

PUMPS CASE STUDY

Smart Circulators Provide Convenience and Savings for Bellwether Housing



The problem and opportunity.

Bellwether Housing is the largest nonprofit affordable housing provider in Seattle, Washington. With locations near businesses, job opportunities, schools and daycares, Bellwether strives to bring stability and opportunity within reach of its 3,200+ tenants. Affordable housing options promote a more vibrant and equitable city by supporting many of Seattle's community members including independent seniors, immigrants seeking opportunity, families exiting homelessness, preschool teachers, social workers and young people just starting out.

Bellwether manages 2,100 units across the city in buildings that range from new construction to century-old apartments. This diversity can pose a challenge for the maintenance team – in the past, it has led Bellwether to participate in weatherization programs like Seattle City Light's Homewise in order to save energy and lower costs.

When Bellwether's Senior Facilities Manager, Marty Gleaves, was presented with the opportunity to upgrade aging domestic hot water recirculation pumps in some of its buildings, he jumped at the chance. "We're always excited to save money, both for Bellwether and for our tenants," said Gleaves. The new high-tech smart pumps promised to provide more efficient, intelligent and adaptive power to the building's systems.

PROJECT NAME:

Bellwether Housing – a nonprofit, affordable housing provider.

LOCATION:

Seattle, Washington

BUILDING TYPES:

Range from new construction to century-old apartments.

NUMBER OF UNITS:

2,100 across all buildings



“We’re always excited to save money, both for Bellwether and for our tenants.”

– Marty Gleaves, Bellwether
Sr. Facilities Manager



The solution.

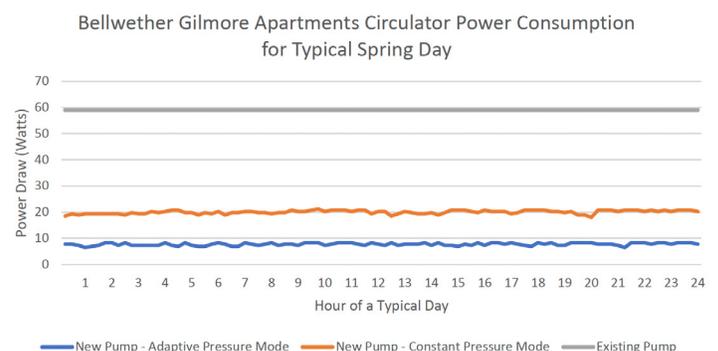
When the time came to replace the pumps, Bellwether worked with the Northwest Energy Efficiency Alliance (NEEA) to install smart pumps in four of its multifamily buildings. Domestic hot water recirculation is a great way to decrease the amount of water wasted and improve occupant comfort by reducing the time-to-tap for hot water in a building.

However, this process also means energy is lost by continuously circulating hot water in the recirculation loop, which results in significant waste. Plus, recirculation pumps are often oversized. The unnecessary increase in flow through the pipes is more than necessary to serve the demand, further wasting energy since the high flow rate increases heat lost and the power required to heat the returning water.

To combat these heat losses and save energy, Bellwether installed circulator pumps with advanced speed controls, or smart circulators, on the domestic hot water recirculation loops. Each circulator is powered by an efficient Electronically Commutated Motor (ECM) and has integral controls that adjust the speed of the circulator to match conditions in the system, decreasing the energy the pump is spending to recirculate the water. During this case study, the smart circulators were operated in the different control strategies that each pump is equipped with in order to compare the energy use and performance, and to determine the option that worked best for each facility.

Ultimately, the optimal control setting would depend on the specific circumstances of the facility. With the installation and operation of these more efficient circulators, the maintenance staff have registered no complaints about reduced service, colder water, or longer wait time.

The graph below shows the energy consumption of the original pump (baseline) compared to the replacement pump in Constant Pressure and Adaptive Pressure modes at the Gilmore Apartments location. For this application, Adaptive Pressure mode was the most efficient and highest-performing setting.



Before upgrade:

Before the smart circulators were installed, each DHW Recirculation Loop was served by a single speed circulator with an inefficient motor. These circulators consumed a lot of energy: On average, the circulators drew 88 watts and ran at full speed continuously 24 hours a day 7 days a week.

After upgrade:

All four circulators were replaced with smart circulators equipped with ECMs and integral speed controls. Three of the four circulators were equipped with more than one Advanced Control Strategy. Each circulator was left in the most efficient control strategy, resulting in an average power draw of 9 watts – a 90% decrease in power consumption from the old circulators. Additional savings occur from the reduced demand placed on water heaters and boilers. In total, each site can expect to reduce energy consumption by 689 kilowatt hours per year, resulting in annual savings of approximately \$69 per pump.

Outcomes

The installation of four Smart Circulators resulted in pump and water heating energy savings of 689 kWh/year per pump. Bellwether expects to save \$1,380 over the next five years operating the new efficient circulator pumps.

Six months after the new pumps were installed, Gleaves was asked how they were performing. “If anything had gone wrong, I would have known about it, but these pumps have been operating flawlessly.” The installation process was seamless, too, requiring only minor plumbing changes in one of the sites. Gleaves is still evaluating the pump performance, but if the circulator pumps continue to serve the residents’ needs, he’ll choose efficient circulators with smart controls for all of the buildings managed by Bellwether Housing.

Project Results



New Pumps Installed
Four



5-Year Estimated Savings
\$1,380



Annual Energy Savings
3,445 kWh



Power Consumption
90% decrease