

Empowering villages

Mini-grids could be a boon to poor people in Africa and Asia

When allied with microfinance, “green grids” can boost economic activity



A FORESTED village in Jharkhand state, eastern India, Narotoli is home mainly to adherents of Sarna, a nature-worshipping tribal religion. In more ways than one, it has long been off-grid. Drive past a police checkpoint a few miles away and you are in territory loyal to “the guys”, a euphemism for Maoist guerrillas. That makes Narotoli more marginalised than most places. A few months ago it became one of the last in India to benefit from a push by Narendra Modi, the prime minister, to supply electricity to all the country’s villages. But the power lines are so “reliably unreliable”, says an Indian executive, that they might as well be washing lines.

Two years before the grid arrived, however, Mlinda, a social enterprise, had set up a “mini-grid”, a bank of batteries charged by solar panels and hooked up to homes, to guarantee round-the-clock power independent of the national network. Mini-grids are different from the rooftop solar panels and batteries (sometimes linked up in “micro-grids”) increasingly used in poor countries to provide LED lighting and to charge mobile phones. Narotoli’s 22.5-kilowatt mini-grid provides lighting to scores of homes linked by its poles and wires, as well as powering a seed-crushing machine for cooking oil, irrigation in the dry season and power for a poultry farm—all of which engender economic activity.

The power generated by the plant is expensive (though it costs less than villagers often pay for alternatives such as kerosene for lighting and diesel for irrigation pumps). The worry is that demand for electricity may not be enough to justify the installation cost. As one Indian official recently scoffed: “Why provide a Ferrari to people who need a bullock cart?”

But Mlinda and other mini-grid installers see them as more than a way to satisfy existing demand for electricity: they are a way to catalyse development. The installers advise villagers on irrigation, farming and marketing to help them develop businesses that require reliable electricity, which in turn justifies the

expense of installation. Vijay Bhaskar of Mlinda says a big mistake in development has been to assume that, once people are hooked up to electricity, businesses will automatically flourish. People have to be taught how to make the most of power, he says. “Bringing energy is the easy part. The hard part is finding productive ways to make use of it.”

This understanding is spreading throughout rural parts of South Asia and Africa, where mini-grids are increasingly seen as one of the most promising ways of connecting the 1.1bn people in the world who still lack access to electricity. The World Bank says users of mini-grids may need microfinance and vocational training to make best use of it. According to one British expert, “mini-grid operators are not sellers of kilowatt-hours; they are stimulators of rural development.” Jaideep Mukherjee, the boss of Smart Power India, an NGO supported by the Rockefeller Foundation, says their job is to “demonstrate the benefits, train and then propagate”.

Talk to Havil Bilung, a farmer in Narotoli, and the potential is clear. He says that with help from Mlinda, increased access to electricity has allowed him to use irrigation pumps to grow an extra harvest of pumpkin and okra in the pre-monsoon months, boosting his income. More crops have cut the number of young men seeking itinerant employment in the cities during the dry season. Women make mustard-seed cooking oil, which sells in Kolkata. An independent study for Mlinda found that GDP per person in eight villages with mini-grids rose by 10.6% on average over the first 13 months, compared with 4.6% in a group of similar villages without them.

Power pose

It is still early days. Mlinda struggles to teach business concepts (Mr Bhaskar notes that the local language does not even have a future tense). But the village is prepared to fork out 55,000 rupees (\$800) on average a month—a small fortune—to keep the mini-grid running. In contrast, villagers say it is not worth paying the local utility for the unreliable grid, which they rarely use.

Mini-grids are being set up at the rate of just 100 or so a year, from Myanmar to Mozambique. But the International Energy Agency (IEA), a forecaster, says hundreds of thousands of them could connect 440m people by 2030, with the right policies and about \$300bn of investment.

African countries used to focus almost exclusively on expanding national electricity networks. Now some, including Nigeria and Togo, have started to prioritise mini-grids. Nigeria, which has the second-largest number of people without electricity after India, recently secured help from the World Bank for a \$330m programme to encourage private firms to build 850 mini-grids, serving 300,000 households and 30,000 small businesses. It includes subsidies for initial outlays, and auctions to encourage lowest-cost bidders. Other promising markets include Kenya and Tanzania.

The experience of Engie, one of several big European power companies testing mini-grids in Africa, helps illustrate their impact. Juan Garcia Montes, the head of Engie’s mini-grid project, PowerCorner, which has 3,500 clients supplied by eight mini-grids in Tanzania, says his customers have not used access to electricity to start new businesses but to make existing ones, such as carpentry and milling, more competitive. Engie provides soft loans for energy-efficient machinery and teaches people how to use it (it was shocked to learn, for instance, that customers unplugged their fridges each night). About 20% of clients consume 80% of the electricity, indicating the importance of a few “anchor” users.

It can take seven years or more to recover the investment in a mini-grid, so developers need long-term certainty about electrification policies. They need information on licensing requirements, on tariffs and subsidies, and on planning—all of which can be political minefields.

Firstly, standard licensing rules help with scale. If mini-grid projects need bespoke environmental-impact assessments or health-and-safety approvals, they become unviable. Secondly, developers need clarity about how much they will be able to charge their customers. If they are allowed to bill enough to cover their investment, that would usually mean poor villagers paying more than city folk for electricity. One way to equalise city and country tariffs would be to redirect the subsidies that utility companies get for extending the grid.

Thirdly, mini-grid operators need to be informed well in advance of plans to extend the grid, to reduce the risk that their installations are left useless when the grid finally arrives. They also need clarity about technical specifications to enable mini-grids to connect to the grid if one day that becomes feasible. All this can be hard to arrange, because state-controlled utilities often see mini-grids as a threat to their monopolies and subsidies. It is helpful to have a government master plan such as the one in Nigeria, setting out where it is and isn't feasible to extend the grid. William Brent of Power for All, an NGO, says that some large mini-grid developers, such as hydro-powered Rift Valley Energy in Tanzania, are linked by power lines to the national grid. He thinks that this model may become more common.

Most mini-grids are green, unlike diesel, kerosene and coal- and gas-fired electricity. That is a welcome feature, though not the main aim, since the contribution of places like Narotoli to global warming is minuscule. Mlinda says it is during weddings that the locals most appreciate their new, reliable power. Near Narotoli, your correspondent saw a wedding and a funeral one evening, on the same street, powered by a mini-grid. As the sun set, electricity meters outside the houses cast an atmospheric green glow—the light of progress.

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