

When it comes to Potato Fan VFDs, we could spend hours talking about respiration rates, air temperature rise, fan run times and outside air availability. But what you really want to know is

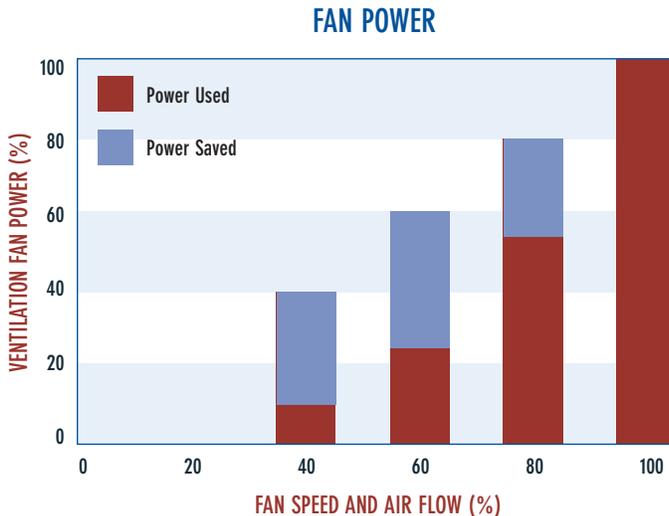


Potato Fan VFDs

“Can VFDs boost my bottom line?”

How do they save energy?

Normally, ventilation fans operate at a fixed speed. Variable Frequency Drives (VFDs) allow a storage manager to adjust the speed of the ventilation fans to match the needs of the potatoes and avoid over or under-ventilation. Potato temperature is held constant, air movement in the storage is reduced, and fan power drops dramatically.



Potato storages without VFDs typically shut off some of the ventilation fans, or reduce the fan run time after the potatoes are at the holding temperature. With VFDs installed, typically all of the fans run whenever outside air (OSA) is available. The fan speed is adjusted by the storage manager or ventilation controller based on return air temperature.

Energy savings can vary widely depending on your

current practices and how the VFDs are controlled after installation. Most growers experience fan energy savings of 30% to 60% over a medium to long storage season.

Will VFDs affect my potato quality?

Research has shown that VFD control has no impact on fry color, sugars, and other quality characteristics. In fact, VFDs consistently reduced mass loss (or shrinkage) as discussed below. You can read a summary of the research as well as a more detailed report on potato storage VFDs at www.cascadeenergy.com.

“Our VFDs paid for themselves in less than two years. They continue to pay us back in electrical savings and product quality.”



Randy Hirano, Tri-Cities Produce, Pasco, WA

Are there any other benefits?

- Mass loss reduction. Research has shown that by providing just enough air, the potatoes don't dry out as much. Reduced mass loss, or shrinkage, means higher load out weights and increased sales at the end of the storage season.
- Increased flexibility. Fan speeds can be adjusted by increments of 1% or less. If your potatoes need 58% air, you can give them 58% air. This is a great help during prolonged loading and unloading.
- Reduced condensation. By running at reduced speeds whenever OSA is available, the fans stay on more of the time. "Fan off" periods and condensation problems are reduced.

What research has been performed?

The University of Idaho performed three years of research on the impact of VFDs.

- Field trials were conducted on a 10,000 ton split plenum storage for three consecutive years using Shepody and Russet Burbank varieties.
- One bay used VFD control of the fans, with automatic fan speed adjustment performed by the ventilation controller.
- The other "control" bay used more traditional practices. After the pile was cooled to holding temperature, one of the fans was shut off and tarped, and daily fan run time was reduced.
- Average fan energy savings was 40% for the VFD bay.
- Average mass loss savings was 0.81% for the VFD bay.
- No harmful quality effects were found. Glucose, sucrose, and fry color were unaffected.



"It was a hard sell to get them put in, but now that we've got them, we wish we had done it a long time ago. The office tells me the drives paid for themselves

within the first year."

Jim Madden, Magic Valley Produce, Paul, ID



"The research confirmed the large energy savings we suspected. At first we weren't sure how the VFDs would impact product quality, but the trials have shown no downside, plus there were consistent reductions in mass loss."

Gale Kleinkopf, Ph.D., University of Idaho

Can I add VFDs to an existing storage?

- Sure. All you need is some wall space where the VFDs are mounted.
- Some existing ventilation controllers can be upgraded to automatically control fan speeds, which captures the most energy and mass loss savings.
- On new construction, VFDs are installed instead of motor starters. This reduces installation cost compared to adding VFDs later.
- Most new ventilation controllers can be purchased with automatic VFD controls.

Who can install VFDs for me?

Most ventilation contractors can supply VFDs and automatic controls. Installation is generally done by an electrical contractor. Electrical contractors can also supply VFDs.

What are the risks?

Motor failures are occasionally a problem with improper design or installation. However, when VFDs are specified and installed properly, failure is rare. VFD-rated motors should be specified on new buildings, and existing buildings can use output reactors after the VFDs to decrease the risk of motor failures.