

**CASE STUDY**

To learn more about Focus on Energy<sup>SM</sup>, call 800.762.7077 or visit [focusonenergy.com](http://focusonenergy.com)

Potato storage is an important factor for the potato industry. Efficient and effective storage is a priority for growers or storage facilities involved in fresh or processed segments of the industry. The role of potato storage is to maintain both the quality and quantity of potatoes throughout the storage period. Both quality and mass loss (shrinkage) are linked to profitability for an operation.



Paragon's grading facility in Plover, WI.

Potato storage facilities require air movement through the pile of potatoes to remove field and respiration heat and control humidity during the storage period. The piles of potatoes are ventilated to preserve quality, prevent shrinkage, bruising, spotting or rot. Water evaporation accounts for the majority of a potato's weight loss over time and is affected by many different factors including humidity and temperature.

Ventilation systems represent the single most important post-harvest factor for potato storage. In order to maintain consistency and efficiency, variable frequency drives (VFDs) should be installed on fan systems that ventilate potato piles.

A VFD, sometimes called a variable speed drive, is an electronic capacity control device

that allows the motor to be continually adjusted relative to the power needed. Without a VFD, a motor runs at a constant speed or cycles on and off, causing wear and tear. VFDs can be incorporated in new construction projects or retrofitted for existing ventilation systems.

The benefits of VFDs are real and measurable. They reduce your energy use, cut your energy costs, increase productivity and, most importantly, by reducing shrinkage, your operation will see increased profitability.

Paragon Farms, a potato packing facility located in Plover, retrofitted their existing ventilation system with VFDs to improve product quality - the energy savings were an added benefit.

Each potato bin or storage unit at Paragon Farms has a ventilation system that exchanges air within the bin. The old fan system would run at full speed – cycling on and off – four times a day which produced a



A potato bin being filled for winter storage.

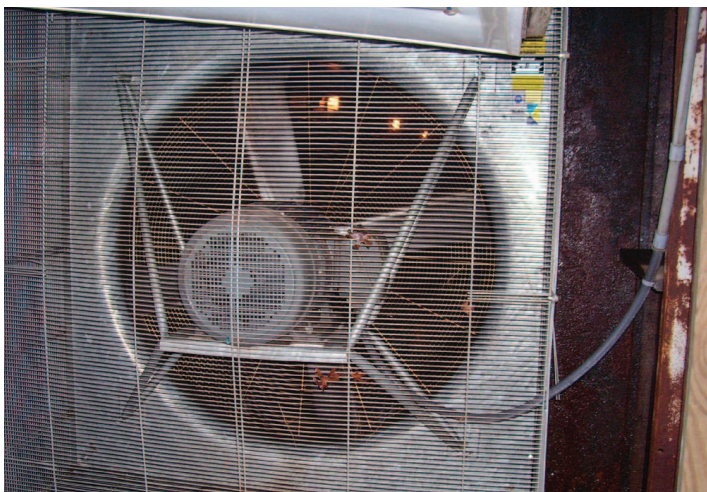


One of the VFD systems installed at Paragon Farms.

sudden and significant change in humidity and temperature. With the VFD control installed the operator can run the fans at a constant speed or adjust the speed according to the potato bin humidity levels and temperature, creating a constant atmosphere. In a study done by the University of Idaho, VFD fan controls were shown to reduce shrinkage by 0.4 percent or more over a storage season. In a sample sited, the load weights increased by 1,200 hundred weight (cwt) and income increased by \$6,000 for sales made at \$5.00 per cwt.

Eugene Mancl, a master electrician from Ron's Refrigeration in Wisconsin Rapids, installed VFDs in three of Paragon's potato storage facilities. "Systems can be retrofitted with VFDs during the storage period without interrupting the fan cycle," Said Mancl. "And typical installations can be completed in eight hours."

Currently, Paragon Farms has installed VFDs on the majority of their ventilation systems.



A typical fan in a potato storage facility is equipped with a VFD.

PARAGON FARMS' ENERGY AND COST SAVINGS BASED ON RETROFITTING EXISTING SYSTEMS					
Location	Installed	Cost	kWh Savings	Dollar Savings	Payback (years)
Bancroft	2 VFDs	\$5,814	74,493	\$3,182	2
Main Storage Facility	2 VFDs	\$10,000	52,313	\$2,754	2
Building 8 at Main Storage	2 VFDs	\$10,500	49,980	\$2,474	3
Building 9 at Main Storage	2 VFDs	\$12,000	79,968	\$3,958	2
Plover River Farms	2 VFDs	\$7,984	34,986	\$1,731	3
<b>Totals</b>	<b>10 VFDs</b>	<b>\$46,298</b>	<b>291,740</b>	<b>\$14,099</b>	

ESTIMATED SAVINGS BASED ON HORSE POWER*	
Horse Power of Existing Fan	Estimated Dollar Savings per Year
5	\$300
7.5	\$450
10	\$600
15	\$900
20	\$1,200
25	\$1,500
30	\$1,800
40	\$2,400

\* This chart assumes 3000 hour run time per year on the existing fan system and an average kWh rate of \$.04 and winter demand rate of \$5.80.

Please contact your contractor for an estimate of installed price. You must contact Focus on Energy prior to beginning installation to qualify for incentive.

#### HOW CAN FOCUS ON ENERGY HELP YOU?

*"The new system is very advantageous for year-round potato storage where tighter control is necessary to effectively lengthen storage time. The financial and engineering consultation provided by Focus on Energy was an added benefit that was very helpful for cost justification of the project."*

– Kirk Willie, Paragon Farms

If you are interesting in learning more about VFDs for your potato storage facility or other energy efficiency opportunities, contact Focus on Energy at 800.762.7077 and ask to speak with an Agriculture and Rural Business Team Member. Or visit our Web site at [focusonenergy.com](http://focusonenergy.com)