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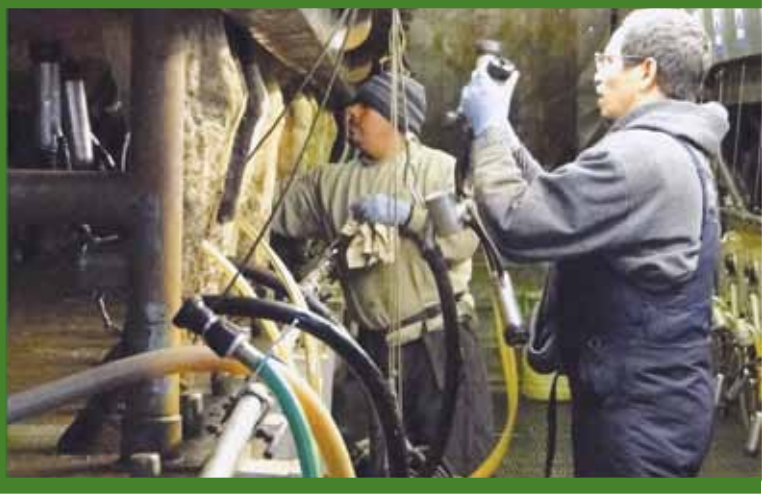
OTTER TAIL POWER COMPANY

*Energy information to help you manage your operation* • *Volume 23, Number 2* • *April 2010*



# Carlson Dairy Farm milking energy-saving programs

## Willmar operation earns state dairy award

When Chad and Carl Carlson go to work every day on the family farm near Willmar, Minnesota, they've got three preceding generations of dairy experience coursing through their veins. Almost a century of working with cows has been passed down from their parents Courtney and Louise Carlson, their grandparents, and their great-grandparents. This paid off in December when the Carlson Dairy Farm earned the highly coveted Producer of the Year award from the Minnesota Milk Producers Association at its annual Midwest Dairy Expo in St. Cloud.

Chad Carlson says the focus on cow comfort has shown a remarkable return in a 900-head herd of cows that produce more milk, live longer and healthier lives, and give birth to stronger calves.

The Carlson sons and their families also have milked significant rewards in the form of reduced energy costs from several energy-saving programs launched with the assistance of Otter Tail Power Company Energy Management Representative Bill Klyve. Family members and the energy-management team at Otter Tail Power Company have encouraged the transition from traditional dairy operations to the computer-driven and monitored model of dairy sophistication currently in place.

### Milking takes place 24/7/365

"We felt we had to get bigger to support three families," said Chad of the transition that began in 1999. "We were milking 60 cows at the time and decided in 2000 to move up to a 450-cow operation with a double-10 milking parlor. A few years later we added another 350 cows and went to a double-14 parlor, milking 28 cows at a time with 20 full- and part-time employees. We might add more and go to a double-18 arrangement."

*"The Carlsons are very scientific about it. For example, they use a geothermal heat pump to remove heat from the milk at 98.6 degrees and then use that heat to help warm the herd's drinking water to 82 degrees, which is the optimal temperature for cows."*

*Bill Klyve*
*Energy Management Representative*
*Otter Tail Power Company*

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When the Carlsons built a new barn in 2000 and added another component in 2003, they also began exploring transitioning from traditional straw bedding to sand bedding—a move they made in 2008, much to the apparent delight of the cows. Substantial energy savings accompanied the bedding change as the families reduced the number of ventilation fans. They went from 108 1.5-horsepower (hp) to 72 1-hp NEMA (National Electrical Motor Association) high-efficiency fans. They employ cross-ventilation with baffles to draw cool air from openings on the north side of the barn across the cows in free stalls that position the cows on a north-south axis for maximum cooling effect.

"The variable-frequency drive on the vacuum pump (another energy-saving improvement) and milk meters work together to keep a constant vacuum level in the milking system and detect when each cow is finished milking," said Chad. "The milk unit then automatically detaches from the cow. New groups of cows are let in as each side of the milking parlor is emptied."


*A variable-drive vacuum system and control panels monitor and control milking for each of the 28 cows in the parlor at any given time.*

## Technology driven by cow comfort, energy savings

Klyve has been the go-to man for the Carlsons, making suggestions and seeing to it that the family realizes not only savings from rebate programs on the purchase and installation of new tools but also in the long-term reduction of energy costs.

"They pay close attention to energy use," said Klyve, a 33-year power company veteran who grew up on a Minnesota farm. "I've never seen a dairy operation this size that conserves energy as efficiently. The Carlsons are very scientific about it. For example, they use a geothermal heat pump to remove heat from the milk at 98.6 degrees and then use that heat to help warm the herd's drinking water to 82 degrees, which is the optimal temperature for cows."

Klyve noted that the farm also eliminated a 75-hp pump that used to move the manure slurry and, instead, converted to a gravity-flow system that enables the Carlsons to recycle up to 90 percent of the sand bedding. They've converted to

*Switching from 108 1.5-hp ventilating fans to 72 1-hp NEMA high-efficiency fans brings substantial energy savings.*

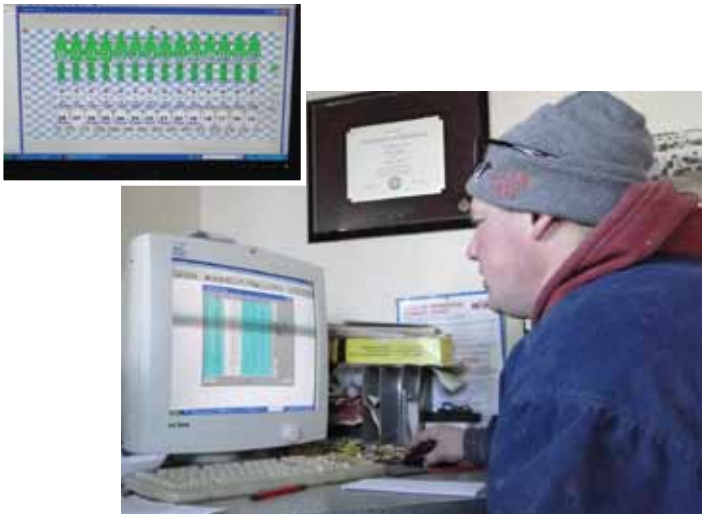
variable-frequency drives on large motors and dropped from 1½-hp motors on the barn fans to NEMA high-efficiency 1-hp motors.

"We also converted from metal halide lightbulbs in the barns to hi-bay fluorescent bulbs with very efficient ballasts and went to fewer hours of light usage," said Chad. "It's a more consistent light, and the cows seem to do better with it. Our reproduction rates and calving success never have been better. And with some of our heating we've been able to keep concrete walkways warm enough to prevent ice and slippage, a serious problem with cows."

The Carlsons and Klyve remain in regular communication about options that can improve the dairy's energy-use profile. Chad noted that he often will run ideas by Klyve and rely on him to figure out potential energy savings. He said the return on technology investment usually is quite short, and the Carlsons implement many of the suggestions.

## Focus on cows creates brighter future

With Chad addressing the feeding, cropping, and related production issues and Carl watching over the herd's health, breeding, and vaccination schedules, the Carlson farm appears to be poised for continued growth and even higher levels of dairy excellence. On the 800 acres that the family owns, they can produce much of the corn and haylage to



*Chad Carlson monitors various aspects of the operation and tracks each cow's output (inset).*

their standards, and they tailor other sources of supply for achieving continued improvements in cows and milk production.

"I can't say we've achieved the ultimate level of production yet," said Chad, who earned his degree in animal science from the University of Minnesota (where his brother also earned a degree). "We're always looking for new ways of doing things and more ways for saving on costs. It's all about achieving the highest efficiency of people, labor, animals, and facilities."

Future generations of Carlsons also are getting to know the dairy business, according to Chad, who has three sons with his wife Kindra. Carl and his wife Kellie have three sons as well.

Part of what helps create and maintain a healthy interest in dairy farming is the entire family's dedication to the dairy industry. Each year the dairy works with the Willmar Lakes Area Chamber of Commerce to host tours for fifth-grade students, and every year the Carlson kids and their parents and grandparents hand out Got Milk stickers at the Pennock Fun Days Parade, along with dairy treats.

The Carlson Dairy Farm's sophisticated operation and preservation of traditional farm values led fellow dairy producers to reward the dairy with Producer of the Year honors. And the Carlsons milk significant rewards in the form of reduced energy costs from Otter Tail Power Company's energy-saving programs.

# New energy-efficient motors qualify for rebates

## Manufacturers must meet federal mandates

Sometimes the wheels of progress seem to turn slowly. Such is the case of the Energy Independence and Security Act (EISA), signed into law on December 19, 2007. EISA gave manufacturers of electric motors three years to adjust their manufacturing processes to produce more energy-efficient industrial electric motors. After December 19, 2010, those manufacturers no longer will be allowed to build less-efficient motors.

With the passage of EISA, the United States took a large step toward greater energy efficiency in the industrial and commercial sector while eliminating an estimated 80 million tons of carbon and reducing power consumption by about 5,800 gigawatt-hours. To help put this into perspective, consider that electric motors use about 25 percent of the total energy produced in the United States, and motorized equipment used by American manufacturers accounts for about 64 percent of the electricity dedicated to their production cycles. So, when EISA goes into effect on December 19, the stakes are extremely high for everyone at the table, including Otter Tail Power Company's commercial and industrial customers.

## Large range of motors affected by new law

Until EISA, regulations related to electric motors were part of EPACT (Energy Policy Act of 1992) and were administered across a broad spectrum of industries. The governing board of the manufacturers, NEMA (National Electrical Manufacturers Association) represents 450 American manufacturers that now are hustling to comply with the December deadline for all motors, ranging in size from 1 to 200 horsepower, to bring them into compliance with Table 12-12 NEMA Premium® Efficiency.

## Rebates incent change

Job Fabre, program manager for motor rebates at Otter Tail Power Company, said the new NEMA Premium® Efficiency motors will continue to qualify for significant Otter Tail Power Company rebates through 2010 and (hopefully) beyond. In addition to energy savings, the new NEMA motors run quieter at lower temperatures and have a higher power factor. So, they last longer with lower maintenance costs and are easier to repair.

"The size of the rebate depends on several factors," said Fabre. "For example, a motor that's installed to replace an older, less-efficient motor before it fails qualifies for a higher rebate than a motor that's purchased and installed after a failure." It's important to note that we have revised the efficiency requirements for explosion-proof motors for applications such as grain elevators and energy plants because customers are experiencing a lack of available efficient motors.

Even with mandates to manufacture more efficient motors, customers still will have access to less-efficient motors in the marketplace. And customers may rewind existing motors. But Otter Tail Power Company encourages customers to install and use the most efficient motors possible. "While we currently are approved for motor-efficiency rebates through 2010, we hope to be able to continue into next year through our Minnesota and South Dakota conservation programs," said Fabre.

And the savings go beyond rebates. Even though the NEMA Premium® Efficiency motors are not claiming a longer service life, they definitely provide power savings!

OTTER TAIL POWER COMPANY

215 South Cascade
Fergus Falls, MN 56537

***Make It Electric*** provides information for industrial and commercial customers interested in energy efficiency, increased productivity, and new technologies.

Industrial Services
Otter Tail Power Company
215 South Cascade
Fergus Falls, MN 56537

800-493-3299

Fax: 218-739-8941

www.otpco.com

# Energy-efficiency programs help you save

Energy-efficiency programs can reduce your energy costs now and into the future. Visit www.ConservingElectricity.com and click on *Business conservation programs* to learn about rebates and grants that can be customized to meet your needs.

## Contacts



**Mark Remer**
Senior Industrial Services Engineer
Fergus Falls
218-739-8967
mremer@otpco.com



**Paul Aasgaard, P.E.**
Senior Industrial Services Engineer
Fergus Falls
218-739-8492
paasgaard@otpco.com



**Jeremy Rham**
Senior Industrial Services Engineer
Jamestown
701-253-4708
jrham@otpco.com



**Scott Sigette**
Energy Management Representative for Rugby, Langdon, and Devils Lake areas
701-662-4876 ext. 740
ssigette@otpco.com



**Ken Johnson**
Energy Management Representative for Crookston and Bemidji areas
218-281-3634 ext. 6103
kjohnson@otpco.com



**Brad Nelson**
Energy Management Representative for Milbank area
605-432-4713 ext. 6602
bnelson@otpco.com



**Bob Sitzmann**
Energy Management Representative for Jamestown, Oakes, and Garrison areas
701-253-4703
bsitzmann@otpco.com



**Craig Farstad**
Energy Management Representative for Fergus Falls area
218-739-8681
cfarstad@otpco.com



**Bill Klyve**
Energy Management Representative for Morris, Wahpeton, and Milbank areas
800-630-7358
bklyve@otpco.com



**Terry Stallman**
Economic Development Consultant for Minnesota and South Dakota
800-630-7965
tstallman@otpco.com



**Don Frye**
Economic Development Consultant for North Dakota
701-320-0373
dfrye@otpco.com