

Microgrid operation eritrea

Getting access to a reliable electricity supply for the first time can be a transformative development in a community. It allows people to store food, run power tools or sewing machines or a computer. It can be a step change on the long road out of poverty, and it's why universal energy access is so important; not just a solar light and a charger, but a decent electricity supply.

In the past, that required a grid connection, and those are expensive. In large developing countries, it would be almost impossible to run the grid all the way out to each last rural town or farmstead, and connection rates are much lower in the countryside.

Renewable energy has changed the economics of electricity connections. It's now possible to install solar, hydro or wind power and connect it to a local grid. Add storage, and you have a reliable 24 hour supply of clean energy. There's been a buzz about the potential of them for a while, but costs have now fallen enough that we are beginning to see micro-grids installed in greater numbers.

Developers and technology companies worldwide continue to focus on electrifying energy-poor areas of Africa. Recent example: 40,000 residents and businesses in the northeast African country of Eritrea now have reliable electricity thanks to two new minigrids.

Developed by UK-based Solarcentury, the minigrids (Africa's term for microgrids) combine solar PV, lithium-ion batteries and diesel generators. The projects -- a 1.25-MW minigrid in Areza and the 1-MW minigrid in Maidma -- replace small diesel generators, which were comparatively costly and polluting, unreliable and limited in hours of operation.

Solarcentury's involvement with the Eritrean rural minigrids projects began when it responded to an invitation for proposals issued by EuropeAid in 2016, said Davies. Solarcentury won the fixed-priced contract as the lowest-priced, qualifying bidder.

The project was finished on budget and cost less than extending the utility grid to the two towns, Davies said. Residents and businesses will pay for the minigrid power they consume. Smart meters have been installed to monitor and keep track of their consumption.

"As a model for rural electrification, this presents an alternative technical solution which takes advantage of low-cost solar and energy storage and will provide abundant power 24 hours a day, seven days a week," he said.

Canadian Solar supplied the solar PV modules for the minigrids and SMA the PV inverters. Tesla supplied and supported installation of the energy storage and associated power electronics, and Caterpillar the diesel



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gen-sets.

"We are technology-agnostic and will choose the best technology for the project. Using second-rate materials in a harsh environment where the cost of replacements and repairs will be high is a common mistake, and we sought to avoid this to ensure reliable operation. The client had also specified that it wanted Tier 1 suppliers -- which is in line with our supply strategy-- so we selected suppliers who had the ability to support the project as well as providing the right materials at a competitive price," Davies said in an interview.

"Environmentally, the system is expected to deliver power which is 70-80 percent solar -- the balance coming from the new back-up generators," he said. "When the generators run they will be optimally loaded by using the batteries so that fuel use will be minimized. This is an improvement of the previous solution which was 100 percent diesel-powered. Obviously the performance and impact of the system can only be determined after some time -- as people adapt to having a continually available power supply."

Local economic opportunities should increase by a significant margin as a result of the minigrids coming online, according to Davies. "There are also many wider social benefits, including lighting for study, power for the health clinic and enhanced opportunities for small businesses," he said.

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