

one business profile



Marshik Dairy Farm

Businesses demonstrating the Power of One®—with effective energy choices

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Farming for the Future

The Marshik Dairy Farm, near Pierz, Minn., has been in the Marshik family since the late 1800s—well over 100 years. Despite its historic significance as a “Century Farm,” it is incredibly futuristic. It boasts a state-of-the-art robotic milking system, smart gates that sort cows for milking, automated alley scrapers that clean up manure, and numerous other time- and energy-saving technologies.

“Rebates and energy savings were huge...Energy is a major cost for us, so keeping our energy use down was always in the back of our minds.”

*Dean Marshik
Owner, Marshik Dairy Farm*

Dairy farming is very labor intensive by nature, but Dean Marshik and his wife, Clare Palmquist, have invested significantly to make their family farm require less effort and use less energy. Their new dairy barn, completed in February 2011, is designed to meet several desired outcomes. It will reduce environmental impact, save energy and money, enhance productivity, improve their quality of life, and help secure the farm’s future.

“Our thought process was to build forward in technology,” Palmquist said. “It is very important to us that this property always remain a dairy farm. The next generation is both focused on the environment and not interested in being tied to farming 24/7.”

The farm’s environmentally friendly nature is evident from miles away. Perched on a hill, it features a towering, 20 kW wind turbine, erected in 2007, to generate green, renewable energy. The grid-connected system produces a portion of the electricity needed to meet their annual energy needs. Energy not used by the farm would be sold to Minnesota Power.

“On some days we generate more than we need; on others, not enough,” Palmquist said. “It all depends on the wind.”

Understanding the farm’s wind resources helped Marshik and Palmquist choose an energy-efficient, cross-barn ventilation system for the new milking barn. It uses temperature differences to control inflatable curtains for natural ventilation. Small motors on the system use approximately the same energy as a 40-Watt light bulb.



Top to bottom: “Smart” gates and computerized ID tags direct cows to milking stations; farmers Dean Marshik and Clare Palmquist; automatic alley scrapers are driven by energy-efficient motors; the Marshik Dairy Farm



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Lighting was a major consideration in the barn. The farmers researched impacts of lighting on milk production and worked with Minnesota Power Energy Consultant Gary Olson, of Energy Management Solutions, to identify the right combination of energy-efficient T-5 fluorescent lighting. **POWER Grant** rebates from Minnesota Power helped defray the incremental cost of the new lighting system and supported the owners' productivity goals.

"Rebates and energy savings were huge in that decision," Marshik said. "Energy is a major cost for us, so keeping our energy use down was always in the back of our minds."

That desire to save energy and lower costs, resulting in higher productivity and quality of life benefits, influenced other decisions, as well. The couple installed a plate cooler heat exchanger to pre-cool milk before refrigeration, saving energy from reduced compressor usage; energy-efficient electric water heaters; an energy recovery tank that pre-warms ground water on its way to the water heater using refrigerant from the compressor; and alley scrapers that remove manure using cables drawn by low horsepower motors.

The centerpiece of the new dairy barn, however, is a robotic milking system. It utilizes computerized identification tags, automatic cow traffic control with gates that sort animals based on their milking schedules, and robotic arms that attach milking clusters to the animals without any human contact. Energy-efficient vacuum pumps deliver more suction per kW than standard equipment. An integrated computer system controls feeding, records milk yields, and monitors cow activity.

Energy-efficient technologies in the new barn qualified for several thousand dollars in **POWER Grant** rebates based on projected energy savings. The choices made are expected to save the Marshik Dairy Farm more than 104,000 kWh per year and reduce demand by 18.7 kW—avoiding annual energy costs of more than \$8,000. This is an excellent example of people demonstrating the Power of One® through their choices in asset improvements and day-to-day activities. This helps them get the most for their energy dollars, while achieving outcomes that go beyond the meter, like environmental impact and automation.

"It is exciting to see the advances in dairy farming and how an operation can increase milk production using less energy and effort than in the past," Olson said. "The dairy farm of the future is here today."

Clockwise from top left: Energy-efficient pump with variable frequency drive motor; robotic arms attach to cows for milking; cross-barn ventilation system controls wind flow with inflatable curtains; a plate cooler heat exchanger pre-cools milk on its way to refrigerated tanks