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Africa's first grid-connected biogas plant powers up

By [Geoffrey Kamadi](#)

NAIVASHA, Kenya, Jan 10 (Thomson Reuters Foundation) - A commercial farm in Kenya has become Africa's first electricity producer powered by biogas to sell surplus electricity to the national grid, cutting the carbon emissions associated with oil-powered generation.

The Gorge Farm Energy Park in Naivasha produces 2 megawatts (MW) of electricity - more than enough to cultivate its 706 hectares (1,740 acres) of vegetables and flowers, and with sufficient surplus to meet the power needs of 5,000-6,000 rural homes.

The new plant generates not only electricity, but also heat for the farm's greenhouses, with fertiliser as a by-product.

Gorge Farm, approximately 76km (50 miles) northwest of Kenya's capital, Nairobi, is owned by the Vegpro Group, a leading East African exporter of fresh vegetables and its second largest exporter of roses.

Biojoule Kenya, the independent power producer that operates the Gorge Farm plant, signed an agreement to sell electricity to Kenya Power & Lighting Company (KPLC) - the country's sole power distributor - in 2016.

Biojoule Kenya sells the power to Gorge Farm and to KPLC for \$0.10 per kilowatt hour (kWh). Diesel-generated power, by contrast, costs \$0.38 per kWh to produce.

"The Gorge Farm plant is physical proof that locally produced feedstock can be used to generate clean and cost-effective power for all Kenyans," said Mike Nolan, chief operating officer at Tropical Power, a developer of biogas and solar plants in Africa.

It supplied engines for the plant in conjunction with Clarke Energy, a UK-based engine service provider.

SLASHING DIESEL USE

The plant produces biogas through anaerobic digestion, a process in which crop residue from the farm is digested by micro-organisms. The biogas produced is burned in two engines, producing both electricity and heat in a process called cogeneration.

Producing the same amount of energy using diesel would require 5 million litres of fuel annually, Nolan explained, plus the extra fuel required to transport the diesel inland from the port of Mombasa.

Tropical Power says the biogas plant contributes to a 7,000-tonne reduction in carbon dioxide emissions per year, since the farm does not have to use electricity from the grid produced by oil-fired power stations.

Cogeneration currently makes up a tiny fraction of renewable power sources in Kenya, at 0.7 percent in 2015, according to the Kenya Electricity Generating Company (Kengen), the country's biggest power company.

Geothermal was the biggest contributor to the electricity generation mix, with 49 percent, followed by hydropower at 44 percent. But some experts see room for considerable biogas expansion.

"The potential for biogas generated electricity in Kenya is significant," said Helen Osiolo, a policy analyst at the Kenya Institute of Public Policy Research and Analysis. She believes biogas could generate between 29 and 131 MW of power, but says the biggest challenge is that the government will not pay enough for it.

"There are concerns that the tariff is too low to attract substantive investor interest," Osiolo said. In addition, agricultural and municipal waste is in demand for other uses such as fertiliser, which may limit the expansion of biogas generation.

Even though anaerobic digestion of waste to produce biogas is an established technology in Europe and Asia, the concept is still new in Africa at large scale. The technology had been deployed in 45 sites globally before debuting at the Gorge Farm plant.

SOURCE OF FERTILISER

Osiolo says a further barrier to the expansion of the use of biogas is the perception that it requires a substantial amount of raw material in order to produce any meaningful energy output.

However, according to Tropical Power, if organic material or crops from 1 percent of Kenya's landmass were deployed in anaerobic plants connected to the grid, it would produce the equivalent of the country's entire current effective installed electrical capacity of around 1,800 MW.

There are further benefits, according to Tropical Power's Nolan. The 50,000 tonnes of Gorge Farm's residue that can be used annually for biogas can produce 35,000 tonnes of a natural fertiliser by-product.

That can be used to improve the crop yield of local farms, displacing synthetic fertiliser, he said.

Nolan said that Tropical Power's experience with the grid operator has been straightforward.

"Our site is located very close to the grid interconnection point and so engineering challenges were minimised," he said.

(Reporting by Geoffrey Kamadi; editing by James Baer and Laurie Goering ;; Please credit the Thomson Reuters Foundation, the charitable arm of Thomson Reuters, that covers humanitarian news, climate change, women's rights, trafficking and property rights. Visit news.trust.org/climate)