricity in a notified rural area or he/she seeks exemption under section 13 of the Electricity Act. Additionally, a distribution license shall not be required if the power station supplies power to the consumers through 'dedicated transmission lines'. There are also specific exemptions available for distribution in certain notified rural areas, subject to fulfillment of various safety conditions.

However, due to the policy framework, which provides selective and often inconsistent area-wise exemptions, it is unclear whether a license is required or not, if electricity distribution via a micro-grid is taken up for a specific rural area. For investors, this creates major uncertainties in their minds regarding whether their operations would be affected if they continue without licenses. Moreover, they also they risk getting a notice from the quintessential not-so-friendly "Babu".

What if the grid enters later?

There is always a risk for an investor in the off-grid space: the grid may be available on a future date, thereby making their investment redundant. Further, the legal position once such a grid is available is also unclear – would the off-grid generator be required to supply power to the grid, or can the off-grid generator continue to supply power to his customers under dedicated transmission lines?

Recent newspaper reports state that the Central Government is considering introducing a policy making it mandatory to feed the power generated through various off-grid solutions, like mini transmission network, to the national grid once it reaches the hinterland. As per the policy, as and when the grid reaches a place that has an off-grid option, there will

be a 'must-run status' for feeding its electricity into the grid. This policy is proposed to reduce demand-supply gap and to meet the objective of supplying power to all. However, it is unclear what the tariff will be if such stand-alone systems are made to feed into the grid. Surely the state cannot expect a microgrid operator (with entire distribution infrastructure in place) to supply power into a grid at the same tariff as a stand-alone generator/ Independent Power Producer.

The Electricity (Amendment) Bill, 2014, introduced in the Lok Sabha by the Ministry of Power in December 2014 proposes various amendments to the Electricity Act to facilitate decentralized distributed generation stations in rural areas. The bill has defined 'decentralized distributed generation' as follows:

"(15A) 'decentralised distributed generation' means electricity generation from wind, small hydro, solar, biomass, biogas, bio-fuel, generation from any kind of waste including municipal and solid waste, geothermal, hybrid power system or such other sources as may be notified by the Central Government for end-use at or near the place of generation;"

Further, the bill proposes amendment to the present section 14 of the Electricity Act that provides for grant of license to persons seeking to undertake distribution of electricity in India. As per the proposed amendment, decentralised distributed generation networks not connected to the distribution system may continue to operate without getting connected to the distribution system, even in case of grant of licence for operation of the distribution system in that area. This is a reform that will greatly help the growth of off-grid electricity distribution.

Summary and conclusion

It is now evident that the framers of the Electricity Act 2003 did start out with the noble intention that off-grid electricity generation should be encouraged. However, the actual framing of the act has made it unclear whether a license is required or not, and also leaves a lacuna in understanding what will actually occur if the main grid reaches the village at the future date. Unless these gaps are clarified, it is unlikely that India will see any major investments in the off-grid space. This is extremely unfortunate since there are several large impact investors who are willing to enter this space, and are waiting for policy clarity. It is important for policy-makers to apply themselves to this fledging space and provide regulatory clarity to aid investors.

About the author

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