

Ways To Decrease Pumping Costs

DR. JOE HENGGELER

PORTAGEVILLE, MO.

There were fears earlier this year that gasoline prices might reach \$5 a gallon this summer. Fortunately, that horrible scenario did play out, but nonetheless the cost of energy is still putting a strain on irrigated agriculture in the southeast

Missouri (SEMO) region. Rice farmers are hit the hardest, with some reporting as paying an average of \$70/acre last year.

For this reason, several agencies have organized an Irrigation Energy Field Day to take place Thursday, July 28th at the MU Delta Center in Portageville to assist local irrigators with ideas on how to decrease energy costs. Information on how to register and get more information for this free Field Day can be found below.

Savings in irrigation energy costs can come from a variety of ways. The broad categories for decreasing out of pocket expenses for irrigation are:

1. Reduce the cost you pay for fuel/energy.
2. Decrease Pumping Head.
3. Improve the efficiency of the pumping plant.
4. Decrease losses in irrigation systems so that pumps don't run as long.
5. Agronomic ways to either reduce crop water requirement or decrease water losses.
6. Miscellaneous methods.

Reduce the cost you pay for fuel/energy. Electricity remains about 2/3rds and 1/2 less expensive than is diesel and propane, respectively. Electricity users can furthermore decrease their cost by signing up for load management programs, especially for those flood/furrow irrigation pumps that have high flow rates and small acreages. Surprisingly, even though pivot users can cut costs, the savings are no where what is available for high flow/low acreage situations (up to \$50/acre). If you don't have 3-phase electricity, many irrigators have found that single phase and a phase converter work fine for them. Bulk buying of diesel can save over 5 percent in costs.

Decrease Pumping Head. This remains one of the most straight forward means to savings. Re-nozzling pivots to run at lower pressures is money in the pocket, and many SEMO irrigators have done just that. Opting for larger diameters of column pipe, buried pipe, and pivot laterals is another way to save cash down the road. Using direct-drive over gear head or pulley belts, where possible, reduces energy loss by 5 and 10 percent, respectively. One huge energy waste that sometimes is seen is running the end gun of a pivot without its own booster pump. The end gun may require 40 or 50 PSI more than the last few nozzles would need if they were low-pressure. This scenario could cost a diesel user \$6,000 a year.

Improving the efficiency of pumping plants. If there is one class of irrigation systems suffering the most from inefficient pumping plants it would be flood/furrow. The reason for this is that these systems are high flow-low head systems. A system may be doing well at the start of the season, but if the water level drops just 8 feet, because they are low head, they'll lose over a third of their water, and that which is pumped is done so inefficiently. It is not just in SEMO, other places in the country report that efficiencies of furrow/flood pumps are significantly lower than pumps that service pivots.

These systems can be just as efficient as pumps that are on pivots if information on the pumping water level (PWL) of a unit was known. An airline to sound the water level

is a cheap, excellent way to provide PWL information. With air lines in place the RPM of engines could be revved up or down to get to the optimum operating point. Several local well drillers will install air lines when they drop the pump if you ask them. Staff from Irrigation Central (Sikeston) and Burge Irrigation (Puxico) are installing air lines (Figs 1 & 2). Ark-Mo Well Co. out of Steele, MO also installs air lines. The MU Delta Center Irrigation Project provides these companies with the needed materials. There is probably no practice that would lead to more overall future irrigation energy savings for this region than if air lines were routinely included in new pump installations!

The three other broad categories of ways to decrease irrigation energy costs will be discussed in the next issue. Δ

DR. JOE HENGGELER: Extension Agricultural Engineer, University of Missouri Delta Center



Figure 1. Irrigation Central staff out of Sikeston, MO tie in the bottom of the air line a few feet from the pump.



Figure 2. Water level of a newly installed pump near Portageville being read by staff from Burge Irrigation Company of Puxico, MO.