BONNEVILLE POWER ADMINISTRATION

# BPA ENERGY EFFICIENCY

# AGRICULTURAL

## NEW OPPORTUNITIES GUIDE

# Introduction

The Bonneville Power Administration, or BPA, energy-efficiency program is continuously evolving to meet Public Power's share of energy-savings targets laid out by the Northwest Power and Conservation Council's Power Plan. Strategically, BPA also uses energy efficiency to address future energy-resource constraints in a cost-effective manner. To achieve these two goals, BPA periodically reviews program offerings.

This Agricultural New Opportunities Guide is a resource that utilities can use to help identify measures, programs and opportunities that support their energy efficiency programs. This guide is also intended to help utilities suggest the most cost-effective measures to their growers, farmers and producers. Focusing on the following measures enables BPA, customer utilities and agricultural producers to earn energy savings in the most cost-effective manner. In turn, this may assist the utilities with keeping their power rates low.

For more information on the complete suite of Agriculture sector program components and offerings, please consult the BPA Implementation Manual.

# Agricultural Measures

BPA is changing its focus on agricultural measures to better align with our new Power Plan. Market transformation and widely accepted measures have made incentive offers unnecessary. Simply put, the market has changed and some measures are not competitive; therefore, people do not need incentives to adopt energy-efficiency products.

This New Opportunities in Agriculture Guide is intended to help utilities suggest the most cost-effective measures to their growers, farmers and producers. Focusing on the following measures enables BPA, customer utilities and agricultural producers to earn energy savings in the most cost-effective manner.

## Sector Offerings

# IRRIGATION

Moving water from rivers, wells, canals and ponds is an energy-intensive operation, which makes irrigation the largest energy-saving category in the Agricultural sector. BPA works with agricultural equipment manufacturers to list the most energy-efficient products and offer appropriate incentives for upgrades and new equipment

## 6.7.1 IRRIGATION PUMP TESTING AND SYSTEM ANALYSIS

For more complex irrigation systems, there are BPA-qualified measures that help to identify potential energy-efficiency improvements such as pump performance, system constraints, pressure-reduction opportunities and controls. To qualify, the pump test reimbursement is allowed on systems that are inefficient as determined by the Irrigation Pump Testing and System Analysis BPA Screening Tool, which is available in the Implementation Manual Document Library. The results of the pump test could be useful in developing the custom project proposal. This is a unique measure in that there is no energy savings associated with this energy efficiency incentive, or EEI, reimbursement.

### WATCHLIST

Check out this brief video from North Dakota State University's Ag Extension Office to learn more about irrigation pump testing.

## IRRIGATION HARDWARE AND PACKAGES

## 6.6.4 IRRIGATION HARDWARE

Many pressurized irrigation systems have potential for improvements in application efficiency and reducing leaks. BPA offers a suite of Unit Energy Savings, or UES, measures that will improve overall efficiency and leak reduction.

## 6.6.2 SPRINKLER PACKAGE REPLACEMENT

During the past 20 years, most center-pivot and linear-move irrigation systems have been converted from impact sprinklers on top of the pivot, to sprinklers on drop-tube hoses. This is called Mid Elevation Sprinkler Application, or MESA, and is five or six feet off the ground. Although the design is good, the regulator sprinkler and nozzle can become worn out. BPA offers a UES measure with energy savings for worn-out equipment.

## 6.6.1 CONVERSION FROM HIGH PRESSURE TO LOW ENERGY PRECISION AGRICULTURE, LOW ELEVATION SPRAY APPLICATION OR MOBILE DRIP IRRIGATION

Some center-pivot and linear-move systems with high-pressure sprinklers on top — also known as a Mid Elevation Sprinkler Application, or MESA — may want to convert to a Low Energy Precision Agriculture, or LEPA; Low Elevation Spray Application, or LESA; or Mobile Drip Irrigation, or MDI. The conversion to LEPA, LESA or MDI requires many additional sprinklers, and some design issues must be addressed by the irrigator and equipment dealer. Although this measure has a good UES incentive for conversions, it is not a good retrofit for many systems.

## 6.6.3 SYSTEM CONVERSION MESA

This UES measure offers incentives for the conversion of a high-pressure center pivot or linear-move system to MESA configuration.

### RESOURCES

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

Please note: BPA does not endorse any manufacturer, product selection, design, supplier or performance of any product.

## 6.7.5 AGRICULTURAL NEW PUMP EFFICIENCY UPGRADE (BPA QUALIFIED)

This measure replaces a worn-out turbine or centrifugal-style pump that is used for irrigation purposes. It has been observed that the routine rebuilding of pumps can lead to thin impellers that are inefficient or can fail.

For this easy-to-use UES measure, BPA assumed the pumps will be at least 10 years old or have been rebuilt a number of times, and that a new pump will be more efficient and generate energy savings.

## 6.7.1 VARIABLE FREQUENCY DRIVES IN AGRICULTURAL PUMP APPLICATIONS (BPA QUALIFIED)

This measure is set for centrifugal, turbine or submersible turbine pumps used for irrigation purposes, which operates at a fixed speed, but has a variation of flow or head requirements. The efficient case for this measure would have a Variable Frequency Drive, or VFD, to better match pump performance to system requirements.

This UES measure provides an annual energy savings of 10-20% of the average of the previous three operating year's annual energy use of the pump.

**WATCHLIST:**

Big Bertha: Pumping up Energy and Water Savings with a Variable Frequency Drive

## CUSTOM PROJECT OPPORTUNITIES

## VARIABLE RATE IRRIGATION SYSTEMS

- Variable Rate Irrigation a new application of precision agriculture on center pivots. At this time, BPA does not have a measure to address this new technology; however, BPA may be able to accommodate custom projects.

**WATCHLIST:**

- What is Variable Rate Irrigation
- NEEA: Agricultural Irrigation Initiative: Precision Water Application Test

# LIGHTING

## LED LIGHTING

Light Emitting Diode, or LED, lighting strategies are available for outdoor, arena, indoor and shop lighting. Use the BPA lighting calculator located on bpa.gov to determine incentives and estimate energy savings.

# DAIRIES

Dairies are keen on keeping their assets at peak performance. With more than 1,100 dairies in the Pacific Northwest alone, there are many opportunities to save energy with efficient enhancements, such as lighting upgrades, VFD-driven compressed air, VFDs on pumps, wastewater treatment heat exchangers and refrigerators. Contact your BPA engineer for assistance. Some dairy projects can be considered Custom Projects.

# BPA Resources

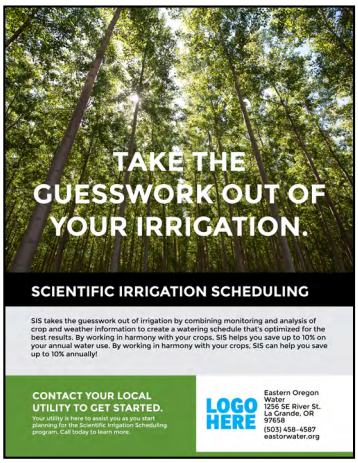
The following resources are available to help utilities optimize their working relationships with BPA, program operations and other personnel to support agriculture producers in their work to achieve better energy efficiency and savings.

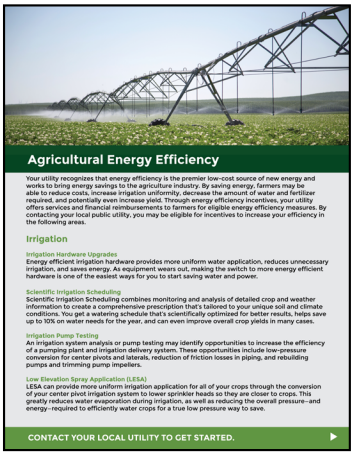
## MARKETING MATERIALS

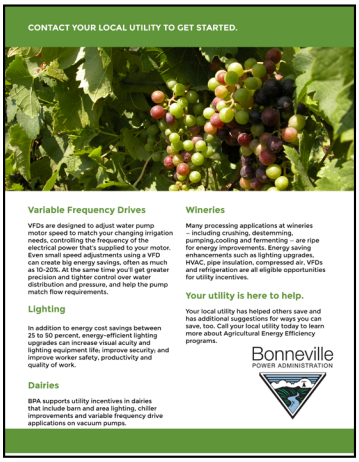
The primary tool BPA's Energy Efficiency Program Marketing team uses to help utilities communicate with their customers about energy efficiency is the Marketing Portal. The Marketing Portal offers a range of easily customizable, ready-made marketing materials and an image library to help utilities communicate about the benefits of energy-efficiency products and current rebate offers. Marketing resources are also located on the Agricultural Marketing Toolkit page on bpa.gov, but for ease of use, are not password protected.

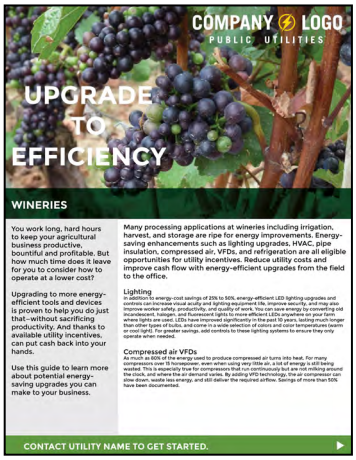
Utilities may also work directly with the Program Marketing team to adapt portal materials to their need if they lack the capability or resources to work with the files, or if they need a level of customization beyond what the portal offers. Remember that your EER and the marketing staff are happy to help you find a solution that meets your needs.



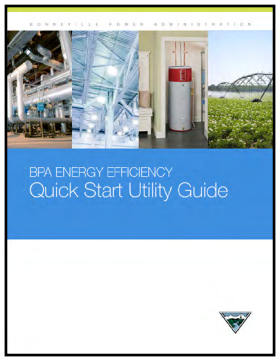




## GETTING STARTED WITH AGRICULTURAL PROGRAMS

Access to Agricultural sector resources is as easy as reaching out to your EER or BPA Customer Service Engineer, or CSE.

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




## CUSTOMER SERVICE

Energy Efficiency Representatives, or EERs, are accountable for building and maintaining customer relationships, and act as they key means to support Energy Efficiency's communication with utilities. EERs lead the Customer Service Team — composed of the EER, field engineer and the contracting officer's representative — for each utility. EERs work with all BPA staff, third-party staff and contract support to provide oversight, coordination, and the execution of communication to and from utilities. Your EER should be your first point of contact for any questions, comments or concerns about BPA's Energy Efficiency program. If your EER doesn't know the answer, he or she will find it and get back to you or put you in touch with the right person.

The EERs can bring in one of BPA's highly qualified subject matter experts, or SMEs. This could be a BPA engineer with years of knowledge and experience in the Agriculture sector, or it could be another SME. If a visit to the project site would help, BPA's engineers or other SME may be available to perform a field visit or observe the project using electronic mapping software. BPA is willing and interested in helping each utility provide solutions to farmers and agricultural producers, and the best point of contact is to start with an EER.

## USER GROUPS

The Agricultural sector has the Agriculture Utility Group, or AUG, that meets quarterly via conference call or webinar. BPA staff leads the meetings; business cases and examples presented by utilities with agriculture projects are often discussed. The AUG provides the opportunity for dialogue between utilities about the installation of projects and how the utility assisted the agriculture producer. If you are not on the AUG list or have not been invited in the past 6-12 months, please inform your EER so you can be added to the invitation list.

# 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.

| AGRICULTURAL | |
|---|---|
| **PROGRAM COMPONENT OR MEASURE** | **PAYMENT** |
| 6.2 Freeze-Resistant Stock Water Tanks/Fountains | $140-$225 per tank or fountain |
| 6.3 Thermostatically Controlled Outlets | $14 per outlet |
| 6.4 Thermostatically Controlled Stock Tanks | $52 per stock tank |
| 6.5 Transformer De-Energization | $0.03 per kWh |
| **6.6 Irrigation Measures** | |
| 6.6.1 Irrigation System Conversions: LESA/LEPA/MDI | $12 per drop |
| 6.6.2 Sprinkler Package Replacements | $3-$12 per drop |
| 6.6.3 Irrigation System Conversions: MESA | $10 per drop |
| 6.6.4 Irrigation Hardware | $1-$275 per measure |
| **6.7 Agricultural Pumps and VFDs** | |
| 6.7.1 Irrigation Pump Testing and System Analysis | $50-$300 per test or analysis |
| 6.7.2 Variable Frequency Drives for Centrifugal Agricultural Pumps (BPA-Qualified) | $50 per horsepower |
| 6.7.3 Variable Frequency Drives in Agricultural Turbine Pump Applications (BPA-Qualified) | $80 per horsepower |
| 6.7.4 Variable Frequency Drive for New Agriculture Pump Efficiency Installations (BPA-Qualified) | $50 per horsepower (New Centrifugal Pump)<br>$80 per horsepower (New Turbine Pump) |
| 6.7.5 Agricultural New Pump Efficiency Upgrade (BPA-Qualified) | $50 per horsepower |
| **Custom Projects** | |
| 6.8 New Agricultural Construction | See the Custom Projects Payment Table in the IM |
| 6.9 Other Agricultural Measures | See the Custom Projects Payment Table in the IM |