

Digester Technology May Save Money On Electricity, Heating

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a year in energy costs. He said it's a better than 30 percent return on investment, and would install a digester even if he had only 15 cows.

Subsidies aren't needed

Waybright, who spoke as part of a digester owner panel, told the more than 150 farmers, ag industry representatives, and government officials present that the technology has been available for years, and that huge subsidies aren't needed for manure digesters to be installed on farms today.

Waybright said that, in this region, because of the cold winters, about 70 percent of the methane gas generated from a manure digester has to be used to heat the manure to a temperature of 105 degrees in order for the methane gas to continue to be generated.

While only 30 percent of the gas remains, the amount is still sufficient to drive a generator, from which not only energy to defray the cost of electricity, but heat can directly be used.

Benefit tremendously

Swine and chicken house operations could benefit tremendously from such a device, according to James Kauffman, a poultry producer from White Horse. A well-maintained digester could save immediately on energy bills alone, because farmers would pay that much less in energy bills.

Kauffman told those at the conference that the biggest expense outside of the farm mortgage is electricity and fuel utilization. But producers already have the free resources to generate that power.

"I don't think that we find that the energy companies over here are really pushing the idea that we should use energy on our farm that's free and available to us," he said. "They generally like to sell us electricity and sell us fuel."

Odor concerns

But what drove the swine operation of Harlan Keener, who operates a 600-sow farrow-to-finish farm just three "air" miles south of Lancaster, was mostly concern with odor. There, Keener installed a 35,000-gallon digester which, when completed, cost about \$225,000, and needed an additional \$100,000 in modifications. But he said he generates millions of BTUs per day out of the hog waste.

Keener's operation generates enough electricity that not only can he use it to power and heat his own farm, but he sells energy back to the utility. While it costs him 6 cents a kilowatt hour to purchase the electricity from the utility, the utility buys it from him at 2.38 cents a kilowatt hour.

He said that if a farmer is serious enough about how he invests his money, he will make the digester work. For Keener, it has paid in terms of keeping good relations with the neighbors and kept his business free from odor lawsuits.

Works well

George Hurst, owner of Oregon Dairy Farm, Lititz, said he installed an underground digester on his farm in 1983. He said he can generate about 30-50 kilowatts/hour on his 300-cow operation. He spent \$120,000 on the digester, and noted it works well on his farm.

Stan Weeks, Agway Farm Research Center, installed a digester on the 250-cow research farm in Syracuse in 1981. The digesters are installed in vertical tanks, all poured concrete. The research center has helped install more digesters on research farms in other states since 1983, including the University of Maine and University of New Hampshire, all with great success. There is a proposal to install one in the USDA Beltsville office to study odor control.

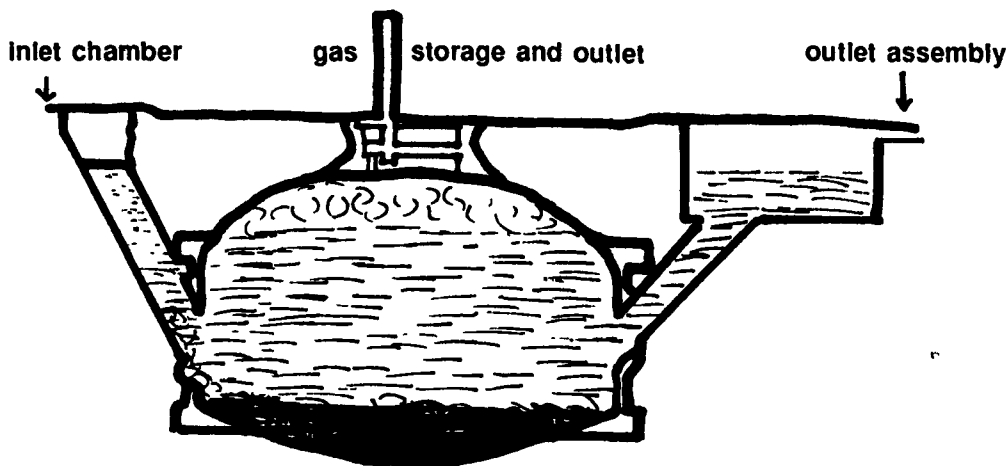


Government agencies were on hand to offer their views of funding digester technology. From left, Yuan Halying, ag attache from China; Larry Lentz, Center for Rural Pennsylvania; Michael Voorhies, U.S. Dept. of Energy; Phillip Lusk, U.S. Dept. of Energy; Tim Murphy, USDA SCS; and Johan Berger, DER. Standing is Leon Ressler, Lancaster environmental ag agent.



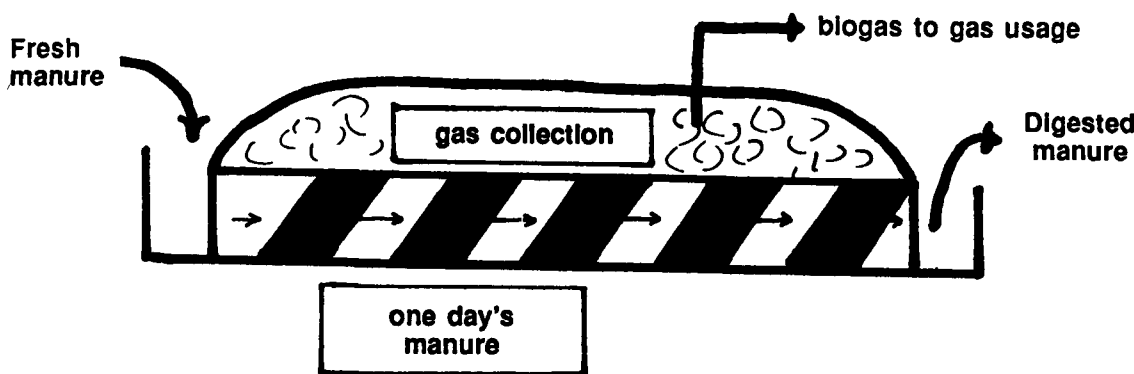
A group of farmers with more than half a century of experience with digesters was assembled at a panel during the On-Farm Biogas Production Conference in New Holland on Wednesday. From left, Harlan Keener, Rocky Knoll Farm; Stan Weeks, Agway Farm Research Center; George Hurst, Oregon Dairy Farm; and Richard Waybright, Mason-Dixon Farms.

Small Scale Digester



Chinese Digester

PLUG FLOW DIGESTER



Large-Scale North American Digester

This illustration shows how a simple underground digester, top, is used in China. Manure is fed into the inlet chamber into the bin, where methane gas is generated and collected at the top. The outlet area to the right is where the effluent is removed. At the bottom, an above-ground digester collects the methane in a bubble, where it is drawn out and used. The technology is similar in both cases.

Environmental concerns

While research at various universities has been pointing out the benefits of using the inexpensive resources of manure digestion since the 1970s, and research was compiled extensively in the early 1980s, studies of manure digesters have fallen off because of environmental concerns, not energy.

But the panelists pointed out that environmental concerns are driving new impetus into ways to handle manure, with the concern over Pennsylvania's new nutrient management law, and because of expanding urban zones near farms.

Those concerns are heating up the debate over the usefulness of digester technology. And as the nutrient management legislation will create more need for manure holding areas, those areas will be prime areas for methane generation.

With that comes the odor problem, especially for covered tanks. Could digesters be built easily and inexpensively, and would energy cost benefits accrue if more farmers grasped the technology?

AgSTAR Program

Other agencies, particularly the Environmental Protection Agency, the Department of Energy, and USDA have expressed interest in methane digester research, according to Tim Murphy of the Soil Conservation Service (SCS). In October this year, a memo was signed by all the agencies under

the umbrella AgSTAR program to promote and encourage ways to obtain energy from a system such as a manure digester for pollution prevention. They have proposed a study which involves adding another staff person for SCS to study biogas for three years to help draw up plans for digesters which farmers could utilize.

Money to more fully understand biogas and manure digestion may be available if the Clinton Administration's environmental directives package passes. Part of the plan involves Action 38, according to Michael Voorhies, U.S. Department of Energy, who spoke on an "agencies views on biogas" panel. That action would dedicate \$19 million, or about \$3 million a year until the next decade, to bring the technology of biogas energy to the forefront.

Right now, no agencies want to commit money to help farmers build a digester. But money and resources, under AgSTAR, will go to developing computer software to help farmers make use of the technology.

Johan Berger, Department of Environmental Resources (DER), said the department, which administers the Chesapeake Bay Program, will provide some advancement in financial assistance from an educational standpoint.

'Harass Foundation' Dr. Richard Fite, USDA veterinary medical officer, said the key

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