

## Renewable Energy

### Situation Overview:

A. *Please describe what technology was selected and why.* A three species methane digester that is capable of producing up to 200 kW was selected. It's a complete mix digester, sized for expansion, in the future. RCM International was selected to construct the digester. The digester utilizes waste manure and water from our dairy farm, our brother's dairy farm, our uncle's swine facility and our brother's layer house. Andrea's parent's dairy operation has a digester, so we were familiar with the technology and decided to pursue it.

B. *What were the expected results and actual results, in terms of the following?*

- **Environmental benefits:** Phosphorus stays in the solids; nitrogen stays in the liquid after manure is separated, so there is no overload of phosphorus in the soil when it's spread. There also is reduced odor because the gas is powering the generator. There are fewer emissions and a smaller carbon footprint for the farm.
- **Farm benefits:** The digester improves cash flow opportunities and opens the door to other options to increase farm income. We have collected tipping fees from various food waste vendors that in turn, help us keep the digester at maximum capacity. The payback is short, thanks to the grant funding programs.
- **Funding successes, failures and challenges:** To secure grant funding, there was extensive paperwork. Although RCM performed the actual grant writing, we had to supply many details and documents. As an example, we documented 833 emails related to the grant and digester, in 18 months. The RCM staff person previously secured grants in Pennsylvania for this type of project; she was knowledgeable and her responsiveness was appreciated. It takes a special person to sit with farmers and submit grants!
- **Permitting/regulatory success, failures and challenges:** It took three years to complete all the permits for this project. In our opinion, that's too long. There is a growing interest in renewable energy on dairy farms, and finding ways to reduce the red tape and expedite these technology projects is important to explore. One of the permits we needed, as detailed in our Permitting Chapter, was a Bog Turtle Permit. We had an environmental staff person come to the farm and search for bog turtles. Thankfully, there were no bog turtles and the project continued.

### Challenges and Opportunities:

C. *What obstacles did the farm overcome while planning for the renewable energy project?* As detailed above, there was a lot of attention to our project (both good and bad) because it was so unique. We were working with a company from across the country (RCM), so there also were time challenges and planning delays. To complete the grants, we had to submit personal information to strangers and trust they would handle it in a confidential manner.

## Renewable Energy...continued

### Actions

- D. *Timetable for the project?* Start Date: August 2010  
Complete Date: October 15, 2012
- E. *Final costs for the project?* \$1.9 million

### Results

F. *What was the cost benefit/return on investment of the option you pursued?* For our digester project, it was 75% funded through grants, making our return on investment high. Our income, from tipping fees and excess energy, has exceeded our projections during the planning phase. We projected approximately \$8,000 per year in tipping fees; for the first four months of 2014, we already collected \$25,000 in fees. Our excess energy sales were projected at .06 cents/kilowatt and in 2013, we earned 10.8 cents, and 10.4 cents in 2014.

At only 20,000 engine hours, as of April 2014, we have not experienced expected maintenance costs yet. It's expected that we will incur about \$40,000 - \$50,000 in costs to rebuild the digester engine when it hits approximately 60,000 engine hours. We've had low acid and sulfur content, which is helpful to engine longevity.

L. *Is the final project meeting initial expectations? Yes. If not, when do you expect it to be functioning at 100%?* We are exceeding expectations in both electric sales and tipping fees since our October 2012 start-up.

M. *Have you shared the technology and learning experiences with other dairy farmers? Yes. If so, what was their response? Yes.* We hosted an Open House with the Center for Dairy Excellence and the Professional Dairy Managers of Pennsylvania, on November 15, 2012. The reaction was very positive from farmers and industry stakeholders that participated. It was covered in several state farm papers, including *Lancaster Farming* and *Farmshine*.

The people that came to the event were seriously interested in the technology. They were conscious of the Chesapeake Bay and looking at ways they could do a better job on their farms.

