

Dung Deal

Power plants choose that most renewable of fuels.

POWER FROM PIG POOP. SOUNDS LIKE A SKIT from *Saturday Night*, but it's not. In July, a bona fide dung-fired power plant came online in that most proper of nations, Great Britain. And according to the firm behind the project, Farmatic UK, the plant could be the first of many in Britain.

Dung-fired power plants are also popular in Germany and Denmark, which each has about 20 large-scale plants operating.

The plants all run on methane gas generated from a fermented slurry of animal waste. Technically, the process is called anaerobic digestion. Large hog, dairy, and chicken operations typically are the source of the waste.

In addition to power, the British plant also produces hot water for the town of Holsworthy, north of Devon, as well

as organic manure suitable for agricultural use. Talk about cradle-to-grave waste management.

Dung-fired plants are not foreign to the United States, but they are fairly low-profile. A dung-fired plant was feeding power to the grid in Hawaii as early as 1984, according to James McElvaney, managing partner at Los Angeles-based Bioconverter LLC.

He has 20 years of experi-

ence in renewable energy technologies, and helped operate the Hawaii plant. In California, plants utilizing manure digestion technology have been feeding power onto the grid for at least 10 years. Those plants are what McElvaney calls "small, 8,000-hog systems that are in the middle of the Sacramento valley and the San Joaquin valley." The thought of even a day's worth of waste from an 8,000-hog farm is a bit staggering.

The Environmental Protection Agency does regulate agricultural waste, due to the nitrates that would otherwise leach into groundwater. To comply with EPA regulations, many large agri-businesses build lined lagoons. Large swine operations typically use large, uncapped lagoons—indeed, there's a 45-acre uncapped lagoon in Iowa, for disposing of waste from 30,000 swine. Aside from the stench, the problem with a lined lagoon that is not capped, McElvaney points out, is that "methane and CO₂ just blows right off into the atmosphere." By capping a lagoon—placing a membrane over it—enterprising farmers or plant operators can capture the methane and use it for fueling a power plant.

And therein lies the beauty of dung-fired power plants. By containing the waste from large agricultural operations, they actually improve the environment—and have almost no emissions resulting from the generation of power. In addition, the by-product of the power-producing process is a fertilizer.

How much power can be gotten from an anaerobic digestion process? The amount of power that can be squeezed from dung varies, of course, depending on the amount of feedstock. McElvaney says that the system in Hawaii, "where we were dealing with 2,000 dairy cows, and chicken manure, produced 500 kW."

The biggest limitation on manure systems, according to McElvaney, is the transportation of the material to a centralized system. He sees their use primarily in spot locations, most likely as part of distributed systems.

Can one actually make money from this type of power plant? McElvaney says yes. The economics of the process are actually enhanced by the fact that most of the time, farmers or other disposers pay a processing fee to get rid of their waste. So, McElvaney says, "If I take 2.5 tons of green waste, and I can make a megawatt-hour with that, and I get, say, \$75 for that 2.5 tons, and that megawatt-hour I can sell for \$50, then I've just made \$125 per megawatt-hour." He says that the cost structure for a dung-fired plant, including debt service, is around 50 percent of the gross profit.

Wanna buy a pig? **E**

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