



Marshik Dairy

Pierz, Minnesota

Winner: Outstanding Achievement in Energy Efficiency

Modernizing operations for the long-term good delivers other unexpected benefits

Dean Marshik and his wife, Clare Palmquist, want a business that does right by its cows, its employees and the community, making sustainability and a good quality of life a top priority. In 2010, this fifth-generation family farm implemented a new, technologically advanced and energy efficient barn design on their 155-cow dairy. The new design included robotic milking facilities, energy efficient lighting and ventilation, and renewable wind and solar power. Not only did the new design improve quality of life on the farm, it also proved sustainable practices could provide unexpected benefits.

Best Practices

1 Robotic milkers

Summary

Marshik and Palmquist sought improvements that would make Marshik Dairy strong enough for the next generation, and robotic milking facilities and a new freestall barn were their answer. The robotic system features two DeLaval Voluntary Milking Systems, computerized identification tags, automatic cow traffic control and integrated software that helps manage feed, record milk yields and monitor cow activity. The accompanying freestall barn was built with expansion in mind, as it can easily be doubled in size by building a replica on the opposite side of the existing structure.

Key benefits

The robotic system has helped Marshik and Palmquist run their farm more efficiently and improved their lifestyle and that of future generations through milking automation and increased cow comfort. The new facilities have reduced health issues and somatic cell counts. In addition, they have improved longevity and help keep the cows cleaner. Building the freestall barn with expansion in mind will alleviate the need to apply for any new permits for reconstruction of the utility room, milkhouse and office space.



2 Energy efficiency

Summary

When designing the new barn, the couple implemented several energy efficient technologies including:

- Inflatable, temperature-controlled curtains
- Time-controlled, energy efficient fluorescent lighting
- A thermostatically controlled, three-phase fan and misting system
- Cross ventilation with energy efficient fans
- A plate cooler heat exchanger
- Energy efficient water heaters and an energy recovery tank
- A variable frequency drive and a scroll compressor
- Alley scrapers with energy efficient motors
- Energy efficient vacuum pumps

Key benefits

Energy efficient technologies save the dairy 110,000 kilowatt hours (kWh) per year. Energy efficient vacuum pumps were also part of the system, aiding in reducing somatic cell count and improving herd health.

3 Renewable energy

Summary

Marshik and Palmquist's 20-kW wind turbine has produced a portion of their electrical needs since 2008. An unexpected benefit of the turbine is its use in cross ventilating their barn. The dairy also is home to a 44-panel, 10.7-kW, roof-mounted solar array, which helps to offset electrical costs.

Key benefits

Both the wind turbine and the solar panels have contributed to energy savings since their implementation. The wind turbine offsets 12 percent of the dairy's electrical use, and annual solar generation is forecasted to be 13,663 kWh, which will reduce electrical use by 8 percent or nearly \$1,350.

4 Manure management/lagoon

Summary

In addition to their new milking facilities, Marshik and Palmquist added a new lagoon to their operation. With it, they are able to control runoff naturally by adding a filter strip containing alternate sections of gravel ridges and grass that retains particles and filters runoff water. Water is cleansed before it reaches water sources, preventing runoff from ever entering the drainage system.

Key benefits

In addition to preventing runoff, their new manure management plan includes regular soil sampling, proper nutrient application, less need for commercial fertilizer and fuel savings. In fact, due to the increased use of manure, Marshik and Palmquist have been able to reduce commercial fertilizer use by 8 percent.

Marshik and Palmquist believe that small farms shouldn't have limited opportunities to pursue sustainable technologies. Energy efficiencies and automation have allowed them to milk 60 percent more cows and increase milk production by 48 percent – all while reducing their environmental impact. Today, Marshik Dairy is generating nearly \$9,000 in annual energy savings. Their long-term thinking and commitment to sustainability will help the dairy thrive for generations to come.



The Sustainability Awards are part of the U.S. Dairy Sustainability Commitment, an industrywide effort to measure and improve the economic, environmental and social sustainability of the dairy industry. The award program recognizes dairy farms, businesses and collaborative partnerships for their contributions to healthy people, healthy products and a healthy planet and showcases that sustainability makes good business sense. An independent panel of judges evaluates all nominations based on the program's or project's results as measured by triple-bottom-line success – economic, environmental and social. For more information, please visit USDairy.com/Sustainability/Awards.