



Motor and drive efficiency

Water well pump variable frequency drives (VFDs)

Prescriptive rebates now available

Pumping systems can be critically important to a facility or plant's operations. In many industrial applications, such as power and petrochemical plants, pumps directly support production processes and run as often as—or even longer than—other equipment at the facility. The amount of energy consumed by many long-running pumping systems often results in a substantial addition to a plant's annual operating costs. In fact, about 27% of the energy consumed by motor-driven equipment in manufacturing facilities is used to operate pumps.¹ Therefore, pumping systems are a natural target in efforts to reduce energy consumption in motor-driven systems.²

Cost to run a 30 HP pump at 6,000 hours/year for 8 years³

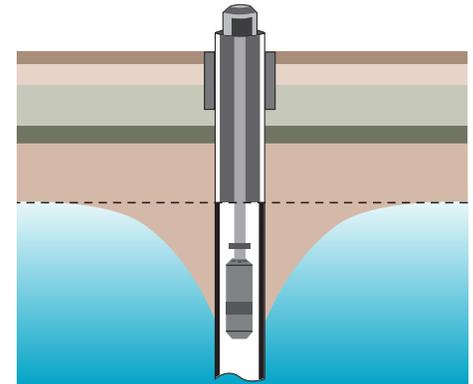
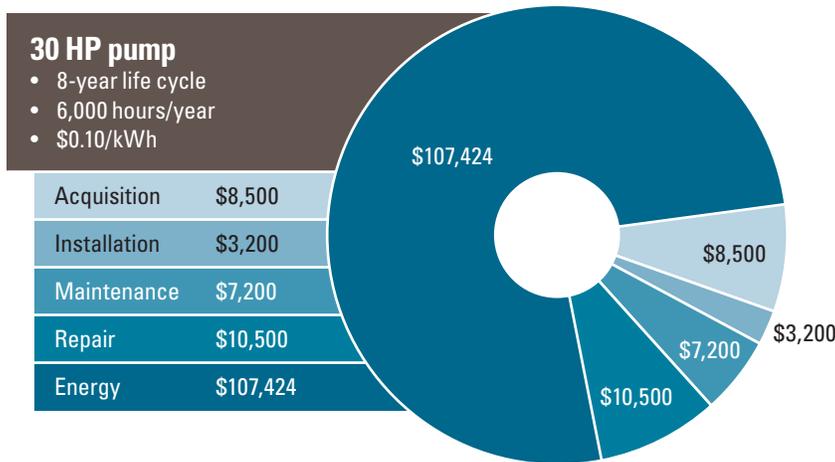


Diagram of a water well pump.

VFD Benefits

- Ideal for pumps that have high variable demand conditions
- Adjusts pump speed to meet system demands
- Provides better matching between the fluid energy required by the system and the energy the pump delivers
- Can help reduce energy and maintenance costs

In pumping applications with variable flow rate requirements, VFDs are an efficient control alternative to throttling or bypass methods. Variable Speed Drives save energy by varying the pump's rotational speed.

Water well pump VFDs:

For these systems	... controlled equipment must have	... in these situations.
Water well pumps— New VFDs on previously throttled pumps	<ul style="list-style-type: none"> • Invoice date of January 1, 2016 or after • Existing throttling control • 20% minimum flow variation • Will operate at less than 100% speed during summer peak hours • Not used as a back-up 	<ul style="list-style-type: none"> • Agricultural irrigation • Golf course/landscape irrigation • Municipal water supply • Other Other applications (when pumped from a well) could include: <ul style="list-style-type: none"> • Lift stations • Snow making • Storm water • Waste water

The following information is required for the Water Well Pump VFDs

- Water well pump design flow (GPM): the design flow rate (GPM) for a water well pump
 - Water well pump design head: the design pressure head (ft) for a water well, or feet of head
 - Static water level (ft): the average well depth (ft) for a water well pump
 - Average pump flow: the time weighted average flow rate (GPM) for a water well pump
 - Maximum pumping water level: the maximum well depth (ft) for a water well pump
- Gallons per minute (GPM) Feet (ft)

System Flow Rate and Head

According to the U.S. Department of Energy (DOE)⁴, the design pump capacity, or desired pump discharge in gallons per minute (gpm) is needed to accurately size the piping system, determine friction head losses, construct a system curve, and select a pump and drive motor. Process requirements may be met by providing a constant flow rate (with on/off control and storage used to satisfy variable flow rate requirements), or by using a throttling valve or variable speed drive to supply continuously variable flow rates. The total system head has three components: static head, elevation (potential energy), and velocity (or dynamic) head. Static head is the pressure of the fluid in the system, and is the quantity measured by conventional pressure gauges. The height of the fluid level can have a substantial impact on system head.

Achieve sustainability

The DOE⁵ further reports that most pumps operating today were selected to meet a maximum system demand, or potential future demands. This means that most pumps are oversized, rarely operating at their full design capacity. In addition, pumps are often installed in systems with multiple operating points that coincide with process requirements.

Adjustable speed drives (ASDs) provide an efficient flow control alternative by varying a pump’s rotational speed. These drives are broadly classified as mechanical (fluid or eddy current) drives and variable frequency drives (VFDs). Today, the VFD is the most frequently specified type of ASD, and pulse-width-modulated VFDs are the most commonly used.

If your project does not qualify for one of the prescriptive water well pumps rebates listed above, it may qualify for a rebate through our Custom Efficiency program.

***Custom Efficiency rebates may be available for projects that are not eligible for prescriptive water well pump VFD rebates.**

The water well pump VFD rebate is designed for the sophisticated customer that is looking for energy efficiency opportunities beyond the low-hanging fruit of a typical VFD project.

Prescriptive Rebates for Water Well Pump VFDs

Drives tiered HP	
Motor HP	Rebate levels
1	\$400
1.5	\$400
2	\$400
3	\$400
5	\$600
7.5	\$750
10	\$1,000
15	\$1,250
20	\$1,600
25	\$2,000
30	\$2,400
40	\$3,000
50	\$3,500
60	\$4,000
75	\$5,000
100	\$6,000
125	\$7,000
150	\$7,000
200	\$8,000
Larger than 200 HP	*Drives on equipment larger than 200 hp will be evaluated via Custom Efficiency.

Sources:

1. United States Industrial Electric Motor Systems Market Opportunities Assessment, DOE/GO-102000-959, U.S. Department of Energy, 1998; see www.eere.energy.gov/bestpractices/
2. <http://energy.gov/eere/amo/advanced-manufacturing-office>
3. <https://www.maintenancetechnology.com/wp-content/uploads/images/stories/2009/1103feature2figure1.jpg>
4. U.S. Department of Energy, Energy Efficiency and Renewable Energy, Energy Tips - Pumping Systems, Pumping Systems Tip Sheet #2, October 2005.
5. U.S. Department of Energy, Energy Efficiency and Renewable Energy, Energy Tips - Pumping Systems, Pumping Systems Tip Sheet #11, January 2007.

To learn more about the water well pump VFD rebate contact your account manager or an energy efficiency specialist at 855.839.8862 or email energyefficiency@xcelenergy.com.

