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# Energy Conservation **Agricultural** Quickstart Guide





## Introduction

Bonneville Power Administration's (BPA) energy conservation group works with utility customers to meet energy-saving targets established in the Northwest Power and Conservation Council's Power Plan. To support this objective, BPA's Agricultural sector develops measures, programs, and opportunities identified in the Implementation Manual (IM) that utilities can implement within their service territories.

This guide is intended as a resource for utilities to identify measures, programs, and opportunities that can strengthen their energy efficiency initiatives and keep power rates low. For specifics on the complete suite of Agricultural sector program guidelines and requirements, please consult the BPA Implementation Manual.

## What is the Implementation Manual?

The Implementation Manual provides the guidelines and requirements for implementing energy conservation projects in the region. The IM describes the requirements that BPA's public and federal utility customers must meet to receive incentive payments and savings credits for conservation accomplishments.

BPA publishes the IM once a rate period (every three years) and updates it every six months (in April and October). These six-month, or mid-cycle updates are revisions or amendments that address critical changes, such as new policy directives, urgent regulatory requirements, or significant adjustments that cannot wait for the next annual publication. The IM is available on the BPA energy conservation webpage.

## Energy Conservation Measures

BPA's agricultural sector offers a range of programs and measure opportunities to help customer utilities serve their agricultural consumers and meet their energy conservation goals. The agricultural sector offers a number of measures, including on-farm energy audits, pump testing, irrigation system conversions and hardware upgrades, Variable Frequency Drives (VFDs) for agricultural pumps, high efficient pumps, and custom project opportunities for dairies and wineries.

Agricultural energy conservation is primarily offered through Unit Energy Savings (UES) measures listed in the IM. The BPA engineering team is available for custom projects in technologies that aren't available in the IM. Priority measures in the Agricultural sector are detailed in the following pages.

## Agricultural Energy Audit Screening

The initial screening helps determine if a detailed on-farm energy audit is right for a dairy. It's a quick look at the farm's energy use, daily production, and equipment (like milk cooling, ventilation, and water heating). To get started, farmers fill out the BPA Ag Energy Audit Screening Tool form with help from their electric utility or with an experienced agricultural energy auditor.

## On-Farm Energy Audits

Energy audits offer dairy farmers an opportunity to cut energy costs and improve operations. This is a thorough energy audit done by a professional to find ways to reduce energy use specifically for dairy farms. This can include things like plate coolers, variable speed drives for vacuum pumps, compressor heat recovery, and other custom energy-saving projects. An experienced agricultural energy auditor will examine and analyze milking parlors, cooling systems, barns, and other dairy processes to pinpoint exact areas where energy can be saved.

## Irrigation

### *Irrigation System Conversions*

Switching irrigation systems can provide more uniform irrigation application for crops by lowering sprinkler heads closer to the ground. When sprinkler heads are closer to the crops they water, it reduces water evaporation and also reduces the overall pressure needed to get it there. This conserves energy and water and saves money. This may also include low pressure conversion for center pivots and laterals, reducing friction losses in piping, and rebuilding or replacing pumps and trimming pump impellers. Irrigation systems conversions include:

- **Low Elevation Spray Application (LESA)** systems lower sprinkler heads closer to the ground (12-18 inches)
- **Mid-Elevation Spray Application (MESA)** systems use sprinklers that operate within 5-10 feet above the ground.
- **Low Elevation Precision Application (LEPA)** systems use sprinklers or bubblers that operate at the ground level.
- **Mobile Drip Irrigation (MDI)** systems operate at the ground level and use level drip tubing attached to the end of drop tubes.

### *Pump Testing*

Pump testing can identify opportunities to increase the efficiency of a pumping plant and irrigation delivery system.

### *VFDs for Irrigation Pumps*

VFDs adjust water pump motor speed to match changing irrigation needs and control the frequency of electrical power that's supplied to a motor. Even small speed adjustments can create big energy savings, as much as 20 percent, plus greater precision and more control over water distribution and pressure (and helps the pump match-flow requirements).



## High Efficiency Irrigation Pumps

Some irrigation pumps may wear out, become less efficient over time, or be incompatible with a farm's irrigation system requirements. Installing a new, more efficient pump improves operation and saves energy.

## Irrigation Hardware Upgrades

New nozzles and gaskets provide more uniform water application and save energy. Making the switch is one of the easiest ways to start saving water and power. Learn more about irrigation sprinkler equipment by visiting these websites.

- [Washington State University- Irrigation in the Pacific Northwest](#)
- [Oregon State University - Irrigation](#)
- [University of Idaho - Irrigation Water Management](#)
- [Nelson Effective Irrigation Technologies](#)
- [Senninger - Irrigation Management Tools and Resources](#)

## Thermostatically Controlled Outlets

Thermostatically controlled outlets (TCOs) offer significant energy savings for agricultural users by intelligently managing electric heaters in various settings like pump houses or livestock buildings. Instead of continuously running, TCOs activate heaters only when temperatures drop below a set point (e.g., 39°F) and deactivate them once a slightly higher temperature (e.g., 50°F) is reached, preventing freezing while avoiding unnecessary energy consumption and reducing operational costs. This optimized heating not only saves money but also helps protect sensitive equipment and maintain suitable environments for livestock.

## Livestock Waterers

Anyone caring for livestock during the winter months knows an immersion tank heater uses a lot of electricity. Replacing the tank with an energy-free tank or adding a thermostatically controlled outlet to limit tank-heater operation on freezing days provides fresh water to animals—and saves electricity.

## Dairies

BPA supports utility incentives in dairies that include barn and area LED lighting, chiller improvements, heat pump water heaters, and VFD applications on milking vacuum pumps and milk transfer pumps.

## Wineries

Many processing applications at wineries—including crushing, destemming, pumping, cooling, and fermenting—are ripe for energy improvements. Lighting upgrades, HVAC, pipe insulation, compressed air, VFDs, and refrigeration are all eligible opportunities for incentives.



## Custom Projects

Custom projects offer a flexible and impactful pathway to achieve deep energy savings that other measures may not address. These projects involve a comprehensive, site-specific engineering approach to identify and implement unique energy efficiency upgrades tailored precisely to an individual farm's complex operations.



### Example Project:



*BPA energy conservation grants funded Big Lost River Irrigation District's pipeline project, increasing water access, energy savings, and water conservation.*



## Getting Started

BPA provides the following resources to help utilities effectively market the benefits of their energy efficient products, programs, and rebate offers to their customers.

## Utility Resources

Access to Agricultural sector resources is as easy as reaching out to your Energy Conservation Account Executive (ECAE). They can help connect utilities with additional information for energy audits, irrigation pump testing, VFD for pumps, high-efficiency irrigation pumps, irrigation hardware upgrades, system conversions, and livestock waterers.

You can also consult the BPA Energy Conservation Quickstart Utility Guide for information including overviews, references, links to additional resources for common tasks, and activities and responses to your potential questions.

## AUG Meetings

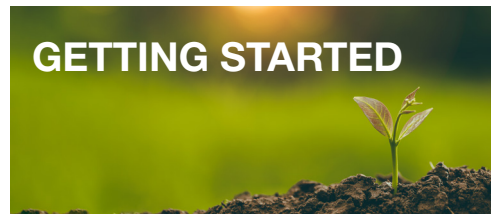
The Agricultural sector has the Agriculture Utility Group (AUG) that meets quarterly via conference call or webinar. BPA staff leads the meeting and presents topics such as new ag energy conservation opportunities, new ag equipment technologies, and regional ag trends. The AUG meeting also provides the opportunity for dialogue between utilities about ag energy conservation project installations in their service territory and how they assisted the ag producer. If you are not on the AUG meeting email distribution list or have not been invited in the past 6-12 months, please inform your ECAE so you can be added to the invitation list.

## Customer Service

ECAEs foster and maintain customer relationships with utilities, and serve as the primary support for BPA's Energy Conservation program. They lead the customer service team, which also includes field engineers and Program Compliance Specialist (PCS) for each utility. ECAEs collaborate with all BPA staff, third-party personnel, and contract support to oversee, coordinate, and execute all communications with utilities.

If a utility is interested in a building model to estimate potential energy savings, the ECAE can bring in a subject matter expert (SME), such as a program manager, engineer, or sector lead to perform a field visit.

For inquiries, feedback, or concerns regarding BPA's Energy Conservation program, your ECAE should be your initial point of contact. If the ECAE does not immediately have an answer, they will find it or facilitate a connection with the right person.



# Marketing Toolkit

Marketing tools and templates are available in the Agricultural Marketing Toolkit on [bpa.gov](http://bpa.gov). This suite of tools includes a wide range of customizable marketing templates, graphics, and stock photography available for download.

Utilities may also work directly with the BPA Marketing team to adapt toolkit materials if they lack the capacity or resources to work with the files. Your ECAE and Marketing team are happy to help you find a solution that meets your needs.

## Important Resources

- [Energy Conservation Implementation Manual](#)
- [The Document Library](#)
- [Utility Toolkit](#)
- [Agricultural Marketing Toolkit](#)



## AUDIT & EARN

AGRICULTURAL ENERGY AUDIT

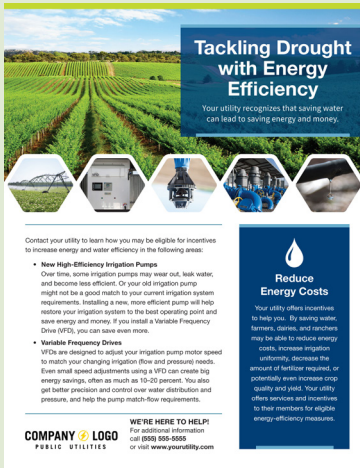
# \$150

Rebate for Energy Audit Screening

**COMPANY LOGO**

PUBLIC UTILITIES

*BPA marketing specialists are available to help brand and customize digital and print collateral.*



### Tackling Drought with Energy Efficiency

Your utility recognizes that saving water can lead to saving energy and money.

Contact your utility to learn how you may be eligible for incentives to increase energy and water efficiency in the following areas:

- **New High-Efficiency Irrigation Pumps:** Over time, some irrigation pumps may wear out, leak water, and become less efficient. Or your old irrigation pump might not be a good match to your current irrigation system requirements. Installing a new, more efficient pump will help reduce your irrigation system to the best operating point and save energy and money. If you install a Variable Frequency Drive (VFD), you can save even more.
- **Variable Frequency Drives:** VFDs are designed to adjust your irrigation pump motor speed to match your changing irrigation flow and pressure needs. From small speed adjustments using a VFD can create big energy savings, often as much as 10-20 percent. You also get better precision and control over water distribution and pressure, and help the pump match-flow requirements.

### Reduce Energy Costs

Your utility offers incentives to help you. By saving water, farmers, dairies, and ranchers may be able to reduce energy costs, increase irrigation uniformity, decrease the amount of fertilizer required, or potentially even increase crop quality and yield. Your utility offers services and incentives to help members to explore energy-efficiency measures.

**COMPANY LOGO**  
PUBLIC UTILITIES

**WE'RE HERE TO HELP!**  
For additional information call (509) 956-6000 or visit [www.yourutility.com](http://www.yourutility.com)



**Sprinkler Package Replacement**  
\$10-21 per installation

**Irrigation Pump Testing**  
\$100-600 based on system complexity

**COMPANY LOGO**  
PUBLIC UTILITIES

**CONTACT US**   **MORE INFO CALL US**  
(541) 332-3931



### Water Where You Need It

Lower your irrigation system, your on-field water, and your energy use!

VARIABLE FREQUENCY DRIVE  
VFD

MID-ELEVATION SPRAY APPLICATION  
MESA

LOW ELEVATION SPRAY APPLICATION  
LESA

LOW ELEVATION PRECISION APPLICATION  
LEPA

MOBILE DRIP IRRIGATION  
MOI

### Savings for Irrigators

Harney Electric Cooperative, Inc. offers eligible customers rebates for upgrading to lower elevation, more precise irrigation systems and VFDs.

Irrigators are constantly faced with increasing energy prices and demand on water, but there are opportunities to invest in efficient irrigation equipment with rebates to help lower your on-field water and energy use. It starts with lowering your irrigation system! Converting to drip irrigation or a linear/pivot system saves both water and energy. Goosenecks and drop tubes also reduce evaporation and increases water application by lowering the sprinkler to the ground. Which lower elevation irrigation system will depend on your crop type.

Variable Frequency Drives (VFDs) are designed to adjust water pump motor speed to match your changing irrigation needs, controlling the frequency of the electrical power that's supplied to your motor. One device is often all you will need to control your varying irrigation needs. Even small speed adjustments using a VFD can create big energy savings often as much as 20 percent! That means big savings today, and even bigger savings on your overall operation costs every year after installation!

**WE'RE HERE TO HELP!**  
To learn more, contact Harney Electric Cooperative, Inc. call (541) 573-2061 or email [hines@hec.coop](mailto:hines@hec.coop)

## Water Conservation in The Big Lost River Valley

**Project Background**

The Big Lost River Valley holds approximately 70,000 acres of farmland in the mountains of south-central Idaho. Water is the lifeblood of farmers in this mountainous region. For years, farmers relied on open canals to deliver their water, which presented challenges with losses through evaporation or leakage.

A system of pipelines was proposed to distribute water across the valley. The Big Lost River Irrigation District—within its broader scope of fairly and efficiently delivering irrigation water to the basin—assisted in the effort with Lost River Electric Co-op, Inc., Natural Resources Conservation Service, and participant irrigators to make it a reality. The pipeline project received funding through energy conservation grants from Bonneville Power Administration (BPA). As of early 2020, 11 systems have been or will be improved upon across the Big Lost River Valley. Once complete, more than 45 miles of line and/or pipe will serve a significant portion of the farmland in the valley.

**Results**

- **Improved water conservation:** In addition to the pipelines and liners, farmers received technical and financial assistance to help install low elevation spray application (LESA) sprinkler package on pivot irrigation systems to conserve water.
- **Energy Savings:** The Inlay Pipeline project resulted in 189,187 kWh of energy saved annually, while the Alekta Pipeline project delivered 83,678 kWh of energy savings annually.
- **Increased Water Availability:** Reduced losses in the delivery system are expected to provide additional water to the southern portion of the valley.



**252,865 kWh**  
Annual Energy Savings



Inlay pipeline farmer basin.



The pipeline project under way at Burnett Ditch.

**What ideas do you have to save energy?**

"Our cooperative mission is to provide safe and reliable electricity, sustainable energy solutions and quality member service, all at a fair and reasonable price."

Lost River Electric Cooperative, Inc.  
©2018 588-3311  
[www.lostriverelectriccoopinc.com](http://www.lostriverelectriccoopinc.com)



BPA can help customize a variety of materials to help utilities promote measures and rebates for their customers. This can include everything from social media graphics to project success posters, application forms, flyers, or bill inserts.

# Measure Summary Table

The payment levels described in this table provide a summary only and can change. Complete, up-to-date details of the payment levels and associated requirements are in the Agricultural Sector section of the [Implementation Manual](#).

## 7.1 INCENTIVE PAYMENT SUMMARY

MEASURE CATEGORY	INCENTIVE PAYMENT
7.2 Freeze Resistant Stock Water Tanks and/or Fountains	\$140 per tank or fountain (Heating Zone 1) \$165 per tank or fountain (Heating Zone 2) \$225 per tank or fountain (Heating Zone 3)
7.3 Thermostatically Controlled Outlets	\$14 per outlet
7.4 Transformer De-Energization	\$0.03 per kWh

## 7.5 Irrigation Measures

7.5.1 Irrigation System Conversion: LESA/LEPA/MDI	\$26 per drop
7.5.2 Sprinkler Package Replacement	Varies, see the Payment section of this measure
7.5.3 Irrigation System Low Pressure Conversion: High Pressure to Low Pressure	\$23 per head per Wheel line or Hand line \$23 per drop per Center pivot or Lateral move
7.5.4 Irrigation Hardware	Varies, see the Payment section of this measure

## 7.6 Agricultural Pumps and VFDs

7.6.1 Irrigation Pump Testing and System Analysis (BPA-Qualified)	Varies, see the Payment section of this measure
7.6.2 Variable Frequency Drive for Agricultural Centrifugal Pump (BPA-Qualified)	\$95 per VFD hp
7.6.3 Variable Frequency Drive for Agricultural Turbine Pumps (BPA-Qualified)	\$135 per VFD hp
7.6.4 Variable Frequency Drive for New Agricultural Pump (BPA-Qualified)	\$95 per VFD hp (new centrifugal pump) \$135 per VFD hp (new turbine pump)
7.6.5 Agricultural New Pump Efficiency Upgrade (BPA-Qualified)	\$95 per pump hp

## 7.7 Custom Projects

7.7.1 New Agricultural Construction	See section 4.1: Custom Project Payment Rate Table
7.7.2 Other Agricultural Measures	See section 4.1: Custom Project Payment Rate Table

## 7.8 Agricultural Energy Audits

7.8.1 Agricultural On farm Energy Audit Screening	\$150 per agricultural producer (e.g., farm, ranch, greenhouse, dairy, etc.)
7.8.2 Agricultural On farm Energy Audit	Lesser of actual energy audit cost minus any funding provided by other federal, state or local agencies, or \$15,000

## Additional Multisector Opportunities

Some Industrial and Commercial Sector measures may be applicable to Agricultural projects.

Measures eligible for installation in multiple sectors are identified where applicable in the body of the IM in the primary sector.



For more information, visit [bpa.gov](http://bpa.gov)

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