

# Hog waste producing electricity and carbon offsets

September 8 2011

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One of the operators walks through the system that converts hog waste into electricity and creates carbon offset credits. Courtesy of Google Green Blog.

A pilot waste-to-energy system constructed by Duke University and Duke Energy this week garnered the endorsement of Google Inc., which invests in high-quality carbon offsets from across the nation to fulfill its own carbon neutrality goals. The system, on a hog finishing facility 25 miles west of Winston-Salem, converts hog waste into electricity and creates carbon offset credits.

By capturing greenhouse gases from hog waste and burning them to run a turbine, the system produces enough electricity to power 35 homes for a year. It is expected to be able to prevent the release of greenhouse

gases equivalent to nearly 5,000 metric tons of CO<sub>2</sub> per year, which is like taking 900 cars off the road.

The \$1.2 million [prototype system](#) was built at Loyd Ray Farms, a 9,000-head hog finishing operation northwest of Yadkinville, N.C. It is intended to serve as a model for other hog farms seeking to manage waste, reduce [greenhouse gas emissions](#), and develop on-farm renewable power. Though this is an established farm, the system meets North Carolina's environmental standards for new and expanded hog farms.

It was built mostly with off-the-shelf technology and is an "open source" design that others may freely adopt. The system includes a lined and covered anaerobic digester and a lined aeration basin. Methane gas is collected under a thick plastic dome over the digester. Gas which isn't burned in the turbine is burned in a flare to prevent its release.

Open waste lagoons currently in use on most North Carolina hog finishing farms are prolific producers of [methane gas](#), which is 21 times more potent than carbon dioxide, pound-for-pound, as a greenhouse gas.

"It is exciting to see the system up and running, and even more exciting that it's getting recognized by Google," said Tatjana Vujic, (TOT-ee-ana VOICH) director of the university's Duke [Carbon Offsets](#) Initiative.

"Completing this full-scale system and getting it operational is a great testament to its design and the foresight of all of its various supporters."

Duke University and Duke Energy have been developing the pilot project for nearly three years, with additional grant funding from the U.S. Department of Agriculture and the North Carolina Department of Environment and Natural Resources Lagoon Conversion Program. Duke Energy and the university will share operational and maintenance costs for the first 10 years of operation. Google will assume a share of the university's portion of the costs in return for a portion of the carbon

offsets for a 5-year term.

The project is expected to yield many benefits beyond renewable energy production and greenhouse gas reductions, including improved water and air quality; reduced odors, pathogens and nutrients; and increased farm productivity.

"It is rewarding to see three years of hard work come into operation and exciting to have Google as a new partner in this project," said Owen Smith, managing director of Duke Energy's regulated renewables business. "As North Carolina continues to explore new ways to generate renewable energy from hog waste, this site serves as a showcase for what others can do to capture the energy from hog waste and turn it into usable electricity for customers."

Capturing the methane creates carbon offset credits for Duke University and Google and using it to generate electricity creates renewable energy credits for Duke Energy. Loyd Ray Farms will use surplus electricity on-site.

Duke University engineering professor Marc Deshusses and his students are also studying the system's performance. "Now that the system is on the ground, we have an opportunity to evaluate and quantify all of its benefits, and to work on making it more efficient and economical to build and operate," Deshusses said. "Innovative systems that can reduce [greenhouse gases](#) plus take waste and turn it into energy are the kinds of things Duke University is anxious to evaluate and promote."

The utility and the university share the Duke name for a reason: Both were founded through the foresight and investment of James Buchanan Duke in the early 20th century. Duke University's carbon offsets initiative was created with support from The Duke Endowment, a non-profit foundation based in Charlotte, N.C.

Provided by Duke University

Citation: Hog waste producing electricity and carbon offsets (2011, September 8) retrieved 24 April 2024 from <https://phys.org/news/2011-09-hog-electricity-carbon-offsets.html>

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