



## VARIABLE FREQUENCY DRIVE (VFD) PROGRAM DESCRIPTION

Eligibility: This Bonneville Power Administration (BPA) program is offered to Wasco Electric Cooperative (WEC) irrigation accounts that have an existing, electrically powered turbine style irrigation pump with substantial variation in flow rates (20% or more) and/or discharge pressure requirements (10% or more). Installations must meet the policy of the cooperative (#C-15) and the IEEE 519 standards. The account must have at least two full years of “typical” energy use history for evaluation purposes.

### Requirements:

1. Determine that your irrigation system is eligible for the program.
2. Send a copy of the VFD bid proposal from your contractor, and all applicable documents (enclosed), to Wasco Electric Cooperative, P.O. Box 1700, The Dalles, OR 97058 or fax to (541) 296-7781
3. **DO NOT BEGIN WORK, OR ORDER EQUIPMENT, UNTIL YOU HAVE RECEIVED A SIGNED APPROVED APPLICATION FROM WEC.**
4. Once the application, required documents and proposal have been reviewed, the application will be signed approved, by a WEC representative and returned to you. You will schedule with your contractor when work will begin.
5. You or your contractor will notify WEC when the work is complete. Once the VFD equipment installed has been verified by a WEC representative, WEC will send the rebate check to the member listed on the approved application.
6. You are responsible for making payment arrangements for any job costs not covered by the rebate amount.

**Rebate Amount:** \$60 per installed nameplate pump horsepower controlled by the VFD and approved by WEC.

**Note:** BPA programs are subject to change without notice.



P.O. Box 1700  
 105 E 4th Street  
 The Dalles, Oregon 97058  
 Tel: (541) 296-2740  
 Fax: (541) 296-7781

### Variable Frequency Drive (VFD) Rebate Program

Member Name: \_\_\_\_\_ Account #: \_\_\_\_\_

Mailing Address: \_\_\_\_\_  
 (Street, City, State, Zip)

Phone: \_\_\_\_\_ Cell: \_\_\_\_\_

#### Project Information

Irrigation meter number	
What is the pump horse power	
Operational hours per year	
Type of crops grown	
How many acres are irrigated by this pump	
Type of turbine pump (e.g. well, booster)	
Pump Total Dynamic Head (TDH) rating	
Gallon-Per-Minute (GPM) flow rating	
TDH differences (as a percentage of total dynamic head)	
Flow requirements changes (as a percentage of total flow rating)	
Estimated site savings in kWh/yr	
Name and version of software used to estimate kWh savings	
(name)	(version)

Estimated cost of project	
Verified-Equipment Install	
Co-op Rebate Amount	

I, the undersigned, as the owner of the property at the above address, certify the information on this application and supporting documents are true and correct. I have read the WEC VARIABLE FREQUENCY DRIVE (VFD) PROGRAM DESCRIPTION and understand and agree to the provisions for the program. I understand that if these requirements are not followed, WEC is under no obligation to grant or disburse program funds. By executing this agreement, I waive any and all claims against WEC that may arise from the installation of said improvements. Signing this agreement, members agree to release WEC from any liability associated with the selection, installation, or operation of the equipment which was purchased under this program, and recognize that in no way is WEC responsible for the safety or satisfactory performance of this equipment. WEC will not accept any liability caused by the members participation in this program.

If requested, I agree to allow a Wasco Electric Cooperative representative to verify the installation of the project.

**Member Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**WEC Representative:** \_\_\_\_\_ **Date:** \_\_\_\_\_

WASCO ELECTRIC COOPERATIVE, INC.  
105 East 4th Street  
The Dalles OR 97058

BOARD POLICY #C-15

SUBJECT: HARMONIC DISTORTION

OBJECT: To define Consumer responsibility for preventing or correcting harmonic distortion conditions that cause disturbances to other Consumers and / or Cooperative's system, in compliance with Institute of Electrical and Electronic Engineers (IEEE) Standard 519-1992. This policy is applicable to existing and proposed services.

Certain electrical equipment including adjustable speed drives (ASD) and variable frequency drives (VFD) for electric motors can produce harmonic frequencies (multiples of 60 Hertz) that can distort the voltage and current sine wave and interfere with other electronic devices such as computers, electric metering, radios and televisions. In addition, the harmonic frequencies produced can cause circulating electric currents in the Consumer's equipment and the Cooperative's transformers producing sufficient heat to damage or reduce the life of said equipment.

To safeguard against this, the Institute of Electrical and Electronic Engineers (IEEE) has established Standard 519-1992, IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems. All ASD, VFD, and other equipment known to produce harmonic frequencies must meet these specifications.

Prior to installation of such equipment, the Consumer's technical consultant or other qualified person will submit design data to the Cooperative indicating that the installed equipment meets the IEEE 519-1992 standards for Wasco Electric's distribution system.

The consumer is responsible to assure that the installed equipment maintains an average Total Harmonic Distortion (THD) level which meets the IEEE 519-1992 standard. If the Cooperative determines that the consumer's equipment is contributing to excess THD on the distribution system, the consumer will install the necessary filtering to maintain the THD at or below the requirements of the Cooperative. Failure by the consumer to install the necessary preventative equipment will result in disconnection of the service.

Approved: July 24, 2003  
Revised: September 23, 2004  
Revised: June 29, 2010  
Revised: August 25, 2011



## Harmonic Evaluation Process

Pump installations with variable speed drive controls must meet the requirements of the IEEE Standard 519 with respect to voltage and current distortion.

The following values are examined:

1. % Voltage distortion for individual harmonic value -- typically limited to 3%
2. % Current distortion for individual harmonic value -- typically limited to 3 %
3. Total % Voltage distortion **%V<sub>thd</sub>** -- typically limited to 5% or 10%\*
4. Total % Current distortion **%TDD** – typically limited to 5% or 8%\*

\* These values may vary with location on the WEC system.

Most equipment manufacturers can supply a computer generated print out predicting what these values will be. In most cases a filter will need to be installed with the motor control to reduce the magnitude of the harmonics transmitted into the electric utility's system. A computer print out of predicted values after the installation of the filter needs to be supplied for WEC to review. Samples of typical printouts are attached.

# Wasco Electric Cooperative

## Adjustable Speed Drive Information

Data By	Data Required	
WEC	Equipment Location Number	
WEC	Substation	
WEC	Feeder	
WEC	System Frequency	60
WEC	Primary Voltage	7.2 Or 12.47
WEC	Secondary Voltage	
WEC	Transformer KVA	
WEC	Transformer % Impedance	
WEC	% of Transformer Load That is non ASD	
WEC	% of Transformer Load That is ASD	
WEC	Load Type Special =Hospital or Airport, General, Dedicated	
WEC	Secondary Wire Size	
WEC	Number of Parallel Secondary Conductors	
WEC	Length of Secondary Conductor	
WEC	Primary Short Circuit MVA	
Customer	Converter Type, 6 Pulse, 12 Pulse, 18 Pulse	
Customer	Converter Horsepower	
Customer	Drive Internal Impedance	
Customer	Additional Impedance External to Drive	

WASCO ELECTRIC COOPERATIVE, INC.  
105 East 4th Street  
The Dalles, OR 97058

BOARD POLICY #C-7

SUBJECT: SPECIAL EQUIPMENT REQUIREMENTS FOR LARGE MOTOR LOADS

OBJECT: To establish guidelines for power factor correction, motor starting, and current transformer metering requirements for large motors loads.

POWER FACTOR CORRECTION

All motors of 20 HP and larger are to be installed with secondary capacitors to ensure a power factor of not less than 95 percent, leading or lagging.

Capacitors will be furnished and maintained by the member as recommended by the motor manufacturer.

MOTOR STARTING EQUIPMENT

All motors of 50 HP and larger will have reduced voltage or other starting equipment subject to the approval of the Cooperative to reduce voltage fluctuations.

The Cooperative will require motor starting equipment on motors smaller than 50 HP if the WEC system capabilities warrant.

CURRENT TRANSFORMER METERING

All current transformer metered loads shall be installed as per the Electric Service Standards of the cooperative.

Approved: October 20, 1999  
Revised: May 29, 2003  
Revised: January 27, 2011

WASCO ELECTRIC COOPERATIVE, INC.

LARGE MOTOR LOAD DESIGN SUMMARY SHEET

The below signed Consumer agrees to furnish and maintain an installation consistent with the requirements of Cooperative Policy C-7, Special Equipment Requirements For Large Motor Loads.

Name: \_\_\_\_\_

Location: T \_\_\_\_\_, R \_\_\_\_\_, Section \_\_\_\_\_ E. W. M. WEC Map No. \_\_\_\_\_

WEC Pole No. \_\_\_\_\_

Horsepower Rating: \_\_\_\_\_ Voltage: \_\_\_\_\_ Phase: \_\_\_\_\_

Motor Manufacturer \_\_\_\_\_ F. L. Amps \_\_\_\_\_ Motor Code \_\_\_\_\_

Breaker or Fuse Size: \_\_\_\_\_ Amp Fuse Type: \_\_\_\_\_ Fuse Manufacturer: \_\_\_\_\_

Fail phase protection: \_\_\_Yes \_\_\_No Lightning Arrestors: \_\_\_Yes \_\_\_No

Current Transformer Metering Cabinet Required Per Cooperative Specifications: \_\_\_Yes \_\_\_No

Furnish and Maintain Capacitors for a power factor of not less than 95 percent ( \_\_\_\_\_ VARS)

**Or** Confirm power factor maintained by Variable Speed Drive equipment is >95 percent \_\_\_Yes  
(Harmonic Distortion Report required for variable speed drive installations)

**Motor starting equipment required for motors 50 HP and larger:**

Type: \_\_\_\_\_

Manufacturer: \_\_\_\_\_

Catalog Number: \_\_\_\_\_

Supplier: \_\_\_\_\_

Contact: \_\_\_\_\_ Phone: \_\_\_\_\_

Electrician Name: \_\_\_\_\_ Phone: \_\_\_\_\_

**Billing Name:** \_\_\_\_\_

By: \_\_\_\_\_ Date: \_\_\_\_\_