

Ergs, Joules & Such

Notes On Energy Savings for the Rural Water Community and Maybe Others



I just returned from the NRWA annual conference in New Orleans and if I brought back one thing with me it was that variable frequency drives seem to be the wave of the future in small system energy conservation. Virtually everyone I talked to about energy mentioned these versatile devices, all in a positive way. It convinced me to spend more time on VFDs and I plan to devote this issue and the next to them. Although some of this may be repetitive, I believe that VFDs can play an important function in water and wastewater utilities. I plan to review fundamentals in this issue and work through an actual or hypothetical case history in a future article. By the way, keep in mind that whatever I say about these devices is reporting what I've read – I have no personal experience with them.

- ❖ First, remember that VFDs reduce motor speed and output by changing the frequency of the electric current driving the motor. This has the advantage of matching output to demand but also reduces horsepower required dramatically.
- ❖ The horsepower reduction occurs because as speed is reduced in a centrifugal pump the horsepower required is reduced by the cube of the speed reduction! Energy savings are not quite that dramatic, but reductions in power bills by fifty percent have been reported.
- ❖ Another side benefit is improvement in power factors. Remember those nasty lines that crop up on some bills? They reflect inefficient electric consumption at your location and power suppliers penalize you by extra charges if they get too bad (low). It turns out that oversized pumps are one cause of low power factors, and if your VFD corrects that overmatching, it may also correct your low power factor.
- ❖ Don't have three-phase current at your location and want to use it because of the lower cost? A VFD can supply that for you too.

- ❖ Want soft starts on your motors? Yep! VFDs will give you that also.
- ❖ Are these VFDs too good to be true? No, there is a price, literally. They are expensive. I've seen price quotes ranging from \$3,000 for a 5-horse motor controller to \$45,000 for a 300 horsepower installation. Wait – don't shut off your thinking because you can't afford those outlays. Maybe you can without any real net cost to your system. We're going to talk about that next issue. The following bullet gives you a hint to be thinking about.
- ❖ Next issue I thought I would take a fairly typical pump station – say something in the 100 horsepower size, determine what it would cost to put in a variable frequency drive controller, estimate what that size controller would cost and how much it would save on power bills and then look at some creative financing with NRWA's loan fund and see what the bottom line might be for you. I think you may be surprised!
- ❖ Finally, this adapted again from Megavolt. Electrician hands attorney \$400 bill for hour's work. Attorney screams – "I never charge my clients that much!!" Electrician – "I didn't either when I was an attorney." Megavolt is an Israeli website – obviously they haven't lost their sense of humor in midst of fighting.

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