University of Nebraska Lincoln

Nebraska Center For Energy Sciences Research

Water, Energy and Agriculture Initiative

BACKGROUND. Rapid expansion of the biofuel industry provides exciting opportunities for economic growth and development in rural Nebraska. Realizing the full benefits of this opportunity and ensuring its long-term viability depends on continued access to adequate supplies of water, electrical energy, and biofuel feedstock crops at reasonable cost. For example, about 70 percent of all corn and 50 percent of soybeans produced in Nebraska comes from irrigated land, and electrical energy for pumping irrigation water represents a major component of peak-load energy demand in the state. Reducing this peak-load electrical demand and consumption is essential for reducing the need for new generating capacity or peak-load energy purchases, thus avoiding increased costs for power. Similarly, increasing water use efficiency of irrigated crops reduces energy demand for irrigation and decreases water withdrawals to produce adequate feedstock supply, which conserves water resources.

GOAL. To maximize the efficiency with which water and energy resources are used to sustain economic development and water conservation in Nebraska agriculture.

PARTNERS. The Water, Energy and Agriculture Initiative was created in 2008 among Nebraska Public Power District, through the Nebraska Center for Energy Sciences Research, the Nebraska Corn Board, the Nebraska Soybean Board, and the Agricultural Research Division at the University of Nebraska – Lincoln.

PROJECTS. The following projects were selected for funding:

1. *Energy Conservation through Improved Irrigation Pumping Plant Performance* – William Kranz, Northeast Research and Extension Center;
2. *Improving the Efficiency of Water and Energy Use in Nebraska's Irrigation Soybean Production Systems* – James Specht, Department of Agronomy and Horticulture;
3. *Benchmarking Corn Water Productivity in Nebraska Irrigated Cropping Systems* – Kenneth Cassman, Department of Agronomy and Horticulture;
4. *Evaluation of Biofuel Driven Irrigation Pumps and/or Electric Generators for Use During Peak Electricity Demand – Milford Hanna, Industrial Agricultural Products Center and Department of Biological Systems Engineering*; and
5. *Optimization of Irrigation Efficiency of Center-pivot Systems Using Spatial and Temporal Data Integration* – Viacheslav Adamchuk, Department of Biological Systems Engineering.

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