

When it comes to evaporator fan VFDs, we can talk till we're blue in the face about the details: fan input power versus speed, temperature gradients, control algorithms and load profiles. But what you are really asking yourself is



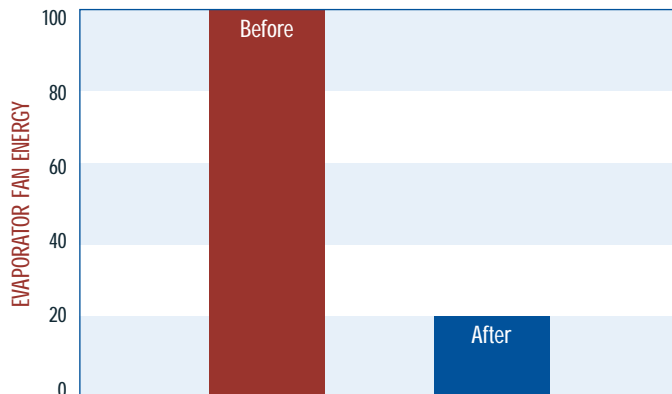
Evaporator Fan VFDs

"Are they right for my cold storage?"

Variable Frequency Drives (VFDs) allow a refrigeration operator to slow down evaporator fans when refrigeration loads are low. Room temperature is held constant, air movement in the room is reduced and fan energy usage drops dramatically.

Conceptually, it makes sense. But does the investment make sense? How much energy can be saved? How quick is the payback? Are the rooms right for the application? And what other benefits can be realized with VFDs?

EVAPORATOR FAN VFD ENERGY SAVINGS POTENTIAL



The staff of Cascade Energy Engineering spent two years researching evaporator fan VFD technology under contract with the Northwest Energy Efficiency Alliance. Demonstration VFDs were installed at six commercial cold storage facilities. The test facilities held a range of refrigerated products including dairy, frozen fruits and vegetables, and frozen meat.

Where VFDs were in use, facilities were able to:

- Reduce evaporator fan energy use by 61% to 86%.
- Achieve an average 3 year payback on the investment when considering energy savings alone.
- Realize non-energy related benefits including increased productivity because of worker comfort.
- Maintain uniform temperatures.

For more information, check the Cascade site at www.CascadeEnergy.com.

"I have to admit that I was real skeptical...But once we got it up and put it into our energy monitoring system, we could see the savings."



Bill McCready, Norpac Foods, Stayton, Oregon

What about the non-energy benefits?

More than 75% of the cold storage study participants noted other benefits of the VFDs, particularly reduced noise and improved comfort for workers. Several operators were confident that the reduced wind-chill resulted in increased employee productivity. Others liked the improved temperature control associated with the VDS.

Are there potential pitfalls?

Motor burnout and early VFD failures have been an occasional problem. However, when specified and installed properly, VFD failure is rare. For new installations, VFD compatible motors should be specified. For retrofit projects, output filters are a proven solution for protecting less robust fan motors.

Despite concerns about less air movement at low fan speeds, temperature gradients within cold storage rooms were minimal at the demonstration sites.

Are VFDs right for my warehouses?

As a consulting engineering firm that specializes in industrial refrigeration and energy efficiency, Cascade Energy Engineering recognizes that no two sites are alike. Their firm develops an "engineered solution" for each of its customers seeking the benefits of VFD evaporator fans or for the complete range of other refrigeration system upgrades and efficiency improvements.



"We've been one of the most energy efficient cold storage warehouses in the industry—in the order of the first percentile or better. And using evaporator fan VFDs is part of the success."

Paul Henningsen, Henningsen Cold Storage

"In our experience, evaporator fan VFDs play an important part in maximizing cold storage energy efficiency."



Marcus Wilcox, Cascade Energy

There is a lot to sort out. In a typical project, Cascade engineers will:

- Install monitoring equipment to observe variations in refrigeration system operations and measure power consumption.
- Check the suitability of the rooms, evaporator fans and coils, refrigeration systems, and electrical system for VFDs.
- Develop detailed computer models of system operations with and without VFDs to accurately predict energy savings.
- Work with vendors and contractor to define a cost-effective, dependable solution.
- Determine eligibility for any utility financial incentives or state tax credits.
- Summarize the findings in a report geared to answer three critical questions:
 - What is recommended?
 - What will it cost?
 - What are the benefits?

Are there other opportunities?

Evaporator VFDs are one of many excellent energy efficiency opportunities in industrial refrigeration systems. The list includes refrigeration computer control, compressor and condenser fan VFDs, thermosyphon oil cooling, premium efficiency motors, energy efficiency doors and bi-level lighting.

To learn more about evaporator fan VFDs and other energy efficiency opportunities in your cold storage facility, contact Marcus Wilcox at Cascade Energy Engineering:

E-mail Marcus.Wilcox@CascadeEnergy.com

Phone 509-529-8040

To learn more about other energy efficiency opportunities, check out the Northwest Energy Efficiency Alliance web site at www.nwalliance.org.