

Are Variable Frequency Drives or Constant Pressure pump systems a way to save energy? Are they "greener"?

Variable Frequency Drives are a type of controller that allow a pump to be run at the exact speed necessary to produce the exact amount of flow/pressure required. These devices are commonly marketed as energy saving devices and, in some select applications may provide some small energy savings. These systems are typically more expensive and more complicated, but do offer some very nice features that can include reduced pump noise, reducing water hammer/surge, extended pump life, & constant water pressure.

The primary reason that VFD's don't provide energy savings is the parasitic energy losses inherent in the technology that involves rectifying the AC voltage from the grid and then re-inverting it to the correct voltage/frequency for the motor's reduced speed.

In side by side bench tests that were conducted for over a week on a conventional pressure switch/pressure tank type system as compared with a VFD system using the same exact pump & motor, with the same exact varying flow rates and volumes resulted in a net zero energy savings.

"Constant" pressure is a bit of a misnomer as these systems do hunt a bit, but not nearly as much as pressure switch type systems. For the most part, most people simply cannot physically tell the difference between a constant pressure and traditional type system at the faucet/in the shower or at the hose-bib in the garden.

Applications where variable frequency drives are rarely called for include systems where a pump directly fills a storage tank, pond or other vessel and the flow rate/pressure is not important at all.

Variable Frequency Drives are really not any more or less green than the alternative system unless they can significantly reduce the quantity of pressure tanks required. Typical pressure switch controlled systems require enough volume (supplied by pressure tanks) in the system so that the pump cycle time does not exceed manufacturer specifications. A VFD can typically reduce this requirement to one medium/small sized pressure tank. On large systems the savings in pressure tanks can easily pay for the additional costs associated with using a Variable Frequency Drive and reduce the physical/carbon footprint of the equipment necessary for installation.