

Commercial microgrids nairobi

Plugging into electricity for the first time is a big deal. Ask Peter Okoth. Until late last year, he struggled to make a go of his bar on the main street in Entasopia, a small, dusty town in Kenya's Rift Valley, five hours from the capital Nairobi and 30 miles from the nearest grid power line. Then, he hooked up to a new solar-powered microgrid that serves local homes and businesses.

Now Okoth has eleven light bulbs, he says proudly -- and enough power to run a TV and a sound system for his customers. Seventy people show up some evenings to watch, listen and buy his food and drink. His profits will soon buy a refrigerator to keep the beer cold in the searing desert heat, and a big screen to show satellite sports channels.

But now, larger central village PV units linked by underground cable to dozens of houses and business are starting to transform lives. For a ten-dollar installation fee, the people of Entasopia can connect to a village microgrid and buy a share of a thousand times as much power. Village homes are filling with household appliances like refrigerators and washing machines, and the businesses on the main street are powering everything from welding equipment and fuel pumps to hair driers.

Microgrids are small electricity generation and distribution systems that operate independently of larger grids. Typically they rely on local sources of renewable energy, such as river flows, wind, biomass, or, most widely, the power of the sun. There are no official statistics on how many there are, or what their total power output is. But a recent study by U.S.-based Navigant Research, which studies new energy technologies, suggested that their combined generating capacity might now exceed 750 megawatts worldwide.

Entasopia is as remote as it gets. It is close to the border with Tanzania, at the end of a bumpy laterite road that winds its way from Magadi, a town some 30 miles to the east. Its single street comprises houses fronted by tin-roofed buildings with businesses ranging from butchers and general stores to bars and mobile phone shops.

It is where Maasai livestock herders in their bright traditional dress come to buy and sell, topping up their mobile phones before disappearing back into the bush. And it is where people from other Kenyan tribes such as the Luo, Kikuyu and Kamba have congregated since an irrigation project fed by rivers from nearby hills started watering fields of fruit and vegetables for sale to Kenyan cities.

Joseph Nyagilo, field manager for microgrid pioneer SteamaCo, picked out Entasopia for a microgrid in 2014 because of the town's strong business activity, which he believed could benefit from the extra power that a such a system can provide. He is proud of the transformation.

At the village filling station, Nancy Kaisa uses solar power to pump fuel. "I had a diesel generator before, but this is much cheaper and easier," she explains. John Owino, a repairman squatting in the sun outside his

workshop, says he can now carry out welding repairs that once had to be sent to distant towns. And Okoth, the entrepreneurial bar boss, said lights meant he can now get up and start work at 4 a.m. Only the owner of the kiosk selling rooftop PV panels seemed gloomy. He was getting on his motorbike to find sales in a neighboring village that did not have a microgrid.

"Light from roof systems can improve quality of life, but only microgrids can lift people out of poverty," says Emily Moder, SteamaCo's software manager. "They are the next step up. And by allowing people to build businesses and another source of income, they improve the resilience of rural communities against drought or climate change."

But SteamaCo is going further. In the past three years, it has been pioneering the use of smart meters in microgrids, and it now has 25 village grids across Kenya, supplying up to 10,000 people and businesses. The idea is to link the supply hardware to pre-payment services that use the country's popular mobile phone-based banking system, M-Pesa.

Cloud-based software keeps track of supplies and payments, alerting customers by text messaging when their credit runs low. There are no contracts, no bills, and no revenue collection problems. Customers can top up their credit, in amounts as small as a few cents. But once the credit expires, the lights go out.

Entasopia's PV hub, renting space in the yard of the village chief, cost \$75,000 to install. It has 24 panels with a maximum generating capacity of 5.6 kilowatts. A control box below houses the smart meter that measures and controls power to each of the 64 customers in town and also communicates remotely with payments software, cutting off power when credit is exhausted.

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