



SECTOR OVERVIEW

Agricultural Energy Efficiency



BPA's energy efficiency program for agriculture offers a unique opportunity for utilities to gain significant energy savings working with a relatively small number of customers.

The agricultural sector includes electricity used by a farm or business to apply water for food production or vegetation growth or by a ranch, dairy or aquaculture business that breeds or raises domestic livestock, poultry, game animals, fish, oysters and the like.

The Northwest Power and Conservation Council's Sixth Power Plan recognizes that the agricultural sector presents significant energy saving opportunities for local utilities. Of 504 average megawatts of savings the plan calls on public power to capture over the next five years, BPA expects to acquire 20 average megawatts from agricultural sector utility programs.

BPA has contracted with state resource conservation and development councils to help utilities work with their local council to reach agricultural producers in their service territory. Resource conservation and development councils have existing relationships with agricultural producers and can help communicate utility energy saving programs to them.

BPA supports agricultural energy efficiency programs with financial incentives to utilities. These incentives can reduce the cost of upgrading to energy efficient options for utility customers and help offset utility implementation costs. The specific reimbursement varies by program. For specific amounts, please see the BPA Energy Efficiency Implementation Manual.

Agricultural energy efficiency opportunities

Scientific irrigation scheduling

Scientific irrigation scheduling accounts for approximately 17 percent of the energy savings goal for the agricultural

sector. Scientific irrigation scheduling helps irrigators know exactly when and how much to irrigate crops through a system that monitors weather and soil moisture data. This reduces energy costs for pumping water, conserves water and can reduce fertilizer use and runoff.

A BPA scientific irrigation scheduling measurement and verification calculator helps utilities estimate a producer's energy savings. BPA staff can help utilities use the calculator and record the estimated savings.

Pump testing

To determine the viability of implementing irrigation system efficiencies, a pump test should be performed at the producer's location. Using the BPA screening tool, the utility will either perform the pump test or subcontract to another experienced entity to perform a pump test on electrically powered pumps of 20 horsepower or greater to identify opportunities for energy saving improvements.

Irrigation hardware

Irrigation hardware initiatives account for approximately 55 percent of the energy savings target for the agricultural sector. Utilities can capture more energy savings by offering incentives to customers to upgrade their irrigation hardware and make their equipment more efficient.

- **Pumps:** Opportunities include low-pressure conversion for center pivots and laterals, reduction of friction losses in piping and rebuilding pumps and trimming pump impellers.
- **Replacement motors:** Utilities can receive incentives when their customers replace their older rewind motors with new and more energy efficient motors



that meet or exceed National Electrical Manufacturers Association standards.

- **Motor rewinding:** Utilities can offer their customers the opportunity to receive a reimbursement of \$1 per horsepower to make their existing motors more efficient by participating in the Green Motors Initiative. The Green Motors Initiative is a direct acquisition program in which BPA reimburses participating service centers per horsepower to rewind motors.
- **Variable frequency drives on agricultural turbine pump applications:** Utilities can receive incentives when their customers install variable frequency drives on turbine pump applications. BPA offers deemed measures for variable frequency drives that are 500 horsepower or less. Incentives for variable frequency drives that are greater than 500 horsepower are available by submitting custom projects.
- **Variable frequency drives on dairy applications:** Utilities can receive incentives for verified variable frequency drive installations of 10 horsepower or less on small milking machines at customers' dairies. Utilities may also receive incentives for installations of variable frequency drives that are larger than 10 horsepower at customers' dairies by submitting custom project requests.

Irrigation system equipment

Water delivery equipment in irrigation systems accounts for approximately 19 percent of the energy savings goal for the agricultural sector. BPA offers incentives on replacement equipment to encourage upgrading to more efficient options. Many times this hardware goes years without maintenance or replacement. The orifices of nozzles become worn out and larger than originals. This leads to leaks, inefficient application of water, soil erosion and unnecessary energy use through pumping too much water. The systems covered include:

- Sprinklers
- Nozzles
- Gaskets
- Drop Tubes

Lighting

Lighting and related initiatives account for approximately 9 percent of the energy savings goal for the agricultural sector. BPA offers a wide variety of incentives related to lighting retrofits and new construction. The reimbursement amount depends on the type of lighting being replaced or installed. New T8 fluorescent lights are much more efficient than the older T12 tubes, so BPA offers incentives to encourage replacement of the older tubes. Incentives are

available for T-5HO lighting when replacing less efficient lighting in metal halide shops and warehouse locations. BPA also offers incentives for other types of lighting including light emitting diodes and induction lamps.

Reducing the time that lights are on saves energy used not only by the lights but also by systems that cool the space. Therefore, BPA also offers incentives for lighting control systems such as occupancy sensors, timers and photocells.

Stock water tanks

BPA offers an incentive for removing old heated stock water tanks and replacing them with a zero-energy stock water tanks. Older tanks freeze during the winter and prevent livestock from drinking. Thus, many have electric resistance heaters to keep water above the freezing point. Newer zero-energy versions prevent freezing with an insulated enclosure over the water and a "door" the livestock can drink through. The elimination of the heaters save significant amounts of power and BPA recognizes this through an incentive.

Custom projects

BPA offers custom projects for utilities to take advantage of energy conservation measures that are not recognized in the BPA Energy Efficiency Implementation Manual. Through the custom project approach, utilities and their customers submit ideas for projects to BPA. Each project is reviewed and approved based on a benefit-cost analysis. Examples of projects that have been approved include:

- Replacing pumps with more efficient ones.
- Converting sprinklers to low-pressure versions, reducing required pumping pressure and providing pump energy savings.
- Converting pivots and lateral systems to low-energy precision applications, which reduces pumping pressure and, hence, energy consumption.
- Applying weather-driven irrigation controllers, standard sprinkler measures, motor improvements and variable frequency drive controls for turf irrigation, which saves energy at municipalities, golf courses and other locations.
- Improving nursery and greenhouse air handling, humidity and temperature controls and irrigation.
- Reducing heating, ventilation and humidification/dehumidification through improved controls.

For more information

Please visit www.bpa.gov/go/agriculture.