Farm Energy Working Group

Center for Energy & Environmental Education University of Northern Iowa January 2011

Farm energy inputs/outputs studied

Tom and Irene Franzen's farm, a diversified 300-acre operation with certified organic animals north of New Hampton, is the location of a detailed energy analysis to determine cost, energy, and CO2 emissions for the farm. This project is sponsored by a Farm Energy Working Group mini-demonstration grant with Rich Schuler as the energy analyst.

During Phase I of the project completed in January, Schuler collected data that includes:

- Energy Sources: Electricity, diesel & gasohol, propane from 2008 to the present
- Farm Energy Inputs: 5140 pounds soybeans, 870 pounds of corn, livestock (cattle, hogs)
- Farm Energy Outputs (crop yields): 1,810 bushels soybeans; 4,250 bushels corn; 43 head cattle; 852 head hogs

Schuler says the goal for Phase I is to quantify the energy flow of the Franzen farm. "Ideally the farm will have less energy coming in than going out," he explains. "If the ratio is more than one, then the farm is using more energy than its delivering."

In Phase 2 of the project, Schuler and the Franzens will evaluate the use of an on-farm resource for heating the farm house. "Tom has 80 tons dry weight of corn cobs at the end of the year," Schuler says. Could he supplement the house heating by intermittently burning corn cobs? Could the excess heat extracted from cob burning be put back into the ground and tied into the geothermal lines that heat the house?

The Franzen's goal is long-term sustainability to reduce their energy costs, reduce their reliance on fossil fuels, and increase their efficiency. The Franzens received the Sustainable Farmer of the Year Award at the Practical Farms of Iowa annual conference in early January. To meet their goal, they hired an energy auditor through Tri-County REC who spent three hours for $150 to show Franzens how to make their home more energy efficient.They plan to take the steps needed to increase their home's energy efficiency. The Franzens received the Sustainable Farmer of the Year Award at the Practical Farms of Iowa annual conference in early January.

For more information on farm energy efficiency and renewable energy technologies to combat rising energy prices, visit National Center for Appropriate Technology Farm Energy Alternatives at http://attra.ncat.org/attra-pub/farm_energy/

Paddock waterer fed by pond water pumped using PV panels (l).

Renewable energy at Radiance Dairy Farm

Francis Thicke, Radiance Dairy Farm near Fairfield, described his energy efficient dairy farm and its renewable energy systems for 35 attendees at the Farm Energy Working Group meeting. At Radiance Dairy the 80 dairy cows are milked twice daily and moved to a new grazing paddock after each milking. The farm has 60 paddocks (small pastures).

The cows harvest their own feed, spread their own manure, and enjoy their work, Thicke says. He compared this healthier, more energy efficient system where the cows do all the work to 95% of the cows in the country that are raised in confinements. "In the natural environment it takes less energy to manage the animals than it does to grow crops, harvest them, put feed in a silo, haul feed to the animals, collect the manure, and take it back out into the pasture," Thicke explained. He also saves energy by not needing herbicide, fertilizer, or pesticides.

Thicke further reduces his farm energy use needs by using several renewable energy systems. Six 125-watt solar photovoltaic panels near a pond pump water into a 4,000 gallon storage tank. The water is then gravity fed into individual watering tanks in all 60 paddocks through a 1" polypropylene pipe buried eight inches underground. "Even on a cloudy day the storage tank gets full," Thicke says. He received a cost share from USDA EQIP (Environmental Quality Incentives Program: http://www.nrcs.usda.gov/programs/eqip/index.html#prog

Thicke also received a grant from the Iowa Office of Energy Independence for a solar hot water system to provide hot water for the milking operation. In summer 2010 he installed four 4 x 10' panels to heat the cold rural water up to 130 degrees where it is stored in two 120-gallon tanks in the milking barn. And he also received a USDA grant for a 33K wind turbine that will produce 60,000 kW/year, about what the farm uses. Thicke says the company selling the turbine wrote the grant.

Other renewable energy/energy efficiency components of Radiance Dairy include: solar electric fences in the back country; selling milk, cheese, yogurt, cream to local stores within a four mile radius; saving gas/diesel fuel to haul hay by growing it on a nearby pasture; and planning to get electric four-wheelers for use on the farm.

For more information, NCAT offers information on a do-it-yourself solar hot water pump at http://attra.ncat.org/attra-pub/farm_energy/studies/water_pumping.html. A profile of Radiance Dairy is at: www.ceee.uni.edu/farmenergy.aspx

Farmers market vendors' energy use survey

Rich Dana and Steve Fugate through National Center for Appropriate Technology (NCAT) surveyed farmers last summer at five Iowa farmers markets to ask how they spend their energy dollars on the farm and in marketing their goods. It was also an opportunity to provide farmers with information on reducing farm energy using specific ATTRA publications (http://attra.ncat.org/attra-pub/farm_energy/)

Dana reported that the farms surveyed ranged in size from one acre to an average of 31 acres. Farmers travel an average of 26 miles to reach their market and attended an average of three markets per week. However one farmer went to 20 markets/week and drove 220 miles/week to reach markets. The average gas for diesel and fuel was 16.4 mpg. The best mileage was 32 mpg; the worst was 8 mpg.

The report also noted that the farm's biggest energy users were coolers for produce, corn dryers, freezers for meat, and water heaters. Farmers mentioned time and labor as the biggest impediments to reducing energy use on the farm. Farmers did want information on specialty crops, farm butchering, grain trade meters for corn, and solar photovoltaic and hot water systems.

Dana noted that under the USDA Valu-Added Producer Grant program (http://www.rurdev.usda.gov/ia/rbcs_VAPG_Fact_Sheet.pdf) and the Farm Service Agency (FSA) loans are available for produce coolers. For FSA information, scroll down to the second article on Cold Storage Facility loans at http://www.fsa.usda.gov/Internet/FSA_File/aiea_may10.pdf

ISU Extension launches farm energy web site

Iowa State Extension recently launched a new website, ISU Farm Energy (http://farmenergy.exnet.iastate.edu) in conjunction with the 2011 Crop Advantage Series. Dana Petersen, Farm Energy Initiative Program Coordinator, encourages people to check out the new web site including the newest fact sheet "Increase Drying Efficiency with Dryeration" http://www.extension.iastate.edu/news/2011/jan/120601.htm Contact petersen@iowastate.edu with questions.

New 8kW wind turbine offered

A North Liberty company, RENAIS Energy, and Viryd Technologies introduced a high efficiency 8 kW wind turbine to Iowan farmers, businesses, and homeowners in January 2011. Company information states that the 8 kW turbine has been tested to produce 20-25 MW/hrs per year in a number of Iowa wind regimes. A spokesperson says combined federal and state subsidies could pay for 55% of the $50,000 installation including the foundation and 80' lattice tower. That percentage counts on the farmer applying for and receiving a USDA REAP grant. Viryd will help interested buyers apply for the grant. Alliant Energy customers might also apply for the cash-back support that could contribute up to an additional 25% of installed cost subsidy based on an required energy efficiency audit. For more information, contact Michael Garvin, mgarvin@simulationed.com, (515) 321-7000.

We welcome more farmers and others to our working group meetings to learn more about using on-farm resources to reduce use of fossil fuels. Add your name to our mailing list above.

Sincerely,

Carole Yates
Farm Energy Working Group