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Philip Hofman knows the secret of operating a successful family-owned dairy operation: he finds smarter ways of doing things. "Every operation should look at and find areas where they can improve what they are doing and how they are doing it," he said.

Recently, Mr. Hoffman installed a variable speed vacuum pump to improve the milking operation at his 330-head dairy farm in Waupun, Wisconsin. This measure will improve his operation's cost-effectiveness and quality of his milk product. It will also reduce his energy bill by over \$2,000 each year. He worked with Focus on Energy, Wisconsin's statewide energy efficiency program, and Alliant Energy, his utility, to implement this project.

VARIABLE SPEED VACUUM PUMP YIELDS SAVINGS AND PRODUCT IMPROVEMENTS

A typical dairy farm's vacuum system uses about 20 percent of the operation's electricity. You can cut this electricity consumption in half by replacing a conventional vacuum regulator

VARIABLE SPEED VACUUM PUMP CHECKLIST	
"TO DO" LIST	
	Install variable speed controllers on blower or lobe type vacuum pumps. They are not recommended for rotary vane or water ring type vacuum pumps.
	Ensure that the vacuum pump is sized properly for the system. An improperly sized pump-either undersized or oversized-will not perform properly or yield the expected energy savings. The pump's life may also be shortened unnecessarily.
BENEFITS	
	Save energy
	Improve milk quality
	Lower noise levels
	Reduce wear and tear as well as maintenance costs
	Limited lubrication required, which lessens the potential to contaminate the soil with lubricants.



A typical variable frequency drive installation.

system with a variable speed vacuum pump. In addition to reducing this system's electricity consumption by 50 percent or more, you will gain better control of vacuum levels.

However, Mr. Hofman had some initial concerns about the variable speed unit. He had heard they contribute to stray voltage. After he did his homework and talked with the agricultural energy experts at both Focus on Energy and Alliant Energy, he decided to install the unit. He immediately saw two important benefits: a drop in electricity consumption and an improvement in milk quality.

"My old vacuum pump was running full power all the time," Hofman said. "The variable speed pump runs according to demand. And the consistency of the vacuum it creates has reduced the somatic cell count, a common measure of milk quality, in my milk significantly. In fact, it's below 100,000 for the first time. This factor alone has added an extra 10 cents to my milk prices."

STEPPING IN TO HELP

Philip Hofman purchased his 400-acre farm from his parents in 1974. Since that time, he has always understood that improving energy efficiency can impact a business in many positive ways. When Hofman was approached by Fred Daniels, an energy advisor for Focus on Energy, and Ed Kubina from Tri County Dairy Supply in Watertown, Wisconsin, he liked what he heard.

"They came to talk with me during a time when milk prices were low," said Hofman. "They outlined some measures that would save my operation money while also improving our product."

Unfortunately, due to the low milk prices, he was limited in his ability to finance these improvements. Focus on Energy and Alliant Energy stepped in to provide this much needed help. The cost to install the variable speed vacuum pump was \$6,500; this cost was offset by a grant from Focus on Energy and financing by Alliant Energy.

"They showed me how they could help my business and helped me with funding the project. With everything they've done for me, they've really shown their worth," said Hofman.

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QUICK DEFINITION: CONVENTIONAL VERSUS VARIABLE SPEED VACUUM PUMPS

The vacuum system used for milking dairy cows relies on an air pump to remove air continuously from the milking system. A conventional vacuum system runs the vacuum pump motor at a constant speed. It must admit air through the vacuum regulator into the system to make up for the air not being used by the milking operations at any moment in time.

A variable speed (VS) vacuum pump regulates the system vacuum level by adjusting the motor speed, instead of admitting air. When the vacuum pump motor slows down, it uses less electricity and reduces the associated energy costs.

VARIABLE SPEED VACUUM PUMP SAVINGS AND PAYBACK

HERD SIZE	COST RANGE	ANNUAL SAVINGS AVERAGE*	SIMPLE PAYBACK**
<100	\$3,000 - 4,000	\$250 - 1,800	3 - 6 years
100 - 199	\$3,000 - 4,500	\$250 - 2,500	2 - 5 years
200 - 499	\$3,000 - 4,500	\$400 - 3,500	1.5 - 3.5 years
>500	\$3,500 - 5,000	\$1,300 - 5,000	6 months - 1 year

* Installation costs and corresponding savings will vary depending on the site conditions and use. Our energy advisors can help determine savings estimates for your situation.
** Before any incentive.

