



# Agricultural Energy Efficiency

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# Agenda

Variable Frequency Drive, or VFD), for centrifugal/turbine/submersible agricultural pumps (new or existing installations).

Agricultural pump-efficiency upgrade.

Sprinkler-hardware maintenance and conversions.

Thermostatically controlled stock-tank deicers.

Thermostatically controlled outlets.

Green Motors.

The background of the image is a solid red color. Overlaid on this background is a repeating pattern of dark teal pump icons. Each icon consists of a circular head with a short horizontal pipe extending to the left. The icons are arranged in a grid, with some missing in the middle-left section to create a space for the text.

# PUMPS

# VFD for Centrifugal Agricultural Pumps

(New or Existing Installations)

## Pre-Condition:

- A fixed-speed centrifugal pump ranging from 20 to 500 horsepower.
- Eligible installations are limited to pumps with at least 20% variation in head.
- Pump manufacturer's performance curve.

## Post-Condition:

- A new (not rebuilt) VFD that meets the 20% variation in head.
- IEEE 519 standards are met (Electrical harmonic mitigation).
- Pump manufacturer's performance curve (if new pump is installed).
- Invoice.

# VFD for Turbine/Submersible Agricultural Pumps

(New or Existing Installations)

## Pre-Condition:

- A fixed-speed turbine/submersible pump ranging from 20 to 500 horsepower.
- Eligible installations are limited to pumps with at least 20% variation in flow rates or 10% variation in head.
- Pump manufacturer's performance curve.

## Post-Condition:

- A new (not rebuilt) VFD that meets the 20% variation in flow or 10% variation in head.
- IEEE 519 standards are met (Electrical harmonic mitigation).
- Pump manufacturer's performance curve (if new pump is installed).
- Invoice.

## Agricultural new pump upgrade

### Pre-Condition:

- Existing submersible, centrifugal or turbine pump.
- Pump ranging from 20 to 500 horsepower.

### Post-Condition:

- New replacement pump, no motor required.
- New pump must be the same or lower horsepower as the existing horsepower, unless a VFD is installed.
- A change from a turbine pump to a centrifugal pump or centrifugal to a turbine is allowable.

*Note: Rebuilt pump or simply new impeller(s) using existing bowls/volute does not qualify for the rebate.*

# Sprinkler hardware



# Sprinkler hardware-conversion rebates

## Pre-Condition

- Pivot or Lateral Move with MESA (Rotators/I-Wobs/Orbitors/Sprays, etc.).

## Post-Condition

Pivot or Lateral Move with LESA / LEPA / MDI package.





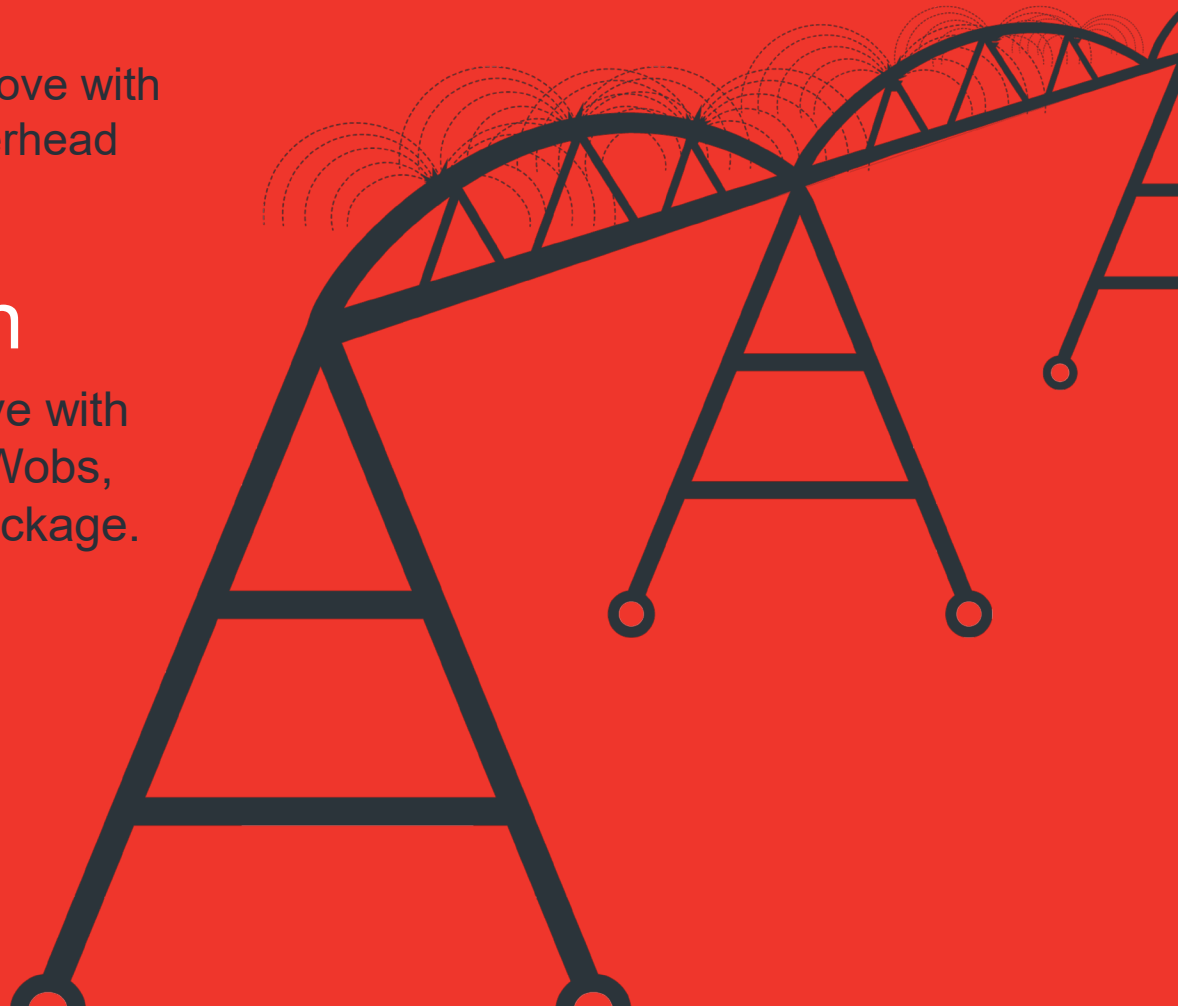
# Sprinkler hardware conversion rebates

## Pre-Condition

- Pivot or Lateral Move with high-pressure overhead impacts.

## Post-Condition

Pivot or Lateral Move with MESA (Rotators, I-Wobs, Orbitors, sprays) package.



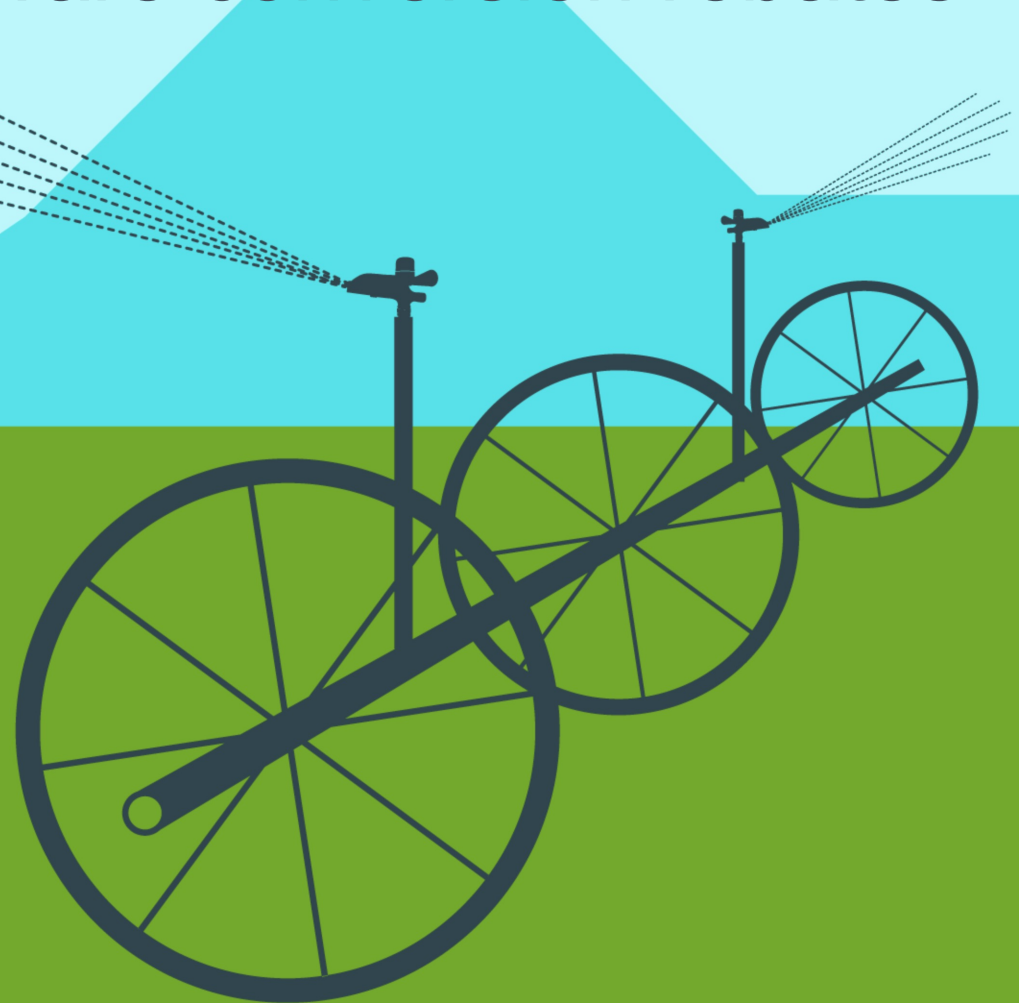
# Sprinkler hardware conversion rebates

## Pre-Condition

- Pivot, Lateral Moves, Wheel Line or Hand Line with high-pressure impact sprinklers.

## Post-Condition

Pivot, Lateral Moves, Wheel Line or Hand Line with Rotators.



# Sprinkler hardware maintenance rebates



## Pre-Condition

- Pivot or Lateral Move with MESA (Rotators/I-Wobs/Orbitors/Sprays, etc.).

## Post-Condition

- New pressure regulator, sprinkler and nozzle (Rotators/I-Wobs/Orbitors/Sprays, etc.).

# Sprinkler hardware maintenance rebates

## Pre-Condition

- Pivot or Lateral Move with overhead high-pressure impact sprinklers.

## Post-Condition

- New impact or rotator sprinklers.



# Sprinkler hardware maintenance rebates



## Pre-Condition

- Pivot or Lateral Move with LESA/LEPA/MDI sprinklers.

## Post-Condition

- New LESA/LEPA/MDI regulators, nozzles and emitters or spray heads.

# Sprinkler hardware maintenance rebates

## Pre-Condition

- Hand Line, Wheel Line or Solid Set with impact sprinklers.

## Post-Condition

- New/rebuilt hardware.

# Sprinkler hardware maintenance rebates



## Pre-Condition

- Pivot or Lateral Move with leaky gaskets.

## Post-Condition

- New center pivot boot gasket or tower/span/pivot-flex gaskets.



# **Thermostatically controlled stock- tank deicers and outlets**





# Thermostatically controlled stock-tank deicers

## Pre-Condition

An electric stock-tank deicer that is functional and not thermostatically controlled.

## Post-Condition

- A deicer thermostatically controlled to control use when ambient temperatures are above freezing.
- Only one thermostatically controlled tank deicer per tank is eligible.





# Thermostatically controlled outlets

## Pre-Condition

- Outlet is located in a pump house or utility room, serving a heater that provides freeze protection.
- Outlet is not already thermostatically controlled.

## Post-Condition

- Add a thermostatically controlled outlet that turns on to prevent freezing conditions and turns off at temperatures above than 50° F.
- Only one outlet per pump house or utility room is eligible.





# Green Motors

The infographic features a light blue sky background with a dark green field of wheat stalks at the bottom. Two water droplets are positioned in the center. The left droplet is white with a teal bottom section, and the right droplet is teal with a white bottom section. The text is contained within these droplets.

An existing  
program operated  
by a third-party  
coordinating Green  
Motor Service  
Centers

15 horsepower to  
500 horsepower  
three-phase  
induction motors  
qualify

# Green Motors



# When a motor fails



An operator has three choices:

1. Rewind to a lower efficiency (typical practice).
  2. Rewind and maintain the original efficiency (Green Motor).
  3. Replace with a new motor.
- Typically need to request a green rewind to get one.

# Preferred benefit

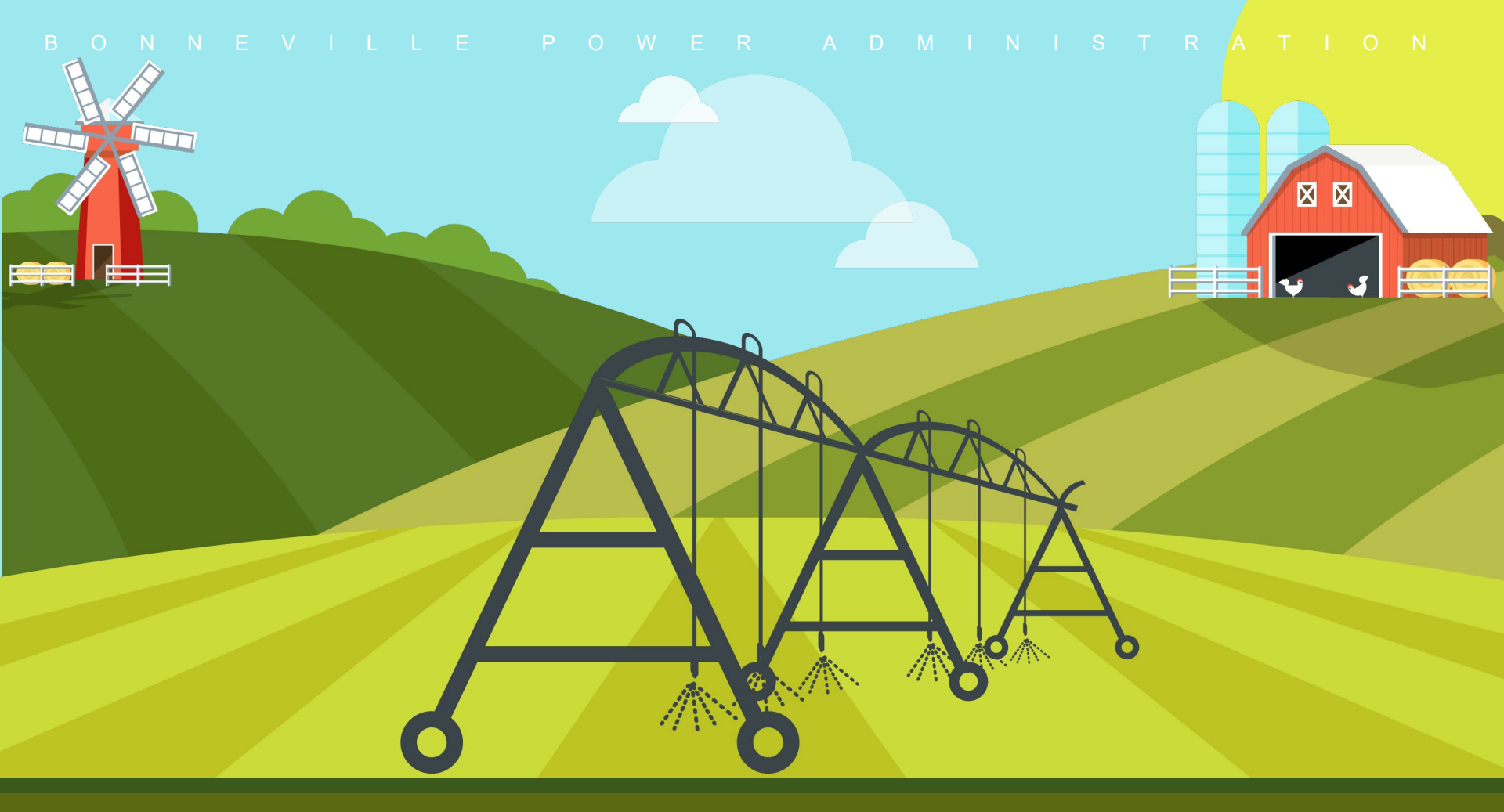
**RELIABILITY**  
**(95%)**  
*It's all about  
temperature*

**OR**

**EFFICIENCY**  
**(5%)**

- For every 10° C (50° F) rise in the windings above design temperature, not 40° C (104° F) ambient, the useful life is reduced by 50%.
- Longer bearing life.
- Longer insulation life.

Anything done to a motor to reduce temperature typically increases efficiency.



Thank you!



# Contacts



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