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More is Less With Variable Frequency Drives

By Duane Ashimini

“Run your equipment less to save energy.” Seems simple, right? But, did you know that there are instances when running more equipment will actually save energy?

As counterintuitive as it may initially seem, it is possible by using Variable Frequency Drives (VFDs). A VFD is a equipment controller that can vary motor speeds based on system load requirements. The VFDs of today actually make running multiple pieces of equipment in parallel more efficient than using a single one. This has not always been the case.



VFD installed at the North Hawaii Hospital. *Photo courtesy of Aaron Won*

Just over a decade ago VFD may as well have stood for Very Foolish Decision. Their high cost and low dependability made it difficult to justify their installation and were often viewed as an afterthought to fix oversized equipment. The 21st century welcomed vast improvements in the reliability, pricing and understanding of the technology, turning VFDs into a leading weapon in the arsenal of energy cost reduction.

Many of the first and second generation VFDs still lurk in your mechanical rooms taking up wall space. Our experience has been that most are either disconnected or in permanent bypass mode. This is not a surprise considering the early versions had no standard protection against power strikes or brown outs which caused routine failures. Failures cost money and embarrassment and so goes the equipment back into full power mode never to be returned to automatic VFD control.

The next generation of VFDs is here. They cost half of what they did a decade ago and are produced by more than 15 major manufacturers. However, price is irrelevant if we're buying the same unreliable product. Fortunately, the increased

competition has created demand for built-in features such as power transient protection, harmonic reduction and built-in control sequences.

VFDs have become one of the standard features in our design and implementation of HVAC systems today. Old school ideas commonly called for dedicated back up or redundant equipment to ensure continuous operation. We have seen that it is frequently more economical to operate both pumps at half the flow. This can reduce the required pumping power by as much as 70 percent.

Why limit VFDs to pumps? They are also big savers on cooling towers, chillers, air handling units, all types of centrifugal pumping, refrigerant compressors and exhaust fans. If the energy savings isn't enough incentive to add VFDs to your facility, consider the reduction in wear on the motors, gears and belts due to reduced speeds and start up torque.

If you're still not convinced, Hawaiian Electric Company supports the technology on HVAC pumps and fans by providing a rebate to help encourage those who may not be entirely sold on the idea.

With reduced costs, utility rebates and significant energy savings, VFDs offer a quick payback on your investment. So stop believing "less is better," with the proper design, installation, control and commissioning of a Variable Frequency Drive systems running more equipment can save you money.



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