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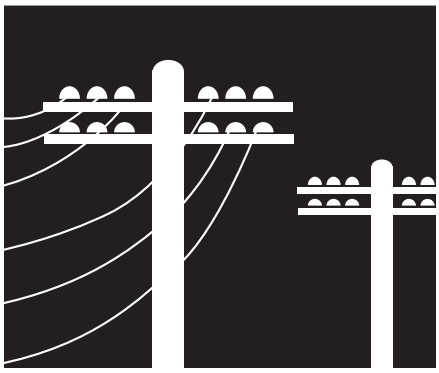

Energy Conservation in Agriculture

Low-Cost Energy Conservation: Irrigation and Crop Storage Facilities

Scott Sanford

Depending on your farm operation, there are some actions you can take to reduce your energy consumption. Refer to the references at the end of the bulletin for more in-depth information.

Irrigation

1. **Irrigation scheduling**—Water only when necessary. Field tests indicate a 7%–32% reduction in energy use per unit of yield, depending on the crop.
2. **Irrigation scheduling software: KanSched**—You can download from www.oznet.ksu.edu/mil

   WISDOM–Available from Gempler's 608-424-1544

   WISP allowable-depletion water balance spreadsheet (www.soils.wisc.edu/wimnext/water.html)
3. **Check nozzle package for uniform distribution of water.** Nozzles ten years or older may be eroded from the water and particles, resulting in uneven distribution of water. If nozzles need replacing, consider replacing them with lower pressure nozzles.
4. **Test well and pump yearly**—Pump tests cost little compared to the cost of underwatering a high value crop.
5. **Consider moving irrigation to off-peak hours to take advantage of lower time-of-use electric rate***s*. This may require increasing pumping capacity to take full advantage.
6. **Replace nozzle package with lower pressure units and allow pump capacity to increase.** Do this if the well can support it and soil infiltration rate is high enough. As system pressure is reduced, pump capacity increases so more water is pumped using the same amount of energy. This reduces hours of operations which saves energy, allows for more off-peak irrigation and increases drought resistance for hot periods during the summer.

Potato, vegetable and fruit storage facilities

1. **Install variable speed drives (VSD) on fans.** The greatest amount of ventilation is needed to remove the field heat from crops but after that is complete, the ventilation requirement may be only 50%. VSD allow the fan speeds to be reduced, saving energy. A fan controlled with VSD operating at 50% speed will only use 15% of the power required to operate at 100% speed.
2. **Check temperature and humidity sensors annually.** Faulty readings could result in reduced quality or spoilage of the crop.

References

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2) *Estimating Soil Moisture by Appearance and Feel,* N.L. Klocke & P.E. Fischbach, Publication G84-690, University of Nebraska-Lincoln, 1984. www.ianr.unl.edu/pubs/irrigation/.

3) *Evaluating Pumping Plant Efficiency Using On-farm Fuel Bills,* D.H. Rogers, R.D. Black, Publication L-885, Kansas State University Extension, Manhattan, KS,1993. www.oznet.ksu.edu/mil/ToolKit.htm.

4) *Considerations for Sprinkler Packages on Center Pivots,* D.H. Rogers & W.M. Sothers, Publication L-908, Kansas State University Extension, Manhattan, KS,1994. www.oznet.ksu.edu/mil/ToolKit.htm.

5) *Comparing Irrigation Energy Costs,* D.H. Rogers & M. Alam, Publication MF-2360, Kansas State University Extension, Manhattan, KS,1999. www.oznet.ksu.edu/mil/ToolKit.htm.

6) *Use of Electronic Speed Controllers for Potato Storage Fans,* R. Ashby, J. Hunter & S Belyea, Agricultural Demand-Side Management, NRAES-65, Northeast Regional Agricultural Engineering Service, Cornell University, Ithaca, NY, 1992.

For more information

Information on different technologies and energy conservation opportunities are contained in the *Energy Conservation in Agriculture* publication series, available from Cooperative Extension Publications at http://cecommerce.uwex.edu.

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