

energizing

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Arkansas

Focusing on sustainable, cutting-edge & renewable energy alternatives

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lighting project
shows promise

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Cover: Dennis Carman, director of the White River Irrigation District, is administering a \$1 million federal grant to install state-of-the-art irrigation monitoring systems.

Alternative Lighting in Pilot Poultry House Project Shows Promise

Jerry Hutton has been around chickens all of his life. His family built some of the first chicken houses in the Prairie Grove area of Northwest Arkansas and today Hutton maintains eight houses. Last year, the University of Arkansas (U of A) Division of Agriculture approached Hutton about participating in a pilot energy efficiency project. "I've worked with the university before and am always willing to help when I can because they're real advocates for the farmer," Hutton said. "When they asked me to do this, it was just a natural to say 'yes.'" Funded by a \$1.5 million grant from the American Recovery and Reinvestment Act (ARRA) of 2009 and administered by the Arkansas Economic Development Commission's Energy Office, U of A researchers are testing alternative lighting for poultry houses.

Four of Hutton's houses, which typically use incandescent light bulbs, were replaced with a mix of LED (light-emitting diode) and compact fluorescent lights. Each house is 500-feet long with solid sidewalls. Dimmable LED bulbs were placed approximately every 10 feet and compact fluorescents were installed in the center. Previously, Hutton had no way of knowing what portion of his overall operating costs was dedicated to electricity. With the assistance of Ozarks Electric Cooperative, he and the U of A will soon be able to identify the amount of power used in the four pilot houses and compare the expected cost savings with his other houses.

"LED is a new technology and it's similar to the introduction of the cell phone 15 years ago," Dr. Susan Watkins, an associate professor in the U of A's Poultry Science Department, explained. LEDs



Studies indicate that alternative lighting may have a positive effect on bird weight and production numbers. According to Jerry Hutton, the chickens in the four houses where alternative lighting was installed have been larger and healthier.



Four of Jerry Hutton's poultry houses are being used in a University of Arkansas pilot energy efficiency project funded by an ARRA stimulus grant.

are actually semiconductor chips that directly convert electricity into light. LED bulbs that are the equivalent of a 25 to 35 watt incandescent bulb use about 0.7 watts. Unlike incandescent bulbs that have a filament that must be heated to produce light, LED bulbs don't have filaments that require heat, which is one of the reasons they are more efficient.

Prior to the pilot project with private producers, various energy efficient bulbs were, and continue to be, tested at the U of A Applied Broiler Research Farm. According to Tom

Dimmable LEDs, compact fluorescents and cold cathode lamps have all proved to be more energy-efficient than incandescent bulbs.

Tabler, manager of the research farm, all of the lights — dimmable LEDs, compact fluorescents and cold cathode lamps — have proved to be more energy efficient than incandescent bulbs. The cost savings at the research farm have been, on average, \$100 over a 45-day period, which is generally the amount of time commercial birds are raised before being slaughtered.

An added bonus of installing energy-efficient lighting appears to be a better product. Studies indicate that

alternative lighting does not appear to adversely affect bird weight or production numbers and may, in fact, have a positive effect on bird behavior. According to Hutton, the chickens in the four houses in which alternative lighting was installed have been larger and healthier. "These are some of the best birds I've ever raised," he said.

Installing LEDs has a high up-front cost. Bulbs can range from \$32 to \$45 each compared with \$0.50 for incandescents. However, the estimated LED life expectancy can range between 35,000 to 50,000 hours, compared to 6,000 hours for traditional bulbs. With a reduction in energy usage of up to 80 percent, poultry producers could recoup their initial investment within a short amount of time. Dr. Watkins said that LEDs will be a tougher sell to poultry farmers, but sees adoption of the technology getting less expensive as demand for the product increases.

"It all boils down to cost versus return, and if we can find ways of being neutral or make a little money and reduce energy needs at the same time, I think an awful lot of farmers will participate," Hutton said.

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Irrigation Pump Efficiencies

Saving Water in the Delta

Nothing is more important to a farmer than water. Irrigation techniques that use pumping systems to water crops are a necessity in agriculture, especially in the Arkansas Delta where the groundwater has been all but depleted. But irrigation systems are typically not as efficient as they should be. This can lead to water loss, overwatering and wastes in energy, money and time.

Through a USDA Natural Resources Conservation Service program, Arkansas received more than \$1 million to help farmers improve their irrigation operations. The money, which is administered by the White River Irrigation District, pays for 35 percent of the cost to install an innovative engine monitoring system called the pumpgenie. It works by tracking data regarding diesel engine or electric motor use in relation to the volume of water pumped in order to determine peak fuel efficiency.

The pumpgenie has multiple sensors that are installed on-site. They record an array of data, including the flow, rate and volume of water pumped, the operating pressure of the system, water depth in the well or pit, temperature, rainfall, oil pressure, oil temperature, engine RPM and fuel tank level. This data is recorded and transmitted to the farmers via the internet, cell phone or other remote handheld device.

Frank Prislovsky, who farms more than 3,000 acres of rice and soybeans near Stuttgart, Arkansas, was one of the first producers to participate in the program. "This has really been helpful for me. It lets me be in control of when and where I



The irrigation efficiency systems have multiple sensors, including water and fuel flow meters, and a water depth sensor. These sensors record valuable data such the flow rate, volume of water pumped, the operating pressure of the system and water depth in the well or pit.

want to irrigate and saves me time because I can turn my pumps on and off without driving hundreds of acres to do it manually," Prislovsky said.

According to Dennis Carman, director of the White River Irrigation District, reductions in fuel use are between 10 to 25 percent, which can translate into thousands of dollars saved for producers. Carman has 30 working units in place and expects to have 150 or more installed by the next irrigation season.

Energy Use in Agriculture: An analysis of food system energy use indicates that, while total per capita U.S. energy consumption fell by 1 percent between 2002 and 2007, food-related per capita energy use grew nearly 8 percent as the food industry relied on more energy-intensive technologies to produce more food per capita for more people.

— USDA Economic Research Service

Increasing efficiency in the agricultural sector can improve the financial situation of farmers and other producers, ease the burden on the electrical grid and decrease pollution and dependence on foreign oil. Millions of federal dollars have and continue to be funneled to states to promote energy efficiency and renewable energy technologies on farms and ranches. However, too many in the agriculture industry are not taking advantage of these grants, loans and rebates.

Why? On the federal level, two major hurdles in getting more participation is the complicated application process and the detailed reporting requirements that are sometimes required even after grant projects have been completed. Virtually all federal grants and loans designed to support or finance on-farm projects require a completed energy audit as part of the application. To date, energy audits have been one of the largest obstacles farmers had to overcome in gaining access to USDA-based energy conservation programs. Qualified auditors have been in short supply and audits for farm operations are both complicated and expensive. Most farmers are not in a position to pay the

up-front cost of an audit on the chance that their project will be approved for loan and/or grant funding.

For several years, Arkansas has missed out on a large portion of funding because of its lack of auditors. Arkansas Resource Conservation and Development Councils (RC&D Councils) and the Arkansas Farm Bureau Federation have stepped up to lead the effort in obtaining the training necessary to conduct energy assessments. These assessments are then sent to companies that take the information and provide federally accepted audits.

On our end, we, as a state, must do a better job of raising awareness and sharing information. This includes forming new collaborations that may not normally share resources. It includes establishing new visions that help the agricultural community realize the benefits of more efficient energy use in operations and processes,

as well as issues related to increasing sustainability in this sector. Arkansas has traditionally ranked near the bottom of all states in receiving funding from the Rural Energy for America program. Last year, Arkansas was awarded just over \$70,000 in funding. However, because of the increased efforts in communication and application assistance, the state recently received nearly \$1 million in grant funding to assist farmers and rural small businesses in making energy efficiency improvements and adding renewable energy systems to their operations.

“Energy costs are by far the largest financial inputs for producers,” Tom Riley, director of the University of Arkansas Division of Agriculture Public Policy Center, said. “Reducing energy costs means increasing profitability, which is good for the agriculture industry and the state as a whole.”

“Reducing energy costs means increasing profitability.”

USDA Program Provides Grants for Energy Efficient Mechanisms in Agriculture

Drying grain such as rice or soybeans is a slow, energy intensive process. It is also an area in agricultural production where energy efficiency is low. The USDA Rural Energy for America Program (REAP) provides funds to agricultural producers and rural small businesses to purchase and install renewable energy systems and to make energy efficiency improvements.

In 2009, Billy Weitkamp, a third-generation farmer in Randolph County, received a \$6,200 REAP grant to offset 25 percent of the cost of variable frequency drives to power fans on two of his five grain drying bins. Most electric motors start and run at a nearly constant speed, yet oftentimes the devices they drive would be more efficient if the speed could be varied. A variable frequency drive can accommodate this speed reduction by varying the motor speed to match the output needs. "My original diesel motors had a high start-up demand. They'd immediately go to 1,780 rpm. The variable drives start at zero, and I control when and how high I want to adjust the rpms depending on the moisture content of what I'm drying and other variables," Weitkamp explained.

The 2002 Farm Bill was the first to include an Energy Title, which added new energy efficiency programs. REAP is one of the USDA's largest programs although the application process is lengthy and complicated. The program requires applicants to have either an energy audit or assessment as a condition of eligibility for certain grants and loans. The 2008 Farm Bill more than doubled the funding for REAP, and also introduced a new grant program largely devoted to funding energy audit programs. Arkansas has historically not received as much REAP funds as other states, partially due to its lack of USDA-certified auditors. Although the state has an abundance of engineers, most do not have the

training to conduct audits to REAP specifications.

Last year, the Arkansas Resource Conservation and Development Councils (RC&D Councils) received a grant from the Arkansas Economic Development Commission to train eight data collectors to conduct energy assessments.

Billy Weitkamp, a third-generation farmer in Randolph County, replaced two power fans on his grain drying bins to variable frequency drives. A USDA REAP grant he received offset 25 percent of the cost. In August, the USDA announced the state had been awarded \$1 million in REAP funding.



The grant process for REAP can be time consuming and overwhelming, but the RC&D Councils are assisting producers so Arkansas can increase its share of REAP funds.

TREND WATCH



A variable speed drive is a piece of equipment that regulates the speed and rotational force, or torque output, of an electric motor. By matching the speed of the motor-driven equipment to the process, farmers can reduce operating costs and improve overall efficiency.

The collectors are trained to compile data from interviews with poultry and grain farm operators. They gather on-site information on poultry house equipment, grain dryers and irrigation systems they currently use. In addition, they collect data from motor ventilation systems and identify types of fans, lighting and controls and insulation on doors and side-walls of poultry houses. Photographs are taken to accompany the documentation. After compiling the information, they input the data into spreadsheets to be incorporated into an energy audit report. The audit can then be used by the farmer to prioritize energy efficiency improvements.

The grant process for REAP can be time consuming and overwhelming, but the RC&D Councils are assisting producers so Arkansas can increase its share of REAP funds. “The Ozark Foothills RC&D Council took a lot of the pressure off of me,” Weitkamp said. “They helped with the application and walked me through the steps. I couldn’t have done it without them. In fact, I probably wouldn’t have done it without them.” The effort appears to be paying off. In August, the USDA announced the state had been awarded \$1 million in REAP funding.

■ **North Little Rock Selects Wisconsin-based Firm for CNG Project.** North Little Rock officials have chosen DCH Enterprises of Madison, Wisconsin, to oversee construction of a compressed natural gas (CNG) fueling station. The city-owned station will cost approximately \$600,000 to build. It is scheduled for completion by March 2011 and will be the only CNG fueling station in central Arkansas.

■ **State Utilities Offering Gas Efficiency Rebates.** Customers of CenterPoint Energy, Arkansas Oklahoma Gas Corp. and Arkansas Western Gas are eligible to receive rebates on purchases of energy-efficient products. The efficiency programs last until June 2011 and could be extended. Depending on the level of efficiency, customers can receive rebates of \$150 to \$300 on the purchases of new furnaces or space-heating systems. Utility customers can also receive a \$50 rebate for an efficient water heater and \$250 on a tankless water heater.

■ **\$20 million Grant awarded to Arkansas Universities for Renewable Energy Research.** Seven Arkansas universities will share a \$20 million grant to conduct research on renewable energy resources. The money will be used to support three multi-campus research networks with the purchase of laboratory equipment and other supplies as well as with stipends for students involved in the research. Researchers at the schools will study wind, solar and bio-based energy sources.

■ **Arkansas Receives Additional Funding for Weatherization Program.** Arkansas has been selected to receive more than \$2.3 million in additional funding under the American Recovery and Reinvestment Act (ARRA) to build on the state’s weatherization program and continue to accelerate the pace of energy efficiency improvements. To date, Arkansas has weatherized more than 2,000 homes under ARRA and supported nearly 160 jobs. The funding will allow local agencies to install new high-efficiency, ENERGY STAR-qualified items including air conditioning systems, clothes washers, and water heaters in residents’ homes.





900 W. Capitol Avenue, Suite 400
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MARK YOUR CALENDAR

Arkansas Earth Institute Friendraiser

November 6, 2010, 6:00 p.m. – 9:00 p.m. • Allsopp Park, Little Rock, Arkansas

The Arkansas Earth Institute (AEI) is an affiliate of the Northwest Earth Institute (NWEI), which is recognized as a national leader in developing innovative programs that empower individuals and organizations to protect the earth. These programs emphasize individual responsibility, the importance of a supportive community, and the dual need to walk lightly on and to take action for the earth. For more information, e-mail info@arkansasearth.org or call (501) 213-5388.

Water Law and Policy: Navigating the Maze

November 9, 2010, 8:00 a.m. – 4:00 p.m. • 4-H Center, Ferndale, Arkansas

This biennial water conference co-hosted by the U of A Division of Agriculture Public Policy Center and the UALR Bowen School of Law will bring participants together with specialists, academics, environmentalists, attorneys and others to address water quality and quantity issues facing Arkansas. To register, go to ppc.uaex.edu. For more information, contact Debbie Henry at dhenry@uaex.edu or (501) 671-2299.

Building Control & Verification Presentation

November 23, 2010 • St. Thomas Episcopal Church, Springdale, Arkansas

Hosted by the U.S. Green Building Council - Arkansas. For more information about this and other presentations, go to www.usgbc-wbac.org.

Energizing Arkansas is a joint education project of the Arkansas Energy Office of the Arkansas Economic Development Commission and the University of Arkansas Division of Agriculture Public Policy Center. The goal of this newsletter is to provide timely, informative articles on the development of energy efficiency, renewable energy and energy policy in Arkansas. Each issue of Energizing Arkansas will explore new research and technology in the bioenergy sector, examine the economic, environmental and policy impacts of bioenergy and spotlight people and organizations leading the pack in sustainable, renewable energy.

Electronic versions of the newsletter as well as an accompanying video clip highlighting one of the stories featured in each issue may be accessed at www.arkansasenergy.org or at ppc.uaex.edu. E-mail your questions or comments to energizingarkansas@uaex.edu.

