From dung to BMWs at green energy plant in South Africa

November 24 2015, by Pierre Donadieu

Cattle ready to produce dung at the Bio2Watt power plant, where cow manure is used to produce electricity

Forty minutes east of South Africa's capital Pretoria, amid the lowing of thousands of cows and the strong stink of dung, a small factory has taken on the challenge of turning manure into energy.

"Every day, 120 tonnes of manure and 66 tonnes of recycled paper are

mixed in one of these tanks," Bio2Watt project manager Steven Roux said in the shadow of a looming 9,000 cubic metre vat.

Also in the tank alongside the bacteria-rich dung is a steaming mix of old yoghurt, fruit juice and abattoir waste, which bubbles away at 52 degrees Celsius for 22 days.

"It's basically a huge living organism," explained project creator Sean Thomas. "While the bacteria is breaking down the waste, it's producing methane gas, which is our primary fuel for our combustion engine—similar to that of a car."

The engine, in turn, is connected to an alternator.

The result: 4.4 megawatts (MW) of electricity, enough to power a village of about 1,500 people, said Thomas.

A Briton now settled in South Africa, it took Thomas eight years to go from bright idea to power production, which the factory achieved in mid-October.

On the farm next door, 40,000 cattle roamed about, chewing the cud that would become Thomas' brown gold.

The dung contributes only about a quarter of Bio2Watt's output.
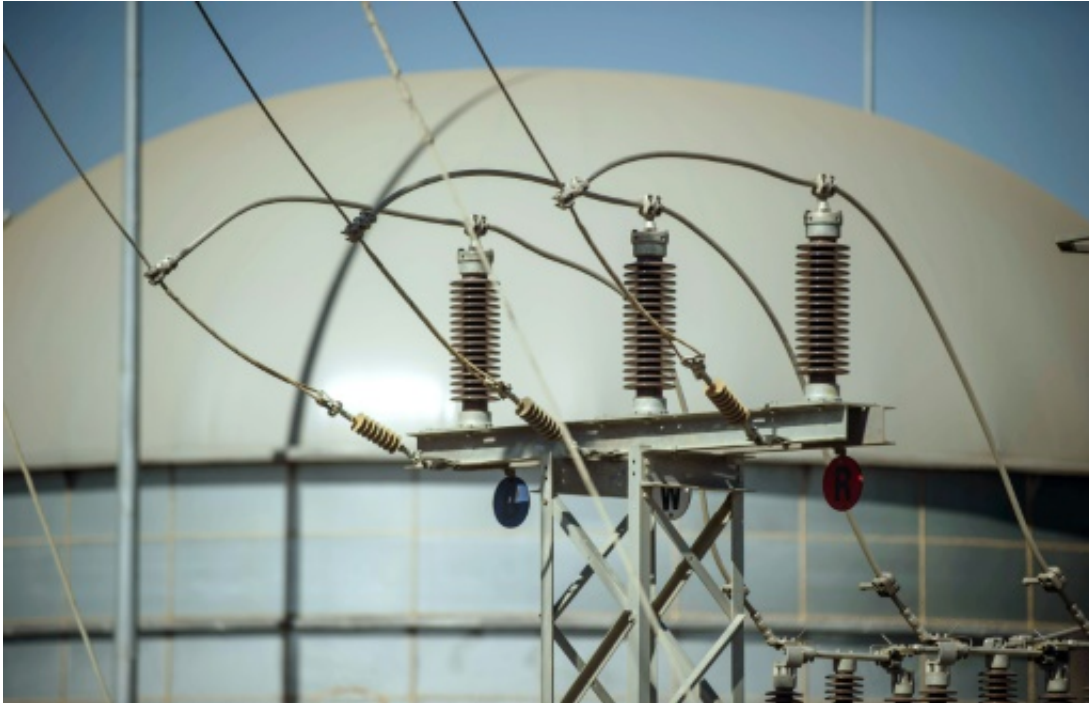
This Bio2Watt gas power plant feeds electricity into the Eskom grid

But in volume, it makes up 60 percent of the potent sludge ripening in the hot tanks, containing the vital bacteria needed to break the waste down into methane gas—the first project of its kind in South Africa.

"There are other projects like this coming up now, but I think we created a precedent," said Thomas.

Bio2Watt's 4.4 MW is a mere blip compared to the 40,000 MW of the national power provider Eskom—but it does offer a decentralised solution in a country where 85 percent of electricity comes from ageing and failing centralised coal-fired power stations.

BMW plant among clients

South Africa suffered frequent blackouts earlier this year as Eskom struggled to meet demand in the cold winter months.

And while the cow farmer next door didn't have enough power to expand his operation, he's now able to tap into Bio2Watt's supply.

But the company's primary client is a plant belonging to German car manufacturer BMW in Pretoria.

A tractor pulls a load of dung at a Bio2Watt gas power plant, where cow manure is used to produce energy

"At present, (the plant) consumes around 12 megawatts per hour and about 30 percent of that (3-4 megawatts) per hour is generated by Bio2Watt—that is 30 percent of green electricity," said Edward

Makwana, director of communications for BMW South Africa.

Along with a 97-million-rand ($6.79 million) injection from the French Development Agency, the project also received a helping hand from a law enacted last year banning organic waste from dump sites.

But Bio2Watt's electricity comes at a higher price than Eskom's.

While Thomas wouldn't name an exact price, he insisted that in about three years it would be competitive with the national provider, which has made repeated applications in recent years to raise tariffs.

Cattle graze near the Bio2Watt power plant

Even the leftover sludge is put to good use.

"Once the waste has gone through the process, the liquid is used to irrigate the surrounding farming land and the solid is sold back to the farmers as a high quality fertiliser," said Thomas.

"It's a win-win situation."

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