

## Profits From Manure Power?

### *The Economics of Anaerobic Digesters On-Farm*

Anaerobic digestion to treat manure and produce electric energy is emerging as a feasible option for animal agriculture. The technology has many benefits, such as reducing odor and Total Oxygen Demand (a measure of potential impact to water), while at the same time producing thermal energy, and electricity from the methane generated in the digestion process. Experiences of the over 40 operating digesters across the United States vary widely.

#### **Don't build just to produce power – build a manure system that makes sense**

Depending on the existing manure management system, it is not always possible to “slap on” a digester. For this reason, often the best time to consider a digester is when building new or upgrading an existing operation. Digesters can produce electricity and heat, but depending on the local price paid for electricity, and production credits available, it may not make sense to build primarily to produce power (average cost to produce electricity from digesters is around 6 cents/kWh or higher). In considering economic payback, farmers should also include the value of non-monetary benefits, like reduced odors and pathogens.

#### **Economies of scale**

Many thousands of simple, small-scale digesters operate successfully in China and India and produce biogas for heating, cooking and lighting needs. However, for digesters with electricity-generating potential, several experts have suggested a rough threshold size of 300 cows or 2000 swine, due to economies of scale in construction and operation. Improved technologies may reduce this threshold size.

#### **Farm energy use and price of electricity is important**

A farmer will need to set up a contract with the electric utility to buy excess electricity from the digester. Two options are most common:

1. *Utility buys all electricity from the farmer at a negotiated wholesale price, then sells the farmer back electricity needed for farm operations at the normal retail price.* This is the least favorable contract, as the wholesale price the utility offers is typically less than half of the retail price – so although the farmer may be producing twice as much electricity as needed for farm use, he/she may still end up owing the utility money at the end of the billing period.
2. *Utility buys only the excess power at wholesale price, and allows farmer to offset the electricity used on farm.* This arrangement is called “net metering”. The farmer essentially receives retail price for the electricity used on farm, since that's what they would have to pay without the digester. However, if the farmer already pays a low price for electricity (for example, if they have a special “standby” rate from the utility), the economics will be less favorable.

⇒ Economics improve if the farmer has a use for the excess heat from the engine/generator, which can be considerable. Technology is being developed that can use the excess heat to chill milk, one of the largest energy uses on a dairy farm.

#### **Financing**

- Capital costs are quite high - typically about \$400/cow or higher for dairy systems. A farmer must be in situation where he/she can take on the debt required to install a digester
- Government programs can offer considerable help in financing a digester. Other grant and loan programs may be available to farmers. For example, the state of Minnesota offers a 1.5 cents/kilowatt hour production incentive for digesters, as well as a low/zero interest loan program.

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