Agriculture Sector Update – Tom Osborn

Agricultural Sector

Harvesting EE Opportunities in Ag

Refresh on current program and available measures

LEPA/LESA

New measures Oct 2018

Future of Ag

Agricultural Sector

The Ag EE Team

David Lee – Sector Lead

Stephanie Vasquez-Pettit – Program Manager

Tom Osborn – Tech Lead

Dick Stroh – Guru

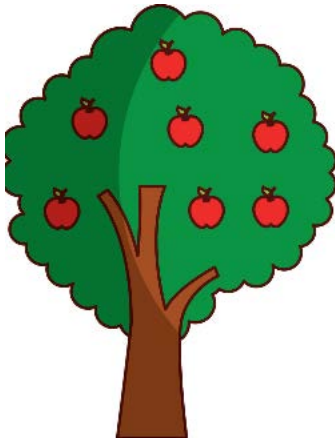
Boyd Wilson – EER representative

Charlie Weber – COTR rep

Our utility partners

Trade allies

Your customer



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Current Ag EE Assets

Historically 5-6aMW per year

Summer resource shape typically 24/7

Can help with summer DR

Sprinkler system hardware (UES includes LEPA/LESA)

Scientific Irrigation Scheduling (2.5 aMW/yr expiring Dec 2018)

Irrigation System and Pump Testing (helps Identify CPPs)

VFDs for Ag Turbine Pumps (BPA Qualified)

Transformer De-energization (seasonal - 3 utils)

LED Lighting upgrades – shops/outdoor /green houses (deemed calculators)

Compressed air for dairies (deemed VFD calculator feeds CPP)

Green Motor rewinds (through 2021)

Non electric stock water tank systems (UES)

Custom Projects (i.e. gravity feed, new pumps/motors, mainline, redesign, diary chillers, etc)

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LEPA LESA

Council identified this measure in 7th plan

WSU research shows 5-15% water savings – wrapped up field research 2017

May not save energy in areas where water is limited

LEPA LESA hardware can use existing UES measures.

LESA is gaining some traction in the PNW, especially S. Idaho

BPA added an incentive to fill out the LEPA or LESA project information form

This measure was added so that BPA and the RTF can collect field specific data on LEPA or LESA conversions.

Takes about ½ hour to fill out. Trade allies can fill this out.

Got 40 PIFs in 2016 and hopefully 40 in 2018

Took results to RTF in March 2018

Results indicate we continue same approach

LEPA / LESA Conversion

Project Information Form for BPA Qualified Measure (For Irrigation Efficiency Projects)

Instructions: To be eligible for this reimbursement, complete this form for *each* center pivot/lateral move irrigation system *converted* to Low Energy Precision Agriculture (LEPA) or Low Elevation Sprinkler Application (LESA). Complete this form with the best information you have, and submit it to your serving utility.

A. FARM AND SITE INFORMATION

SERVING UTILITY:

Farm Name:	City / State:	
Address:	Zip:	
Farm location address (if different from above):		
Meter or Account number of primary pumping plant:		
Estimated flow of pivot *before* conversion (gpm):	Estimated pivot run time (hrs/yr):	
Design flow of pivot *after* conversion to LEPA or LESA (gpm):	LEPA?	LESA?
What is primary pumping plant lift (feet) from water source (eg from well or canal water surface)?		
What is elevation at primary pumping plant (feet)?		
What is elevation of converted pivot (list ID number and elevation of pivot point)?		
What is the pivot pressure at the pivot point?		

B. IRRIGATION SYSTEM INFORMATION

Total irrigation system size (acres) served by irrigation pumping plant				
Number of acres under the pivot or lateral move irrigation system converted to LEPA/LESA				
Predominant Soil Type (description)	Terrain Type (description)			
	2013	2014	2015	2016
Crop type under the converted pivot				

C. ANNUAL ENERGY USAGE INFORMATION

Utility can complete this section.

	2013	2014	2015	2016*
Primary pumping plant (kWh)				
Booster pumps (kWh)				

*The 2016 data will be entered after completion of the 2016 irrigation season.

D. FINAL INFORMATION

Total Installed Cost of the conversion (before incentive) includes equipment, labor and tax $			
Did you receive any incentives?	☐ No	☐ Yes	
If yes, from whom?	☐ NRCS	☐ Serving Utility	☐ Other,

By signing this form, I confirm that the above information is correct to the best of my knowledge.

Representative Signature	Print Name Phone # ( )- -	Date / /

THANK YOU FOR FILLING OUT THIS FORM!

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New Oct 2018 Measures – BPA Qualified

VFDs

- Centrifugal Pumps - $50/HP, 10% savings if 20% head reduction
- New pump stations – $50/HP centrifugal , $80/HP Turbine

New more efficient pumps

- Replace that old worn out pump with a new more efficient pump
- $50/HP. A great deal!

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Centrifugal Pump VFD – BPA Qualified

VFDs

- Centrifugal Pumps - $50/HP, 10% savings if 20% head reduction

- **Preconditions:**
- The VFDs for agriculture pumping system with the following characteristics:

- A fixed speed centrifugal pumping plant ranging from 20 to 500 horsepower,

- Eligible installations are limited to pumps with substantial variation in head pressure requirements (20 percent variation or more).

- **Post-conditions:**

- Add a VFD that will reduce pressure to better serve the irrigation system and save energy.

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New Pump Station VFDs – BPA Qualified

VFDs

- New pump stations – $50/HP centrifugal , $80/HP Turbine

- **Preconditions:**
- The VFDs for new agriculture pumping system with the following characteristics:

- The baseline is a newly installed fixed-speed pumping plant ranging from 20 to 500 horsepower,

- Variation in flow rates (20 percent variation or more for turbine pumps) or discharge pressure requirements (10 percent variation or more for turbine pumps, or 20 percent variation or more for centrifugal pumps).
- **Post-conditions:**

- Add a new pumping plant that will reduce pressure or flow to better serve the irrigation system and save energy.

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New Efficient Pumps – BPA Qualified

New more efficient pumps

- Preconditions:
- The eligible agriculture pumping system with the following characteristics:

- • An installed irrigation pump ranging from 20 to 500 horsepower,
- • The existing pump must be centrifugal, turbine or submersible,
- • The existing pump is believed to be inefficient where the new pump will be better matched to the irrigation system requirements, be more efficient and as a result it will reduce energy usage and will save energy.

- Post-conditions:
- • A new more efficient pump.
- • The new replacement pump must have the same or lower horsepower rating,
- • If there is no nameplate, contact your energy efficiency engineer to help you convert utility kW readings to horsepower.

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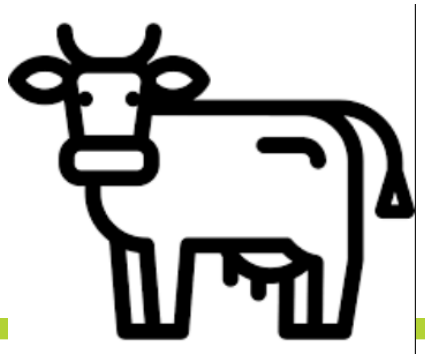
New Oct 2018 Measures – RTF approved

Thermostat Controllers

- Pump house heaters
- Reimbursement $14 per pump house ($25 on line)

Thermostatically Controlled

- Stock-water tank de-icers
- Reimbursement $52 per stock tank ($35-75 on line)



Pump House Heaters

RTF assumed equipment is operating 75% of time when the following are true:

Base Case

- Month is within the assumed installed/removed month range

- AND -

- Temperature is below minimum thermostat setting (45° F)

Efficient Case

- Month is within the assumed installed/removed month range

- AND -

- Temperature is below outlet "on" thermostat setting (35° F)

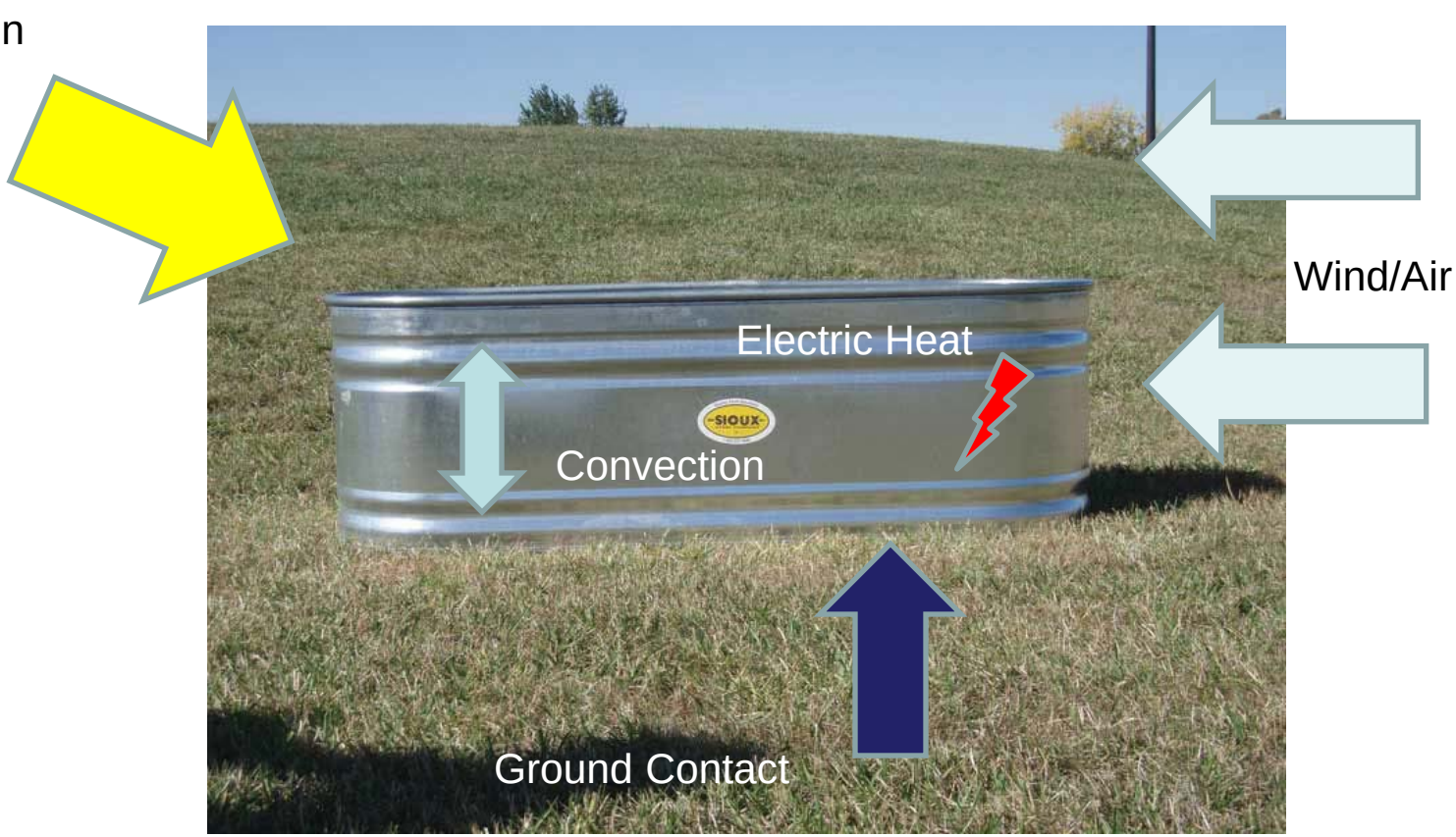
- OR -

- Temperature is below outlet "off" thermostat setting (45° F) AND equipment was on in the previous hour.

Stock Tank Heaters

- RTF analysis showed equipment installed in months where below freezing conditions are experienced for more than a few hours
- Water temperature is an average of the air temperature in the current and previous three hours
- Thermostat control turns on at 35 degrees to prevent freezing
- To account for heat retention and heater cycling, stock tank de-icers assumed to operate 75% of the time water under 35 degrees
- Controlled stock tank de-icers replace de-icers with equivalent wattage

Measure UES Analysis



Measure Overview

Floating

Submersible

Drain Plug

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Near Term Work

Resource Plan

Ensure that Ag provides the energy savings at the time and price we need.

Pivots

- Collect data on pivot and sprinkler system health (2018) (IPCo as well)
- VRI project data collection in 2018
- Investigate a higher incentive for the new low pressure end gun sprinklers

Hardware

- Seen by RTF as Maintenance verses BPAs view as retrofit.
- Changed CE of UES, therefore may become BPA Q

Pumps

- Market the Pump Testing program and marketing (see new flyer)

IRRIGATION PUMP TESTING

Pump-efficiency testing provides vital information that can help you decide when to retrofit, repair, or replace an inefficient pump. Pumps can become inefficient due to wear and tear, age, or if the pump is not matched for current operating conditions, such as when:

- Lower pressures or flows are required to serve the irrigation system
- Pump performance has degraded over time
- Irrigated land area has increased or decreased
- The water table has dropped over time

During testing, a qualified specialist will measure flowrate, pressure, lift, and energy consumption to determine the health of your pumping plant. They can also look at your irrigation system design to help you save energy and water. Pump testing and system analysis may identify energy savings associated with:

- Motor replacement
- Pump repair or replacement
- Replacement or trimming of the impeller
- Upgrade or add a variable frequency drive
- Mainline
- Low-pressure conversion

Contact your local utility to learn more about cost share for pump testing and system analysis, available energy-efficiency programs and incentives.

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Potential Ag EE Ideas

- Zonal Variable Rate Irrigation (only one CPP done, need more)
- Mobile Drip Irrigation (MDI) data coming from 3rd parties in 2018 (some Univ research and some field monitoring) (no savings in water short areas)
- Timer or internet control of pumps (verses 12 hour sets, work schedule) (a good measure in the 90's). Maybe come up with BPA Q for smaller pump stations
- New pivot control panels with phone apps (eg Ag Sense, Valley, Lindsay) (how to M&V). Can they track performance like SEM for Large Ag? How to deal with variables like yield, quality, seed variety, water variability, pests, fertilizer, precip, solar radiation, harvest date, buyer preference, market timing
- Explore Farm, Dealer and Food Processor connections?
- E3T?
- Other ideas?

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  - LEPA
  - **Agricultural Marketing Toolkit**

Energy Efficiency
Agricultural Marketing Toolkit

To help utilities reach out to their agricultural customers, BPA has created a suite of marketing materials to promote agricultural energy efficiency upgrades.

Guided by customer input BPA has developed a number of materials including bill inserts, informational flyers, print and web advertisements, and HTML email templates. All materials can be customized to suit a variety of needs to market to end users.

These materials are being provided in their source format (Adobe InDesign) so that customers can customize these tools to fit their needs. Should you need assistance with this customization, please contact the BPA marketing department. The BPA Photo Library also contains images that can be used with BPA marketing materials or additional customer communications.

Scientific Irrigation Scheduling

Scientific Irrigation Scheduling

Copy Library
Informational Flyer
Print Advertising

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Program Future

The loss of SIS measure and good CPPs allowed us to explore BPA Q opportunities.

The new BPA Resource Plan will help us guide our EE investments, improve the cost effectiveness and stability of Ag measures.

BPA willing to help you grow the market for Ag EE!

Contact your EER!