

Lithuania rural microgrids

Creating access to electricity for the 1.2 billion or more people estimated to live without power in disconnected impoverished rural communities has so far been an insurmountable challenge.

Small-scale decentralised microgrids could, however, form a potent solution. A microgrid can provide electricity for as little as 20 households via a low voltage distribution network using interconnected local generation sources such as micro-hydro, a diesel generator, biomass or solar.

A proven technology already in use around the world, microgrids have garnered attention from the UN and World Bank for their Sustainable Energy for All (SE4ALL) initiative, for which one of its three global objectives is to deliver universal energy access, both electrification and clean cooking solutions, by 2030.

However, as a report published earlier in the year revealed, microgrid developers and operators often encounter many community-related challenges where a one-size-fits-all business model is not applicable.

The report, entitled ‘Microgrids for Rural Electrification: a critical review of the best practises’, looks at twelve case studies located in India, Malaysia and Haiti which all had systems of roughly 100 kilowatts.

It found that some of the main challenges developers encountered were: difficulty controlling use of the system, theft and bad management of operations and maintenance. However, these issues varied for different communities and depending on whether a microgrid operation was for-profit or part or fully subsidised.

‘We certainly found just getting people to pay on time a challenge and they [case studies] each came up with different ways in how to manage that,’ says report co-author and founder of Earthspark International, Daniel Schnitzer, a Ph.D. candidate at Carnegie Mellon University in the US. .

To overcome this, some operators put in prepaid electricity meters, while others simply had a payment collection staff member collect payments from the customers at least once a week or, in some cases, almost every day.

Other issues that affected part-subsidized and for-profit microgrids, the report found, was controlling customers’ usage and combating theft. One of the characteristics of a microgrid is that there is a limit to the amount of power it can put out, says Schnitzer. Output therefore needs to be controlled otherwise customers will tend to abuse how much energy they use.

‘Even if a small number of users do that it will cause the grid to go into a brown-out or even in a black-out and it [microgrid] will just stop working. Then your microgrid has essentially failed,’



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Schnitzer warns.

Co-founder of Mera Gao Power, which serves off-grid villages in Uttar Pradesh, India, with solar microgrids, Nikhil Jaisinghani, says energy theft was and is a continuing problem.

“Initially we were only a lighting company. We figured out how to limit [electricity] theft for TVs but we couldn’t stop people from charging their phones. We tried everything we could think of before we eventually decided to add phone charging into the service. That eliminated 90% of power theft attempts,” he says.

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