

Villages may Go 'Off the Grid' to Address Power Problems

POWERING UP To make villages self-sufficient in power through the use of clean energy

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New Delhi: More than 25,000 villages, which have been waiting in vain for half a century and beyond for the government to provide them with electricity, could soon see light at the end of the tunnel as they go 'off the grid' using novel clean energy solutions. Rather than be dependent on utilities to plug them into the energy network, these villages will get electrified through so-called micro-grids that generate power for their needs.

Such off-grid solutions have been successfully deployed in Ghana and Germany, making rural areas self-sufficient in power through the use of clean energy and have captured the imagination of the government and industry alike.

Renewable energy, particularly innovative solutions to India's energy problems, have the strong backing of Prime Minister Narendra Modi and was high on the agenda during his recent US visit.

"To expand the availability of clean energy resources to more people, President Obama and Prime Minister Modi endorsed the proposal to launch Promoting Energy Access through Clean Energy (PEACE), a PACE initiative, to rapidly deploy innovative renewable energy solutions to those who currently lack access to energy," the foreign ministry said in a release last week. PACE or Partnering to Accelerate Entrepreneurship is a US programme.

Out of 6 lakh villages in India, about 26,000, mostly in Odisha, Rajasthan, Bihar, UP and Jharkhand, have no electricity at all. Thousands of other villages have a connection that barely works or lights up the lamps for just an hour or two a day.

Tata Power is working on a pilot project in Purnia in Bihar in collaboration with the MIT to install a micro grid with a capacity of 1 MW to power 200 households in the region.

"The project should be completed by December this year or January 2015 and the billing would be on a flat monthly rate—₹100-200—instead of metering," said Praveer Sinha, Tata Power Delhi Distribu-

Let There Be Light

How micro grids work

Customers can pay a small, fixed monthly charge for few bulbs and fans

They can use single or combination of energy sources like solar, wind, biomass

Storage of energy is central

How it works in other countries

Ghana
A solar-charged lithium-ion battery feeds households via underground cables

Feldheim: German town 40 miles south of Berlin

No flat monthly fee as customer use prepaid cell phone vouchers to buy power

First German city with its own independent micro grid

Power generated from a combination of wind turbines and biomass plant

Micro Grid Economics

Building it is often cheaper than extending a big grid to remote areas	It is cheaper than energy generated by burning liquid fuels like diesel	Not feasible on big scale without govt funding/subsidies
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tion's CEO and managing director.

Off-grid solutions could refer to standalone appliances used in lighting, cooking and agriculture as well as those that power village-specific micro grids using one or a combination of renewable energy sources.

For a country that ranks lower than even much smaller African economies such as Libya, Gabon and Trinidad and Tobago in per-capita electricity consumption, according to the World Bank, off-grid solutions can cater to millions of homes without getting bogged down by the complications and inefficiencies of grid-connected electricity.

"Ghana and Germany have now what are called 'power independent' villages, which have their own solar-powered micro grids and surplus storage systems. There's a possibility to cover at least 25,000-30,000 villages in India in a similar manner," said Manoj Kumar Upadhyay, founder chairman and managing director of ACME Group, which is engaged in solar energy solutions.

Coal, power and oil minister Piyush Goyal told ET recently about his plan to expand "off-grid solutions".

"On the second day of taking charge, I decided let's do off-grid solutions, particularly for far-flung areas," he said. "I do realise that it

is going to be impossible to get grids reaching out all the way there. We'll have to look at some off-grid solutions, some local solutions," Goyal said.

Five R&D centres are being set up on power storage, a critical component in implementing off-grid solutions. Along with the Indian Institute of Technology-Jodhpur under the leadership of Anil Kakodkar, NTPC is conducting a project to set up solar-thermal combination plants, Goyal added. A halving of the cost of production and storage of solar energy over the last few years is also a reason for the increased focus on off-grid solutions, said experts, who peg this market at billions of dollars.

"It has been estimated that in India currently there are about 400 million people (about 80 million households) who do not have access to clean commercial energy," said Anish De, partner, infrastructure and government services, at KPMG. "According to the World Resources Institute, decentralised renewable energy enterprises (DRE) offer an annual market opportunity of \$2.04 billion while the solar home lighting (SHS) market is estimated to be \$27.4 million a year."

De also said the capital invest-

ment required for these solutions would be relatively lower than that for regular power projects and that a number of firms are focusing on the area. The size of the opportunity is also drawing the interest of renewable energy companies such as Suzlon Energy, which are not yet active in the off-grid space.

"Off-grid solution is one of the most promising methods of filling the demand-supply gap with distributed generation to supplement grid supply," said Chintan Shah, president, strategic business development at Suzlon. "Indeed, it also enhances the access to electricity in rural areas. At Suzlon, by leveraging our edge from our robust and reliable technology, we constantly endeavour to bring down cost of energy and provide access to clean and affordable energy to all."

The opportunity is not without its share of hurdles. The industry has highlighted various issues starting from collection of money from villages to state participation in making off-grid solutions a success. Consultancy firm Auctus Advisors also pointed out the inability of off-grid solutions to provide continuous electricity.

"Cost of technology, equipment and manufacturing of off-grid solutions needs to come down as these solutions will be primarily meant for below-poverty-line families, who may not be able to foot that cost," said Saurabh Singhal, associate director at Auctus.

According to DuPont Photovoltaic Solutions, challenges also include initial investment for systems, poor support from banks, lack of understanding of solar integration, gaps in training and organisation to help solar power reach remote villages, absence of a consumer market, and the lack of net metering.

"Cutting costs by cutting corners on the quality of materials in solar panels can have potentially damaging consequences for the industry at a critical point in its growth," said Rajaram Pai, business leader at DuPont Photovoltaic Solutions. According to official data, India produces a little more than 1,020 MW of off-grid power as of now, of which half comes from biomass.