



Agricultural Utility Group Meeting

April 14, 2026



Agenda

Start Time	Agenda Item	BPA Staff
9:00 a.m.	Welcome, meeting norms, ice breaker, sector team, incentive reminders	David Lee
9:10 a.m.	Ag energy audit measures	David Lee
9:20 a.m.	Dairy unit energy savings (UES) measure opportunities efforts/Heat Pump Water Heater (HPWH) demonstration projects	David Lee / Keshmira Engineer
9:35 a.m.	BPA Marketing services	Robin Moodie
9:40 a.m.	Variable Frequency Drive (VFD) for Ag pumps calculator improvements overview	Kathy Yi
10:00 a.m.	VFD for Ag pumps calculator demonstration	Dick Stroh



Ag Customer Support Team Members

- David Lee – Ag Sector Lead / Program Manager
- Kathy Yi – Energy Conservation Account Exec. (ECAE)
- Lita Mahan – Ag Program Compliance Specialist (PCS)
- Ben Mabee – Planning and Evaluation
- Larry King – Ag Program Specialist
- Dick Stroh – Ag Engineer
- Keshmira Engineer – Emerging Tech
- Robin Moodie – Marketing Specialist
- Open Vacancy – Ag Tech Lead

Ag Incentive Changes Effective Oct. 1, 2025 - Reminder

Measure Name	Old Payment (\$)	New Payment (\$)
Sprinkler Conversion to MESA from High Pressure	18	23
Sprinkler Package Replacements High Pressure	16	18
Sprinkler Package Replacements MESA	15	21
Sprinkler Conversion to LESA/LEPA/MDI from High Pressure	18	26
Sprinkler Conversion to LESA/LEPA/MDI from MESA	18	26
Sprinkler Package Replacements LESA/LEPA/MDI	7	10
Sprinkler Conversion to Low pressure from High Pressure	16	23
New High Efficient Pump	70	95
VFD on New and Existing Irrigation Turbine Pumps	100	135
VFD on New and Existing Irrigation Centrifugal Pumps	70	95

What is an Ag Energy Audit?

- **Identifies/analyzes on-farm energy conservation opportunities in a comprehensive report for the farmer.**
 - **For example:**
 - Irrigation system conversions/hardware upgrades.
 - VFDs for pumps, pump efficiency upgrade.
 - General lighting upgrades.
 - Dairy farm energy conservation upgrades.
- **Follows American Society of Agricultural and Biological Engineers (ASABE) 2009 standard. Meets BPA Ag On-farm Energy Audit guidelines.**
- **Performed by a Certified Energy Manager (CEM), United States Department of Agriculture Natural Resources Conservation Service Technical Service Provider (USDA NRCS TSP), Professional Engineer (PE), or experienced Ag energy auditor.**

Why do it?



For the Utility

- **Creates pipeline of energy conservation projects.**
 - Assists in Energy Efficiency Incentive (EEI) spend planning.
- **Helps your members improve their farm operation.**



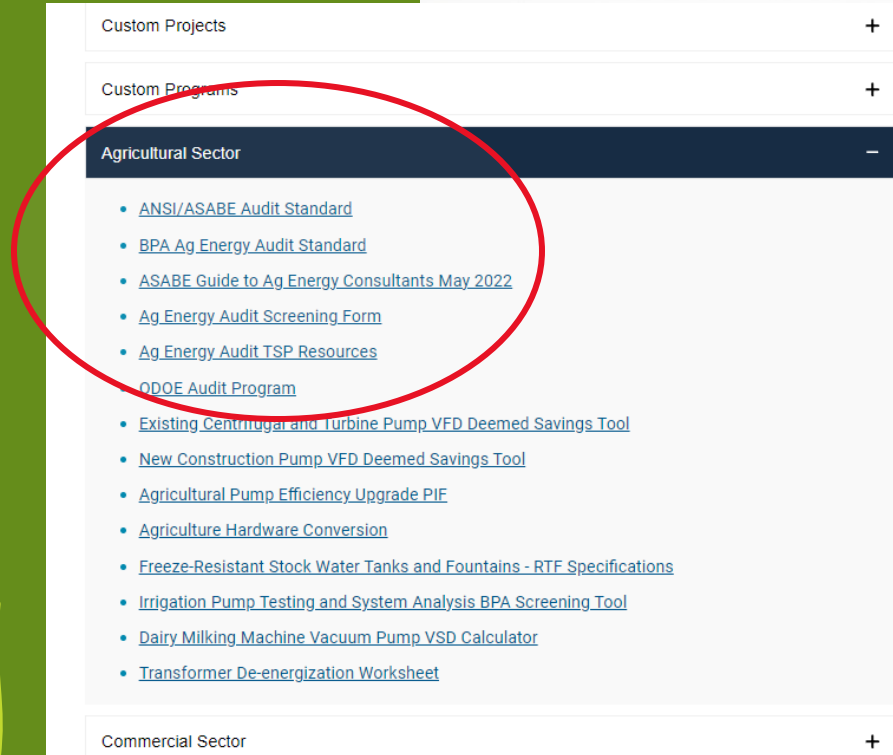
For the Farmer

- **Comprehensive Energy Audit Report.**
 - Business case for the farmer to make financial decision on implementing energy conservation projects.
 - Energy and operations and maintenance (O&M) cost savings
 - Available utility incentive
 - Available funding sources
 - Enables quick implementation of low-cost measures
 - Assists in planning for capital intensive projects
- **Completes necessary step to get USDA Rural Energy for America (REAP) guaranteed loan for energy conservation project funding.**

[Rural Energy for America Program Renewable Energy Systems & Energy Efficiency Improvement Guaranteed Loans | Rural Development](#)

Ag Energy Audit Measures Resources

Located in the BPA Document Library:
bpa.gov/energy-and-services/efficiency/document-library



Custom Projects +

Custom Programs +

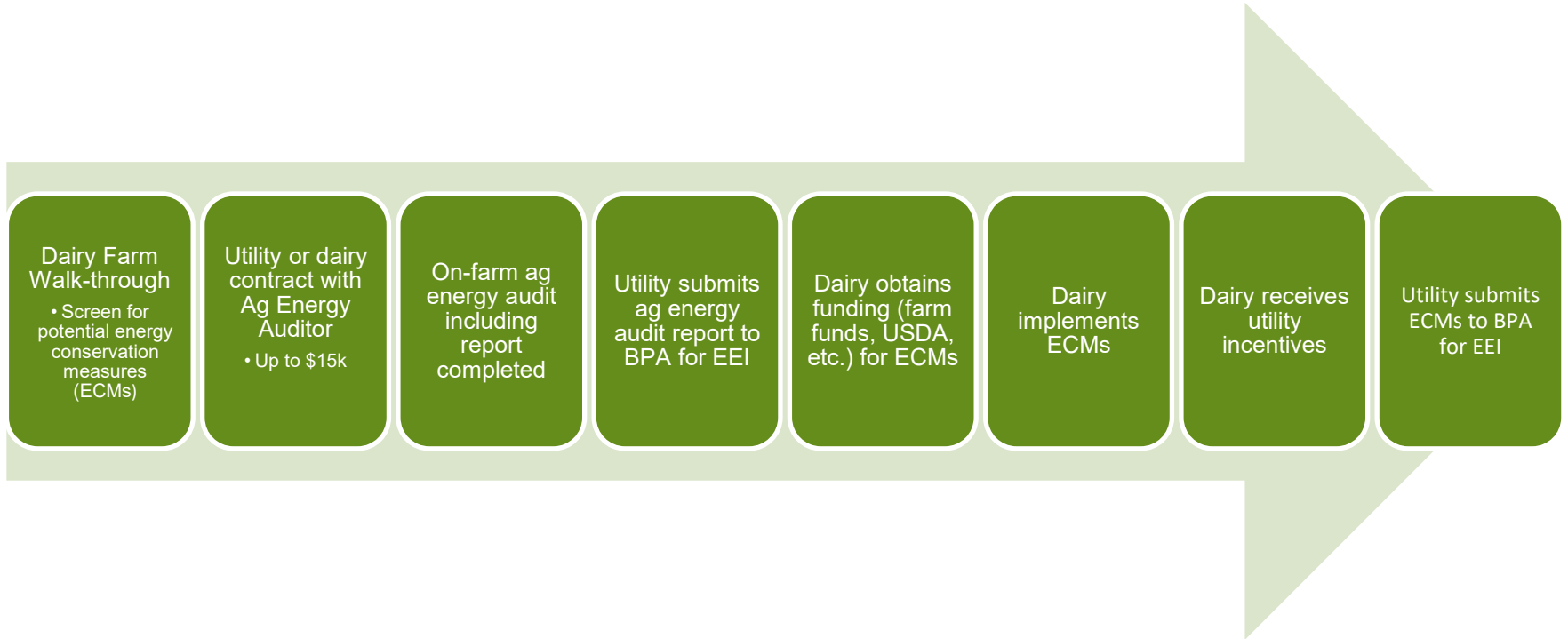
Agricultural Sector -

- [ANSI/ASABE Audit Standard](#)
- [BPA Ag Energy Audit Standard](#)
- [ASABE Guide to Ag Energy Consultants May 2022](#)
- [Ag Energy Audit Screening Form](#)
- [Ag Energy Audit TSP Resources](#)
- [ODOE Audit Program](#)
- [Existing Centrifugal and Turbine Pump VFD Deemed Savings Tool](#)
- [New Construction Pump VFD Deemed Savings Tool](#)
- [Agricultural Pump Efficiency Upgrade PIF](#)
- [Agriculture Hardware Conversion](#)
- [Freeze-Resistant Stock Water Tanks and Fountains - RTF Specifications](#)
- [Irrigation Pump Testing and System Analysis BPA Screening Tool](#)
- [Dairy Milking Machine Vacuum Pump VSD Calculator](#)
- [Transformer De-energization Worksheet](#)

Commercial Sector +



Dairy On-farm Energy Audit Process

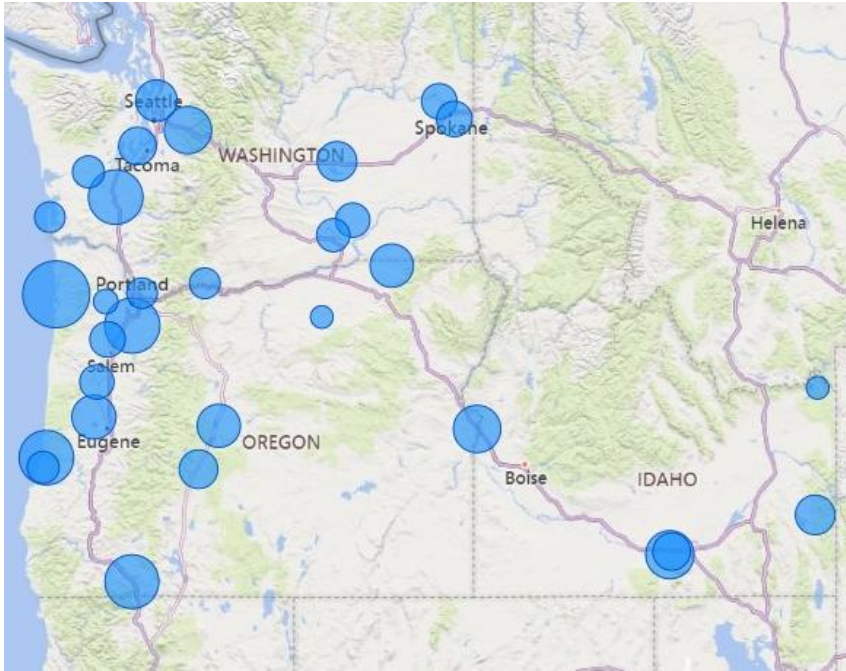


Dairy Farms

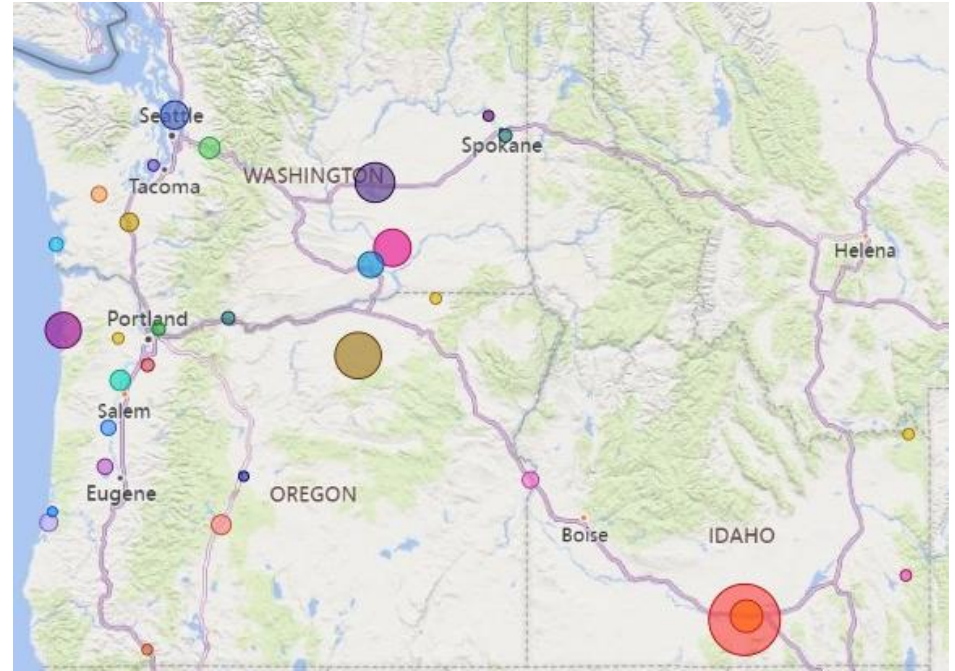


- Energy Intensive Operation.
- Power Council's 9th plan identified significant dairy energy savings potential (5-7 aMW).
- BPA Territory has ~300,000 dairy cows across ~600 dairy farms.
- Variable but controllable energy costs.
- New technologies open additional opportunities.
- Demonstrations and case studies sought to get to UES and incentive values.

Dairy Farms



Number of Dairy Farms



Number of Dairy Cows

Dairy Farms

Energy consumption is a *significant and controllable variable* operating cost.

Milk Vacuum and Transfer Pumps	10-20%
Lighting & Ventilation	10-15%
Milk Cooling	25-35%
Water Heating	30-40%



Dairy BPAQ Measures Pursuit (for April or Oct. 2027)

Measure Description	kWh Unit Energy Savings	Unit
VFD on milk vacuum pumps	TBD	hp
VFD on milk transfer pumps	TBD	cow
High efficiency ventilation with VFD and humidity/temperature control	TBD	hp
Water Source HPWH System Configurations	TBD	cow
High Efficiency Chiller System (w/ waste heat recovery)	TBD	cow
Raw milk plate pre-cooler	TBD	cow

DAIRY FARM ENERGY CONSERVATION UPGRADE OPPORTUNITY:

**Sanitization Hot Water
and Chiller System Integration**

Recovering Waste Heat and Improving Operations

Keshmira Engineer

Emerging technologies





Webb Basin Dairy

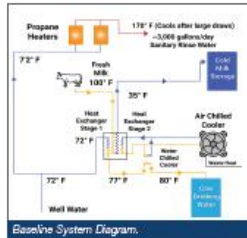
Read more about the Webb Basin Dairy Case Study on our page: webb-dairy-case-study-web.pdf

Summary

This project demonstrates how dairies can reduce energy costs and increase operational efficiencies with a commercial heat pump water heater (HPWH) system. Webb Basin Dairy's existing propane water heating system was at the end of life and very costly to operate. To address this, the dairy installed a Colmac water source heat pump (WSHP), designed to meet four key objectives: reduce propane usage, reduce chiller energy consumption, reduce upfront costs, and reduce equipment downtime.

The propane savings exceeded expectations as the efficient electric WSHP completely displaced the propane load. The chiller savings fell short as the WSHP was optimized for sanitation water heating and not optimizing chiller performance. The project's payback period increased from an estimated 3.5 years to ~7 years because of additional upfront costs and bundled upgrades such as system controls and water softeners. Despite the longer payback, the system's combined Coefficient of Performance (COP) was ~4.9, which demonstrates the high efficiency and potential for WSHPs to provide substantial energy savings.

- Total Project Cost: \$188,089
- Annual Energy Savings: 214,546 kWh
- Annual Cost Savings: \$31,000



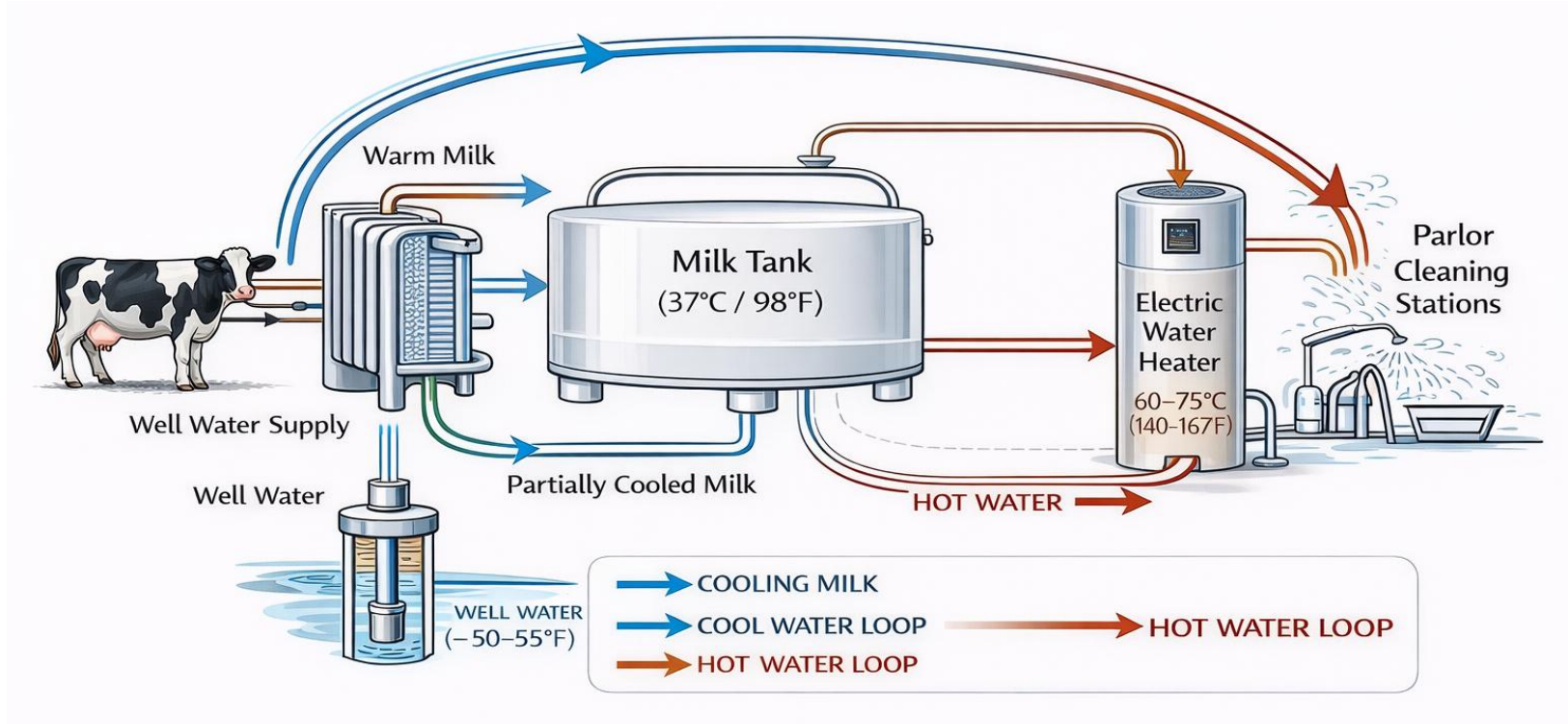
HERE TO HELP!
For additional information, email et@bpa.gov

Dairy Farm Hot Water and Chiller System Integration

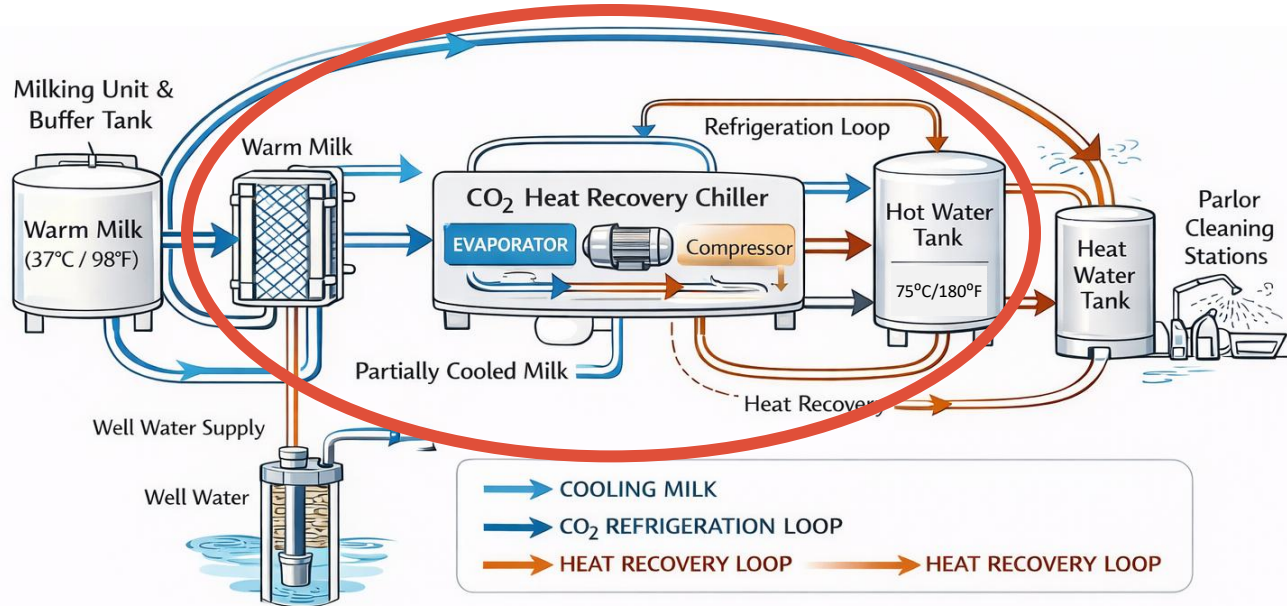


- Process of cooling raw milk produces recoverable waste heat.
- Transfer that heat to other dairy processes like sanitization hot water.

Standard Dairy Design



Integrated Chiller and Hot Water System



Cooling transfers heat to produce sanitization water.

Seeking Studies/Demonstration Projects

BPA is Seeking Heat Pump Hot Water/Chiller System Integration Demonstration Projects

- \$150 energy audit screening for dairy farm.
- On-farm dairy energy audit.
 - Up to \$15K.
 - Informs on specific HPWH opportunity as well as other energy conservation opportunities.
- Seeking 3-4 demonstrations any where in BPA territory.
- M&V energy savings(pre and post).

Site Attributes

Site Attributes for Demonstration Project:

- Aging systems (chiller, water heating).
- Hot water storage.
- Large sanitization hot water draw profile.
 - ~ 1000 dairy head herd, ~3000 gal/day.
- Have an air or water source chiller system to cool the milk.
- Currently not using waste heat recovery.

BPA MARKETING SERVICES

Robin Moodie

Marketing specialist



Marketing Materials

BPA offers Utilities Marketing Services and Resources for all Ag needs:

- bpa.gov > energy & service > utility resources > marketing resources



Bonneville Power Administration

Agricultural Energy Conservation

Your utility works to bring energy savings to the agriculture industry.

By saving energy, farmers, dairies, and ranchers may be able to reduce energy costs, increase irrigation uniformity, decrease the amount of water and fertilizer required, or potentially increase yield. Your utility offers the following rebates to farmers for eligible measures.

- Livestock waterers
- New high-efficiency irrigation pumps
- Variable Frequency Drives (VFDs)
- Irrigation hardware upgrades
- Low Elevation Spray Application (LESA)
- Irrigation pump testing
- Lighting
- Dairies
- Wineries

Your utility can help

Call your local utility today to learn more about Agricultural energy conservation and available incentives for energy-saving improvements.

- Graphic design.
- Measure Incentive promotion (bill stuffers).
- Copyediting / storytelling / PR.
- Social media / website content and strategy.
- Digital assets and print collateral.
- Presentations and forms.

To find out how a BPA Marketing Specialist can help you, please contact your ECAE.

Graphic Design Services

Original Graphic Design Services | Template Customization | Forms

TAKE CONTROL & SAVE

THERMOSTATICALLY CONTROLLED OUTLETS AUTOMATICALLY TURN OFF WHEN TEMPERATURES RISE, SAVING YOU MONEY.

\$14
per outlet, one per utility room

COMPANY LOGO
PUBLIC UTILITIES

Water Where You Need It

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

VFD VSDA VLSA VLPN VSI

Savings for Irrigators

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

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 requirements 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 will depend on your crop type.

WE'RE HERE TO HELP!
To learn more, contact Harney Electric Cooperative, Inc. call (541) 555-5555 or email harnelec@hec.org

Residential Insulation Rebate Application

BEFORE INSTALLATION: Please visit us at the Program Participation Substore.

AFTER INSTALLATION: Please complete all sections of this application to process the rebate. The completed form, paid contractor invoice, vendor air-seal and post-project photos are required for processing.

MEMBER INFORMATION

Account # (required) _____ Today's Date _____
 Date of Installation: _____ Are you the account holder? Yes No
 Member Name: _____
 Relationship to Member: Family Member Landlord Tenant Other: _____

INSTALLATION ADDRESS

Street _____
 City: _____ State: _____ Phone: _____ Zip: _____
 E-mail: _____
 MAILING ADDRESS (if different)
 Street _____
 City: _____ State: _____ Zip: _____

HOME INFORMATION

Residence Type: Site Built Home (up to 4 units) Manufactured Home Multi-Family
 Electric Heat Source: Electric Forced Air Electric Zone Heat Pump Other _____
 *Rebate may vary substantially (member provides details) based on type of heat source. If a heat pump, specify the model and capacity. If a heat pump, specify the model and capacity. If a heat pump, specify the model and capacity.

INSTALLATION INFORMATION

Who installed unit: Contractor Homeowner

ENERGY EFFICIENT UPGRADES

Type: Existing System New System Area: Full Partial Type: Blowers Thermostats, etc. Insulated Crawl Space

Year Installed: _____
 *This incentive does not apply to new construction and does not apply to any unheated area of the home such as a garage or porch.

REQUIRED SIGNATURES

Member Signature: _____ Date: _____
 *An electronic signature will be accepted as consent to the rules and restrictions of the program.

This program is available through the Bonneville Power Administration. BPA programs are subject to change without notice.

PROMOTIONAL REBATE OFFERS

FOR AGRICULTURAL INSTALLATIONS

CONTACT US TODAY!

For application information, please contact:
 Guy Smith
conservation@utilitypubd.org
 (541) 555-5555
www.utilitypubd.org

COMPANY LOGO
PUBLIC UTILITIES

INCENTIVES FOR AGRICULTURAL CUSTOMERS:

- Energy Audits
- Irrigation Hardware Upgrades
- Irrigation Pump Testing
- Livestock Water Tanks
- Thermostatically Controlled Outlets
- High Efficiency Irrigation

MANY MORE REBATES AVAILABLE!

CONTACT YOUR UTILITY TODAY!

conservation@utilitypubd.org
 (541) 555-5555
www.utilitypubd.org

* Customized social media or other digital graphics.

* Print collateral, including flyers and case studies.


* Form development and audit forms for BPA requirements.

* Customized bill inserts promoting incentives.

Public Relations & Communication

Articles | Project Success Posters | Case Studies | Big Checks

Water Conservation in The Big Lost River Valley




Project Background

The Big Lost River Valley holds approximately 76,000 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 2025, 11 systems have been or will be improved upon across the Big Lost River Valley. Once complete, more than 45 miles of liner and/or pipe will serve a significant portion of the farmground in the valley.



252,865 kWh
Annual Energy Savings



Insteep Pipeline farmer 50-in.



The pipeline project under way.


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 Insteep Pipeline project resulted in 169, 187 kWh of energy saved annually, while the Alkeke 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.

What ideas do you have to save energy?

Lost River Electric Cooperative, Inc. (LREC) makes electric energy available to the members at the lowest cost consistent with sound economy and good management.

Lost River Electric Cooperative, Inc.
(208) 688-3311
www.lostriverelectriccoopinc.com





VFD CALCULATOR

Kathy Yi

**Energy conservation
account executive**



Background

- VFD calculator determines eligibility
 - Turbines
 - Variation of **flow** must be at least 20 percent, OR
 - Variation of **head** must be at least 10 percent
 - Centrifugal
 - Variation of **head** must be at least 20 percent

	A	B	C	D	E	F
1	AGRICULTURE RETROFIT - TURBINE AND CENTRIFUGAL PUMP VFD CALCULATOR TOOL					
2	Version Date: 10/07/2025					
3	Please fill in all of the green highlighted fields. Add explanatory notes where needed					
4	Use this tool to determine eligibility and calculate the BPA deemed energy savings related to VFDs installed on EXISTING pumping plant installations in Ag					
5						
6	A. IRRIGATOR INFORMATION					
7	Estimated Date of VFD Installation:		January 2, 2025			
8	Irrigator Member Name:		Jane the Farmer			
9	Address:		Albilla Road	Contact #		
10	City, State, ZIP:		Idaho Falls, ID			
11	Serving Electric Utility:		Rural Coop			
12	Account Number or		123456			
13	Meter Number		54123			
14	Average Annual Energy Usage		686.367	kWh per year		
15	Melded Average Cost per kWh:		0.065	\$/kWh		
16						
17	B. PUMP VFD DATA					
18	Irrigation Pump Rated HP for VFD:		400	HP (eligible from 7.5-1,000 HP)		
19	Total Rated HP on meter (value from below):		473	HP		
20						
21	C. PUMP DATA					
22	Pump Type (select Centrifugal or Turbine):		Turbine	Select Pump Type from drop down menu		
23	Pump Manufacturer:		Good ID Pumps			
24	Pump Model:		123-abc			
25	Rated Head (or TDH) (nameplate or curve):		850	feet	WHP check = 305	
26	Rated Flow (from nameplate or curve):		2,200	gpm	EHP check = 424	
27	Pump Depth (feet):		450	feet	use zero for centrifugal	
28	Estimated Average Lift (feet):		36.0	feet		
29	Maximum Estimated Lift (or inlet pressure in feet):		36.0	feet		
30	Lowest Estimated Lift:		30.0	feet		
31	Discharge pressure Maximum Lift (psi):		90	psi gauge at pump		
32	Discharge pressure Minimum lift (psi):		1.05	psi gauge at pump		
33	Expected lowest discharge pressure with VFD (psi):		85	psi gauge at pump		
34	Highest Flow expected (gpm):		1,900	gpm		
35	Lowest Flow expected (gpm):		1,000	gpm		
36	Highest Total Dynamic Head (ft) (calc):		568	feet		
37	Lowest Total Dynamic Head (ft) (calc):		496	feet		
38	Variation in Flow requirements during season calc:		41%		Variation in flow must be at least 20% percent for Turbines,	
39	Variation in Head during season calc:		13%		Variation in head requirements of at least 10% percent for t	
40	Does system pressure get too high (Y/N)		yes			
41	If yes, how is it controlled (PRV, throttling, dumping)		PRV			
42						
43	D. METFERED I LOAD USAGE ESTIMATES					

Background (continued)

- **BPA Qualified Measure**
 - Additional Information
 - BPA collecting data to support the Regional Technical Forum's (RTF) analysis of the measure
- **Site Savings**
 - New Construction
 - Turbine = 440 kWh * pump motor hp
 - Centrifugal = 220 kWh * pump motor hp
 - Retrofits
 - Turbine = 20 percent * Estimated Annual Energy Consumption
 - Centrifugal = 10 percent * Estimated Annual Energy Consumption

	A	B	C	D	E	F	G
43	D. METERED LOAD USAGE ESTIMATES						
	Equipment Description on same meter	Rated Load	Units (kW or HP)	Equipment load as percentage of metered load	Motor Load Factor	Estimated hours of Operation for pivots assume 33% run time	Estimated Annual Energy Consumption (kWh)
44	Main Pump (where VFD will be installed)	400	HP	84.6%	0.9	2,250	604,260
45	Centrifugal Booster Pump (if any)	50	HP	10.6%	0.8	2,250	67,140
46	Pivot 1 (6 towers at 1 HP each)	6	HP	1.3%	1	743	3,323
47	Pivot 2 (10 towers at 1.5 HP each)	15	HP	3.2%	1	743	8,309
48	End gun booster pump (pivot 2)	2	HP	0.4%	0.9	1,200	1,611
49				0.0%			0
50				0.0%			0
51				0.0%			0
52				0.0%			0
53	TOTALS =	473					Estimated Total = 684,643
54							kWh actual = 686,367
55	Adjust hours of operation in Column F (45-52) to obtain an overall deviation of less than 5%			Deviation ((kWh actual - calc)/ kWh actual) =			0.3%
56	E. CROP AND IRRIGATION SYSTEM TYPE DATA (incentive can be submitted at any time, post installation data is for evaluation at a later date)						
		Year	Metered kWh	Crops grown	Acres	Irrigation System type	
58		3 years prior to VFD installation	2022	723,000	alfalfa, wheat	240, 360	5 pivot with drops
59		2 years prior to VFD installation	2023	641,100	wheat, alfalfa	360, 240	5 pivot with drops
60		1 year prior to VFD installation	2024	695,000	wheat, alfalfa, hay	120, 240, 360	5 pivot with drops
61		1 year post installation of VFD	2025	?	potatoes, wheat, alfalfa	120, 240, 240	5 pivot with drops
62							
63							
64							
65							
66							
67							
68	F. PREVIOUS ENERGY SAVINGS MEASURES						
	Name of Measure	Install Date	Energy Savings claimed (kWh/yr)	First year of impact on billing history	Adjustment to Energy consumption Required?		
69	Pivot sprinkler package	Oct-22	600	2023	no, in baseline		
70	Custom Project for mainline improvement	Dec-23	25000	2024	yes, post		
71							
72							
73							

Barriers/Issues

- **Confusing**
 - Two Calculators
 - Retrofit and New Construction
 - Not all fields are necessary
 - Don't know what to put into each field
- **Pre-filled data**
 - Information not being updated

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5						
6	A. IRRIGATOR INFORMATION					
7	Estimated Date of VFD Installation:	January 2, 2025				
8	Irrigator Member Name:	Jane the Farmer				
9	Address:	Albala Road		Contact #		
10	City, State, ZIP:	Idaho Falls, ID				
11	Serving Electric Utility:	Rural Coop				
12	Account Number or	123456				
13	Meter Number:	54123				
14	Average Annual Energy Usage	686.367		kWh per year		
15	Molded Average Cost per kWh:	0.065		\$/kWh		
16						
17	B. PUMP VFD DATA					
18	Irrigation Pump Rated HP for VFD:	400		HP (eligible from 7.5-1,000 HP)		
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22	Pump Type (select Centrifugal or Turbine):	Turbine		Select Pump Type from drop down menu		
23	Pump Manufacturer:	Good ID Pumps				
24	Pump Model:	123-abc				
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26	Rated Flow (from nameplate or curve):	2,200		gpm	EHP check = 424	
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37	Lowest Total Dynamic Head (ft) (calc):	496		feet		
38	Variation in Flow requirements during season calc:	41.2		feet	Variation in flow must be at least 20% percent for Turbines,	
39	Variation in Head during season calc:	1.3%		feet	Variation in head requirements of at least 10% percent for t	
40	Does system pressure get too high (Y/N)	yes				
41	If yes, how is it controlled (PRV, throttling, dumping)	PRV				
42						
43	D. METFRFD I OAD USAGF ESTIMATES					

Barriers/Issues (continued)

- Unclear how to enter in the BEETS Upload Template
- Known Errors
 - B/C Ratio incorrect
 - Currently calculated as Busbar kWh/Total Project costs
 - Summing HP and kW together
- Lack of a Notes field

76	G. DEEMED ENERGY SAVINGS AND INCENTIVE				
77	Site Annual Energy Savings (based on calculated pump usage)	120,852	kWh/year	(site savings)	
78	Busbar Annual Energy Savings (site savings * 1.1032)	133,324	kWh/year	(busbar savings)	
79	Pump VFD Incentive Rate (\$/VFD HP) (reimb per unit)	\$135			
80	Total Pump VFD Incentive (\$)	\$54,000			
81	Calculated Site Savings per VFD HP =	302.13	kWh/HP		
82	Total Project Cost of VFD & harmonic mitigation =	\$75,000			
83	Simple Payback with incentive =	2.7	years		
84					
85	If you have any questions, please contact your Ag Customer Service Engineer				
86					
87	ENTER THE FOLLOWING VALUES IN THE DEEMED MEASURE UPLOAD:				
88	UES REFERENCE NUMBER =	AMDMC40238	REFNO		
89	QUANTITY =	400	HP is Unit		
90	CALCULATOR SAVINGS PER UNIT =	302.13	kWh/VFD HP		
91	B/C Ratio =	1.78			
92					

94	H. Notes
95	The motor horsepower was used for modeling purposes to determine energy savings. The VFD horsepower was used to determine the rebate.
96	
97	The pump nameplate was mis-stamped. The correct model number in Cell C24 is the correct number. Correction noted in the pictures in South Side's files.
98	
99	
100	
101	
102	
103	
104	
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106	
107	
108	
109	

Barriers/Issues (continued)

- Utilities not providing past usage (for retrofit scenarios)

	A	B	C	D	E	F
1	AGRICULTURE PUMP VFD DEEMED SAVINGS TOOL					
2	Bonneville Power Administration			Version Date: 4/1/2023		
3						
4	The rebate can be submitted anytime after installation. This post installation usage data should be collected on this page for BPAs future use.					
5						
6						
7	A. IRRIGATOR INFORMATION					
8	Date of VFD Installation:	January 2, 2025				
9	Grower Contact Name:	Jane the Farmer				
10	Address:	Alfalfa Road				
11	City, State, ZIP:	Idaho Falls, ID				
12	Serving Electric Utility:	Rural Coop				
13	Account Number	123456				
14						
15						
16						
17	Average Annual KWH usage (Use the last 3 years, unless the usage is atypical in one or two years, then use the best representative usage)					
18	Add up monthly metered usage if multiple pump stations are impacted by the VFD operation					
19						
20		kWh 2022	kWh 2023	kWh 2024	3 Year Average	
21	Jan	0	0	0	0	
22	Feb	0	0	0	0	
23	Mar	0	0	0	0	
24	Apr	55,000	100	0	18,367	
25	May	100,000	90,000	100,000	96,667	
26	Jun	140,000	166,000	120,000	142,000	
27	Jul	175,000	190,000	200,000	188,333	
28	Aug	150,000	150,000	150,000	150,000	
29	Sep	75,000	33,000	95,000	67,667	
30	Oct	28,000	12,000	30,000	23,333	
31	Nov	0	0	0	0	
32	Dec	0	0	0	0	
33		723,000	641,100	695,000	686,367	

Barriers/Issues (continued)

- Metered Load Usage Estimates Confusing**
 - Pre-filled information adds to the confusion
 - Purpose is to narrow in on the kWh usage at the Main Pump
 - Uses past usage data and known equipment on that meter
- Just sending info to BPA Customer Service Engineers to complete**
 - BPA CSE chasing down answers for the calculator

A	B	C	D	E	F	G	
D. METERED LOAD USAGE ESTIMATES							
Equipment Description on same meter	Rated Load	Units (kW or HP)	Equipment load as percentage of metered load	Motor Load Factor	Estimated hours of Operation (for pivots assume 33% run time)	Estimated Annual Energy Consumption (kWh)	
Main Pump (where VFD will be installed)	400	HP	84.6%	0.9	2,250	604,260	
Centrifugal Booster Pump (if any)	50	HP	10.6%	0.8	2,250	67,140	
Pivot 1 (8 towers at 1 HP each)	8	HP	1.3%	1	743	3,323	
Pivot 2 (10 towers at 1.5 HP each)	15	HP	3.2%	1	743	3,309	
End gun booster pump (pivot 2)	3	HP	0.4%	0.9	1,200	1,611	
			0.0%			0	
			0.0%			0	
			0.0%			0	
TOTALS =	473				Estimated Total =	684,643	
					kWh actual =	686,367	
Adjust hours of operation in Column F (45-52) to obtain an overall deviation of less than 5%					Deviation ((kWh actual - calc)/ kWh actual) =		0.3%
E. CROP AND IRRIGATION SYSTEM TYPE DATA (incentive can be submitted at any time, post installation data is for evaluation at a later date)							
	Year	Metered kWh	Crops grown	Acres	Irrigation System type		
3 years prior to VFD installation	2022	723,000	alfalfa, wheat	240, 360	5 pivot with drops		
2 years prior to VFD installation	2023	641,100	wheat, alfalfa	360, 240	5 pivot with drops		
1 year prior to VFD installation	2024	695,000	wheat, alfalfa, hay	120, 240, 360	5 pivot with drops		
1 year post installation of VFD	2025	?	potatoes, wheat, alfalfa	120, 240, 240	5 pivot with drops		
F. PREVIOUS ENERGY SAVINGS MEASURES							
Name of Measure	Install Date	Energy Savings claimed (kWh/yr)	First year of impact on billing history	Adjustment to Energy consumption Required?			
Pivot sprinkler package	Oct-22	600	2023	no, in baseline			
Custom Project for mainline improvement	Dec-23	25000	2024	yes, post			

New VFD Calculator Goals

- Less confusing
- Best Case: Empower utilities to complete the calculator themselves
- Worst Case: Easier for BPA staff to complete for the customer

	A	B	C	D	E	F
1	AGRICULTURE RETROFIT - TURBINE AND CENTRIFUGAL PUMP VFD CALCULATOR TOOL					
2	Version Date: 10/07/2025					
3	Please fill in all of the green highlighted fields. Add explanatory notes where needed					
4	Use this tool to determine eligibility and calculate the BPA deemed energy savings related to VFDs installed on EXISTING pumping plant installations in Ag z					
5	A. IRRIGATOR INFORMATION					
7	Estimated Date of VFD Installation:		January 2, 2025			
8	Irrigator Member Name:		Jane the Farmer			
9	Address:		Alfalfa Road	Contact #		
10	City, State, ZIP:		Idaho Falls, ID			
11	Serving Electric Utility:		Rural Coop			
12	Account Number or		123456			
13	Meter Number		541133			
14	Average Annual Energy Usage		686,367	kWh per year		
15	Melded Average Cost per kWh:		0.065	\$/kWh		
16	B. PUMP VFD DATA					
18	Irrigation Pump Rated HP for VFD:		400	HP (eligible from 7.5-1,000 HP)		
19	Total Rated HP on meter (value from below):		473	HP		
20	C. PUMP DATA					
22	Pump Type (select Centrifugal or Turbine):		Turbine	Select Pump Type from drop down menu		
23	Pump Manufacturer:		Good ID Pumps			
24	Pump Model:		123-abc			
25	Rated Head (or TDH) (nameplate or curve):		350	feet	WHP check = 306	
26	Rated Flow (from nameplate or curve):		2,200	gpm	EHP check = 424	
27	Pump Depth (feet):		400	feet	use zero for centrifugal	
28	Estimated Average Lift (feet):		36.0	feet		
29	Maximum Estimated Lift (or inlet pressure in feet):		36.0	feet		
30	Lowest Estimated Lift:		300	feet		
31	Discharge pressure Maximum Lift (psi):		90	psi gauge at pump		
32	Discharge pressure Minimum lift (psi):		105	psi gauge at pump		
33	Expected lowest discharge pressure with VFD (psi):		85	psi gauge at pump		
34	Highest Flow expected (gpm):		1,900	gpm		
35	Lowest Flow expected (gpm):		1,000	gpm		
36	Highest Total Dynamic Head (ft) (calc):		568	feet		
37	Lowest Total Dynamic Head (ft) (calc):		495	feet		
38	Variation in Flow requirements during season calc:		41%	Variation in flow must be at least 20% percent for Turbines.		
39	Variation in Head during season calc:		13%	Variation in head requirements of at least 10% percent for tur		
40	Does system pressure get too high (Y/N)		yes			
41	If yes, how is it controlled (PRV, throttling, dumping)		PRV			
42	D. METRFED LOAD USAGE ESTIMATES					

Old VFD vs New VFD Calculator

AGRICULTURE RETROFIT - TURBINE AND CENTRIFUGAL PUMP VFD CALCULATOR TOOL					
					Version Date: 10/07/2025
Please fill in all of the green highlighted fields. Add explanatory notes where needed					
Use this tool to determine eligibility and calculate the BPA deemed energy savings related to VFDs installed on EXISTING pumping plant installations in Ag					
A. IRRIGATOR INFORMATION					
Estimated Date of VFD Installation:	January 2, 2025				
Irrigator Member Name:	Jane the Farmer				
Address:	Alhafa Road	Contact #			
City, State, ZIP:	Idaho Falls, ID				
Serving Electric Utility:	Rural Coop				
Account Number or	123456				
Meter Number	54321				
Average Annual Energy Usage	686.367	kWh per year			
Melded Average Cost per kWh:	0.065	\$/kWh			
B. PUMP VFD DATA					
Irrigation Pump Rated HP for VFD:	400	HP (eligible from 7.5-1,000 HP)			
Total Rated HP on meter (value from below):	473	HP			
C. PUMP DATA					
Pump Type (select Centrifugal or Turbine):	Turbine	Select Pump Type from drop down menu			
Pump Manufacturer:	Good ID Pumps				
Pump Model:	123-abc				
Rated Head (or TDH) (nameplate or curve):	580	feet	WHP check = 306		
Rated Flow (from nameplate or curve):	2,200	gpm	EHP check = 424		
Pump Depth (feet):	400	feet	use zero for centrifugal		
Estimated Average Lift (feet):	36.0	feet			
Maximum Estimated Lift (or inlet pressure in feet):	36.0	feet			
Lowest Estimated Lift:	30.0	feet			
Discharge pressure Maximum Lift (psi):	90	psi gauge at pump			
Discharge pressure Minimum lift (psi):	1.05	psi gauge at pump			
Expected lowest discharge pressure with VFD (psi):	85	psi gauge at pump			
Highest Flow expected (gpm):	1,900	gpm			
Lowest Flow expected (gpm):	1,000	gpm			
Highest Total Dynamic Head (ft) (calc):	568	feet			
Lowest Total Dynamic Head (ft) (calc):	496	feet			
Variation in Flow requirements during season calc:	43%	Variation in flow must be at least 20% percent for Turbines,			
Variation in Head during season calc:	13%	Variation in head requirements of at least 10% percent for t			
Does system pressure get too high (Y/N)	yes				
If yes, how is it controlled (PRV, throttling, dumping)	PRV				
D. METFERED LOAD USAGE ESTIMATES					

AGRICULTURE - VFD CALCULATOR TOOL (7.5 - 1,000 Horsepower)							Version Date: MM/DD/YYYY
Please fill in all of the green highlighted fields. Add explanatory notes where needed							
Orange fields are required							
A. IRRIGATOR INFORMATION							
Unique Site ID							
Serving Electric Utility:							
Estimated Date of VFD Installation:							
B. PUMP AND MOTOR DATA							
New Pump, Existing Pump Replacement or Retrofit?		--Select Application Type--					
Pump Specifications							
Pump Motor Rated Horsepower							
Variable Frequency Drive Rated Horsepower							
Pump Manufacturer:							
Pump Model:							
Type of Pump		--Select Pump Type--					
Number of Stages							
Impeller Trim (inches)							
Design Flow (gpm):							
Design Head (ft):							
C. Operational Data							
Is lift (ft) or pump intake (psi) used to calculate head?		--Select--					
How will the VFD be controlled?		--Select Control Type--					
Reason(s) for the VFD (Check all that apply)							
Flow Management		<input type="checkbox"/>					
Lift Management		<input type="checkbox"/>					
Pump Intake Pressure Management		<input type="checkbox"/>					
Pump Discharge Pressure Management		<input type="checkbox"/>					
Elevation Change Management		<input type="checkbox"/>					
Other		<input type="checkbox"/>					

Informational Only - For BPA Use

Whp check = 0	Efficiencies
Bhp check = 0	Pump: 0.00%
Ehp check = 0	Motor: 0.00%

Barrier/Issue

- Confusing
 - Two Calculators
 - Retrofit and New Construction

New VFD Calculator – One Calculator

- One Calculator for Retrofit and New Construction
 - If New Construction, certain information grayed out/not requested

B. PUMP AND MOTOR DATA

New Pump, Existing Pump Replacement or Retrofit? **--Select Application Type--**

Pump Specifications

Pump Motor Rated Horsepower **--Select Application Type--**

Variable Frequency Drive Rated Horsepower

Pump Manufacturer:

Pump Model:

New Pump Installation
Existing Pump Replacement
Retrofitting Existing Pump

E. CROP AND IRRIGATION SYSTEM TYPE DATA (incentive can be submitted at any time, post installation data is for evaluation at a later date)

	Year	Metered kWh	Crops grown	Acres	Irrigation System type
3 years prior to VFD installation	2022	0			
2 years prior to VFD installation	2023	0			
1 year prior to VFD installation	2024	0			
1 year post installation of VFD (if requested by BPA)	2025	?			

B. LOAD PROFILE, 3 years - Only Required for Existing Pump Replacement or Retrofit

Month	2022			2023		
	kW	kWh	Cost	kW	kWh	Cost
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
Annual	0.0	0	\$0.00	0.0	0	\$0.00

Barrier/Issue

- Confusing
 - Not all the fields are necessary

New VFD Calculator – Only Necessary Info (Hidden Fields)

AB	C	D	E	F	G	H	I	J
1	AGRICULTURE - VFD CALCULATOR TOOL (7.5 - 1,000 Horsepower)						Version Date: MM/DD/YYYY	
2	Please fill in all of the green highlighted fields. Add explanatory notes where needed							
3	Orange fields are required							
4								
5								
6	A. IRRIGATOR INFORMATION							
7	Unique Site ID							
8	Serving Electric Utility:							
9	Estimated Date of VFD Installation:							
10								
11	B. PUMP AND MOTOR DATA							
12	New Pump, Existing Pump Replacement or Retrofit?	--Select Application Type--						
13	Pump Specifications							
14	Pump Motor Rated Horsepower							
15	Variable Frequency Drive Rated Horsepower							
16	Pump Manufacturer:							
17	Pump Model:							
18	Type of Pump	--Select Pump Type--						
19	Number of Stages							
20	Impeller Trim (inches)							
21	Design Flow (gpm):							
22	Design Head (ft):							
23								
24								
25	C. Operational Data							
26	Is lift (ft) or pump intake (psi) used to calculate head?	--Select--						
27	How will the VFD be controlled?	--Select Control Type--						
28								
29	Reason(s) for the VFD (Check all that apply)							
30	Flow Management	<input type="checkbox"/>						
31	Lift Management	<input type="checkbox"/>						
32	Pump Intake Pressure Management	<input type="checkbox"/>						
33	Pump Discharge Pressure Management	<input type="checkbox"/>						
34	Elevation Change Management	<input type="checkbox"/>						
35	Other	<input type="checkbox"/>						
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								
52								
53								
54								

Informational Only - For BPA Use

Whp check = 0 Efficiencies

Bhp check = 0 Pump: 0.00%

Ehp check = 0 Motor: 0.00%

AB	C	D	E	F	G	H	I	J
1	AGRICULTURE - VFD CALCULATOR TOOL (7.5 - 1,000 Horsepower)						Version Date: MM/DD/YYYY	
2	Please fill in all of the green highlighted fields. Add explanatory notes where needed							
3	Orange fields are required							
4								
5								
6	A. IRRIGATOR INFORMATION							
7	Unique Site ID							
8	Serving Electric Utility:							
9	Estimated Date of VFD Installation:							
10								
11	B. PUMP AND MOTOR DATA							
12	New Pump, Existing Pump Replacement or Retrofit?	Existing Pump Replacement						
13	Replacement Pump Specification							
14	Pump Motor Rated Horsepower							
15	Variable Frequency Drive Rated Horsepower							
16	Pump Manufacturer:							
17	Pump Model:							
18	Type of Pump	Horizontal Split Case Centrifugal						
19	Number of Stages							
20	Impeller Trim (inches)							
21	Design Flow (gpm):							
22	Design Head (ft):							
23								
24								
25	C. Operational Data							
26	Is lift (ft) or pump intake (psi) used to calculate head?	Lift						
27	How is the current pump controlled?	Throttling						
28	How will the VFD be controlled?	Pressure Transducer						
29	Where is the pressure transducer location?	At Critical Sprinkler						
30	Reason(s) for the VFD (Check all that apply)							
31	Flow Management	<input checked="" type="checkbox"/>						
32	Lift Management	<input checked="" type="checkbox"/>						
33	Pump Intake Pressure Management	<input type="checkbox"/>						
34	Pump Discharge Pressure Management	<input checked="" type="checkbox"/>						
35	Elevation Change Management	<input checked="" type="checkbox"/>						
36	Other	<input type="checkbox"/>						
37								
38								
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53								
54								

Informational Only - For BPA Use

Whp check = 0 Efficiencies

Bhp check = 0 Pump: 0.00%

Ehp check = 0 Motor: 0.00%

New VFD Calculator – Only Necessary Info

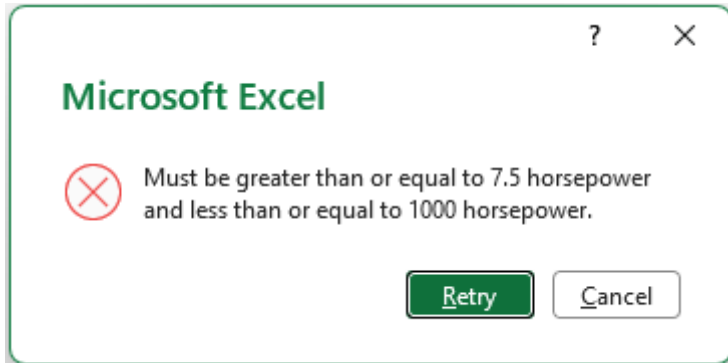
(Print Only Version)

- Print Only Version for utilities that give forms to vendors/irrigators
- **QUESTION:** Do you want information from the main calculator to **flow to** the Print Only tab?

AB	C	D	E	F	G	H	I	
1	AGRICULTURE - VFD CALCULATOR TOOL (7.5 - 1,000 Horsepower)						Version Date: 4/09/2026	
2							Page under construction	
3								
4								
5								
6	A. IRRIGATOR INFORMATION							
7	Unique Site ID							
8	Serving Electric Utility:							
9	Estimated Date of VFD Installation:							
10								
11	B. PUMP AND MOTOR DATA							
12	New Pump, Existing Pump Replacement or Retrofit?	--Select Application Type--						
13								
14	Pump Specifications:							
15	Pump Motor Rated Horsepower							
16	Variable Frequency Drive Rated Horsepower							
17	Pump Manufacturer:							
18	Pump Model:							
19	Type of Pump	--Select Pump Type--						
20	Number of Stages							
21	Impeller Trim (inches)							
22	Design Flow (gpm):							
23	Design Head (ft):							
24								
25	C. Operational Data							
26	Is lift (ft) or pump intake (psi) used to calculate head?	--Select--						
27	If Retrofit, how is the current pump controlled?	--Select Existing Control--						
28	How will the VFD be controlled?	--Select Control Type--						
29	If at the pressure transducer, where is the transducer location?	--Select Location--						
30								
31	Reason(s) for the VFD (Check all that apply)							
32	Flow Management	<input type="checkbox"/>						
33								
34								
35								
36	Lift Management	<input type="checkbox"/>						
37								
38								
39								
40	Pump Intake Pressure Management	<input type="checkbox"/>						
41								
42								
43								
44	Pump Discharge Pressure Management	<input type="checkbox"/>						
45								
46								
47								
48								
49	Elevation Change Management	<input type="checkbox"/>						
50								
51								

New VFD Calculator – Only Necessary Info (Error Messages)

- Error messages for combinations that can not exist



C. Operational Data

Is lift (ft) or pump intake (psi) used to calculate head?

How will the VFD be controlled?

Where is the transducer location?

Reason(s) for the VFD (Check all that apply)

System Management	<input type="checkbox"/>	
Flow Management	<input type="checkbox"/>	
Lift Management	<input type="checkbox"/>	Error: Cannot select Pump Intake Pressure Management if Lift is used to calculate head
Pump Intake Pressure Management	<input checked="" type="checkbox"/>	
Pump Discharge Pressure Management	<input checked="" type="checkbox"/>	
Elevation Change Management	<input checked="" type="checkbox"/>	Error: Elevation Change Management not possible with Transducer control at the pump

Barrier/Issue

- Confusing
 - Don't know what to put into each field

New VFD Calculator – Instructions/Pop Up Messages

- Instructions Page
- Pop Up Messages
 - Examples:

There could be four reasons for checking this box:

Pump Discharge Pressure Management

Elevation Change Management

Other

Eligibility for Pump Type:

Variation in Flow requirements during season

Variation in Head during season calc:

IS THE VFD ELIGIBLE?

METERED LOAD USAGE ESTIMATES

Are other pump or pivot loads connected to

1. When the irrigation system has multiple operating pressure requirements, enter the minimum and maximum desired operating pressures **with** a VFD in the Minimum and Maximum Pressure boxes.
2. If changes in operating flows create excessive system pressures, enter the operating pressure when pump is operating at full speed **without** a VFD for Maximum Pressure and enter the desired minimum operating pressure **with** a VFD for Minimum Pressure.
3. When the pump is oversized for the irrigation system and less pressure is needed, installing a VFD can allow for pressure reduction. Enter the operating pressure when pump is operating at full speed **without** a VFD for Maximum Pressure and enter the desired minimum operating pressure **with** a VFD for Minimum Pressure.
4. When a higher pressure system is converted to a lower pressure system without modifying or replacing the pump, a VFD is used to reduce the pressure. Enter the operating pressure when pump is operating at full speed **without** a VFD for Maximum Pressure and enter the desired minimum operating pressure **with** a VFD for Minimum Pressure.

	A	B	C	D	E	F	G	H	I	J	
1	AGRICULTURE - VFD CALCULATOR TOOL (7.5 - 1000 Horsepower)										
2	Instructions										
3											
4	The purpose of the Agriculture - VFD Calculator Tool is to determine the eligibility of the variable frequency drive installed on a turbine or centrifugal pump.										
5											
6	Complete the VFD Eligibility Info and the Utility Data tabs with the applicable information. The PRINT ONLY VERSION tab if a blank form is needed for distribution. Below are additional clarification for certain fields.										
7											
8	For any questions, please contact your BPA customer service engineer.										
9											
10	Enter information in GREEN or ORANGE fields. If the font turns GREY , the information is unnecessary or will result in an error if the selection is chosen.										
11											
12	VFD Eligibility Info Tab										
13	B. PUMP AND MOTOR DATA										
14	New Pump, Existing Pump Replacement or Retrofit?										
15	New Pump Installation: When there is a new pump installation, and a new VFD is also installed, select New Pump.										
16	Existing Pump Replacement: If an existing pump is being replaced and a new VFD is being added to the replacement pump, select Existing Pump Replacement.										
17	Retrofitting Existing Pump: If a VFD is added to an existing pump, select Retrofit.										
18	This is the rated horsepower listed on the nameplate of the motor with the VFD.										
19	If the motor has been rewound to a different horsepower rating, enter that value and provide documentation.										
20	This is the manufacturer's horsepower rating of the variable frequency drive.										
21	Design Flow is the same as Rated Flow which was referenced in the old calculator. Terms are used interchangeably. If the pump nameplate does not show the Rated Flow and is otherwise unknown, try contacting the pump vendor.										
22	Otherwise if Design Flow is not available, enter the maximum expected pump flow during the irrigation season, or contact your local BPA customer service engineer.										
23											
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Barrier/Issue

- Pre-filled data

New VFD Calculator – No Pre-Filled Information (Visual Color Cues)

AB	C	D	E	F	G	H	I	J	
1	AGRICULTURE - VFD CALCULATOR TOOL (7.5 - 1,000 Horsepower)						Version Date: MM/DD/2025		
2	Please fill in all of the green highlighted fields. Add explanatory notes where needed								
3	Orange fields are required								
4									
5									
6	A. IRRIGATOR INFORMATION								
7	Unique Site ID								
8	Serving Electric Utility:								
9	Estimated Date of VFD Installation:								
10									
11	B. PUMP AND MOTOR DATA								
12	New Pump, Existing Pump Replacement or Retrofit?	--Select Application Type--							
13	Pump Specifications								
14	Pump Motor Rated Horsepower								
15	Variable Frequency Drive Rated Horsepower								
16	Pump Manufacturer:								
17	Pump Model:								
18									
19	Type of Pump	--Select Pump Type--							
20	Number of Stages								
21	Impeller Trim (inches)								
22	Design Flow (gpm):								
23	Design Head (ft):								
24									
25	C. Operational Data								
26	Is lift (ft) or pump intake (psi) used to calculate head?	--Select--							
27									
28	How will the VFD be controlled?	--Select Control Type--							
29									
30	Reason(s) for the VFD (Check all that apply)								
31	Flow Management	<input type="checkbox"/>							
32									
33	Lift Management	<input type="checkbox"/>							
34									
35	Pump Intake Pressure Management	<input type="checkbox"/>							
36									
37	Pump Discharge Pressure Management	<input type="checkbox"/>							
38									
39	Elevation Change Management	<input type="checkbox"/>							
40									
41	Other	<input type="checkbox"/>							
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									

Informational Only - For BPA Use
 Whp check = 0 Efficiencies
 Bhp check = 0 Pump: 0.00%
 Ehp check = 0 Motor: 0.00%

AB	C	D	E	F	G	H	I	J	
1	AGRICULTURE - VFD CALCULATOR TOOL (7.5 - 1,000 Horsepower)						Version Date: MM/DD/2025		
2	Please fill in all of the green highlighted fields. Add explanatory notes where needed								
3	Orange fields are required								
4									
5									
6	A. IRRIGATOR INFORMATION								
7	Unique Site ID	123456							
8	Serving Electric Utility:	ABC Utility							
9	Estimated Date of VFD Installation:	October 1, 2025							
10									
11	B. PUMP AND MOTOR DATA								
12	New Pump, Existing Pump Replacement or Retrofit?	Existing Pump Replacement							
13	Replacement Pump Specification								
14	Pump Motor Rated Horsepower	100							
15	Variable Frequency Drive Rated Horsepower	125							
16	Pump Manufacturer:	XYZ Manufacturing							
17	Pump Model:	Horizontal Split Case Centrifugal							
18									
19	Type of Pump								
20	Number of Stages								
21	Impeller Trim (inches)								
22	Design Flow (gpm):								
23	Design Head (ft):								
24									
25	C. Operational Data								
26	Is lift (ft) or pump intake (psi) used to calculate head?	Lift							
27	How is the current pump controlled?	Throttling							
28	How will the VFD be controlled?	Pressure Transducer							
29	Where is the pressure transducer location?	At Critical Sprinkler							
30	Reason(s) for the VFD (Check all that apply)								
31	Flow Management	<input type="checkbox"/>							
32									
33	Lift Management	<input checked="" type="checkbox"/>							
34									
35	Pump Intake Pressure Management	<input type="checkbox"/>							
36									
37	Pump Discharge Pressure Management	<input checked="" type="checkbox"/>							
38									
39	Elevation Change Management	<input type="checkbox"/>							
40									
41	Other	<input type="checkbox"/>							
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									

Informational Only - For BPA Use
 Whp check = 0 Efficiencies
 Bhp check = 0 Pump: 0.00%
 Ehp check = 0 Motor: 0.00%

Barrier/Issue

- Unclear how to enter in the BEETS Upload Template
- Known Errors
- Lack of a Notes field

New VFD Calculator (continued)

- Clear what information to enter into the BEETS UES Template
- Fixed Errors
 - B/C Ratio calculation
 - HP and kW sum
- Added Notes Field

ENTER THE FOLLOWING VALUES IN THE BEETS UES TEMPLATE UPLOAD			
UES REFERENCE NUMBER =	AMDMC40238	REFNO	Column D
QUANTITY =	100	HP is Unit	Column E
CALC REIMBURSEMENT PER UNIT =	135	\$/VFD hp	Column W
CALCULATOR SAVINGS PER UNIT =	0.00	kWh/VFD HP	Column V
B/C Ratio =			Column Y

Notes:

Barrier/Issue

- Utilities not providing past usage data (for retrofit scenarios)

Barrier/Issue

- Metered Load Usage Estimates Confusing

New VFD Calculator (continued)

– Metered Load Usage Data

- **New Construction**
 - No longer requiring the information
- **Retrofits**
 - Are other pump and pivot load connected to the meter?
Yes/No
 - If **NO**, savings based on past average usage data.
 - If **YES**, additional information required

D. METERED LOAD USAGE ESTIMATES
Are other pump or pivot loads connected to the meter?

Equipment Description on same meter	Rated Load	Units (kW or HP)	Equipment load as percentage of metered load	Estimated Hours of Operation (See notes to adjust pivot run time)	Estimated Annual Energy Consumption (kWh)	Use Pre-project Motor hp to Model
Main Pump (where VFD to be installed)	0	HP	0%	600	0	
Other miscellaneous equipment on same meter						
			0%		0	
			0%		0	
			0%		0	
			0%		0	
			0%		0	
			0%		0	
TOTALS =	0		0%		0	Estimated Total

D. METERED LOAD USAGE ESTIMATES
Are other pump or pivot loads connected to the meter?
Provide three years of usage on the Utility Data tab and provide information on the additional connected load below

Equipment Description on same meter	Rated Load	Units (kW or HP)	Equipment load as percentage of metered load	Estimated Hours of Operation (See notes to adjust pivot run time)	Estimated Annual Energy Consumption (kWh)	Use Pre-project Motor hp to Model	
Main Pump (where VFD to be installed)	0	HP	0%		0		
Other miscellaneous equipment on same meter							
			0%		0		
			0%		0		
			0%		0		
			0%		0		
			0%		0		
			0%		0		
			0%		0		
TOTALS =	0		0%		0	Estimated Total	
					Enter Usage on Utility Data Tab	0	kWh actual average

New VFD Calculator (continued)

- Obtaining additional data may still be a challenge
 - Still necessary to evaluate the BPAQ measure
 - More training for the utility
 - Proposed alternative method for **Metered Load Usage Estimates** will be shown during the demonstration

D. METERED LOAD USAGE ESTIMATES					
Are other pump or pivot loads connected to the meter? <input type="text" value="Yes"/>					
Equipment Description on same meter	Rated Load	Units (kW or HP)	Equipment load as percentage of metered load	Estimated Hours of Operation (See notes to adjust pivot run time)	Estimated Annual Energy Consumption (kWh)
Main Pump (where VFD to be installed)	0	HP	0%		0
Other miscellaneous equipment on same meter					
			0%		0
			0%		0
			0%		0
			0%		0
			0%		0
TOTAL S =			0		0
					Estimated Total
E. CROP AND IRRIGATION SYSTEM TYPE DATA (incentive can be submitted at any time, post installation data is for evaluation at a later date)					
	Year	Metered kWh	Crops grown	Acres	Irrigation System Type
3 years prior to VFD installation	2023	0			
2 years prior to VFD installation	2024	0			
1 year prior to VFD installation	2025	0			
1 year post installation of VFD (if requested by BPA)	2026	?			
FOR UTILITY USE ONLY					
F. PREVIOUS ENERGY SAVINGS MEASURES					
Name of Measure	Install Date	Energy Savings claimed (kWh/yr)	First year of impact on billing history	Adjustment to Energy consumption Required?	

Next Steps

- Utility Sounding Board April 8
- Ag Utility Group Meeting April 14
- Test with more utilities
- Adjustments based on utility feedback
- Refine Instruction tab
- Launch May
 - Old calculators will still be available

1 AGRICULTURE - VFD CALCULATOR TOOL (7.5 - 1000 Horsepower)

2 Instructions

3

4 The purpose of the Agriculture - VFD Calculator Tool is to determine the eligibility of the variable frequency drive installed on a turbine or centrifugal pump.

5

6 Complete the **VFD Eligibility Info** and the **Utility Data** tabs with the applicable information. The **PRINT ONLY VERSION** tab if a blank form is needed for distribution. Below are additional clarification for certain fields.

7 For any questions, please contact your BPA customer service engineer.

8 Enter information in **GREEN** or **ORANGE** fields. If the font turns **GREY**, the information is unnecessary or will result in an error if the selection is chosen.

9

10 **VFD Eligibility Info Tab**

11 **B. PUMP AND MOTOR DATA**

12 New Pump, Existing Pump Replacement or Retrofit?

--Select Application Type--

- New Pump Installation: When there is a new pump installation, and a new VFD is also installed, select New Pump.
- Existing Pump Replacement: If an existing pump is being replaced and a new VFD is being added to the replacement pump, select Existing Pump Replacement.
- Retrofitting Existing Pump: If a VFD is added to an existing pump, select Retrofit.

13 This is the rated horsepower listed on the nameplate of the motor with the VFD.

Pump Motor Rated Horsepower

If the motor has been rewound to a different horsepower rating, enter that value and provide documentation.

14 Variable Frequency Drive Rated Horsepower

This is the manufacturer's horsepower rating of the variable frequency drive.

15 **Design Flow** is the same as **Rated Flow** which was referenced in the old calculator. Terms are used interchangeably. If the pump nameplate does not show the **Rated Flow** and is otherwise unknown, try contacting the pump vendor.

Design Flow (gpm)

16 Otherwise if **Design Flow** is not available, enter the maximum expected pump flow during the irrigation season, or contact your local BPA customer service engineer.

< > **Instructions** VFD Eligibility Info Utility Data PRINT ONLY VERSION +



DEMONSTRATION

Dick Stroh

Ag Engineer



Thank you!

