Putting WaterSense® to Work

Hospital Installs Water-Efficient Laboratory and Medical Equipment

Sector: Hospitals; Focus: Laboratory and Medical Equipment

Project Summary

Providence St. Peter Hospital in Olympia, Washington, is a 340-bed, 750,000-square-foot patient care facility. The hospital logs approximately 95,000 patient days per year and employs 2,300 staff.

In Olympia, water rates increased 40 percent between 2000 and 2011. Realizing the potential for saving both water and operating costs, Providence St. Peter Hospital began identifying water efficiency improvement projects as early as 1999. In 2001, the hospital partnered with its mechanical contractor to perform a facility water assessment and identify sources of water waste, focusing its initial efforts on improving operations and maintenance. Providence St. Peter maintenance staff analyzed irrigation systems, heating and cooling systems, faucets, kitchen equipment, hydrotherapy pool operations, and other potential sources of leaks and made repairs where necessary.

Following the initial water assessment and leak detection and repair phase, Providence St. Peter began the major work of improving the efficiency of some of its medical equipment, as well as equipment in restrooms, kitchens, and mechanical spaces.

Like most hospitals, Providence St. Peter uses sterilizer equipment to disinfect and sterilize surgical instruments, medical waste, and other materials. The hospital's four existing instrument steam sterilizers all are outfitted with orifice venturi equipment, which uses water to produce a vacuum. By replacing the venturi equipment with electric vacuum pumps, Providence St. Peter was able to eliminate the water use associated with the vacuum operation in its sterilizer units. Additionally, piping was modified so that steam condensate was recovered from the sterilizer jacket, which is now redirected to the boiler plant for reuse instead of discharged to the drain.

Medical air compressors

Instead of using potable water for single-pass cooling of its liquid-ring central vacuum pumps, Providence St. Peter uses recirculating chilled water from the central chilled water system, although some fresh water is required to flush the system clean of any medical fluids. Providence

Case Study Highlights

- **Facility name:** Providence St. Peter Hospital
- **Location:** Olympia, Washington
- **Potential occupancy:** 340 beds
- **Building size:** 750,000 gross square feet
- **Water savings:** 31 million gallons of water in total over 10 years, or approximately 5.9 million gallons per year once retrofits were completed
- **Cost savings:** $1.5 million over 10 years, or approximately $140,000 per year
- **Simple payback:** Accounting for rebates and incentives, all of the implemented projects paid for themselves in less than 2 years

St. Peter has also replaced its liquid-ring, non-medical (control) air compressors and waste anesthesia gas pumps with non-water-using equipment.

In addition to addressing the water efficiency of some of its medical equipment, Providence St. Peter has also improved the efficiency of its sanitary fixtures, mechanical equipment, and outdoor water including:

- Installed dual-flush valves on existing flushometer-valve toilets and installed several new high-efficiency toilets, making use of available utility rebates.
- Installed 1-pint urinals.
- Installed water-saving showerheads that meet patient expectations of performance.
- Worked with a manufacturer to design dual-flush bed pan washers.
- Eliminated single-pass cooling in air conditioning units and ice machines.
- Maximized the cooling tower's water efficiency; the cooling tower is the largest user of water at the facility, consuming approximately 3.2 million gallons of make-up water even under an efficient control scheme.
- Installed a weather-based irrigation controller on its irrigation system.
- Replaced the garbage disposal with a food separator and compost system.

Providence St. Peter has additional water efficiency projects that it is considering, including: collecting and reusing rainwater; installing submeters to better monitor water use; reducing and/or reusing clean dialysis reject water; and collecting and using air handler condensate as cooling tower make-up water.

Savings Summary

The upgrade of the existing steam sterilizers was by far the most significant of the water efficiency improvement projects completed at Providence St. Peter Hospital. As a result of these improvements alone, the hospital was able to reduce its water use by 4,300 gallons per day or approximately 1,600,000 gallons per year. To finance the $30,200 retrofit project, the hospital received a 50 percent grant from its wastewater utility. With this grant, the payback period for the project was less than two years.

Anesthesia evacuation pumps

Table 1 provides a summary of the water savings from all of the projects implemented at Providence St. Peter through 2012.

All of the projects completed at Providence St. Peter combined have lowered operating costs and reduced the burden on the hospital's budget. Providence St. Peter Hospital estimates that it saves approximately $140,000 each year in water and sewer bills, and at least 3.4 million gallons of water.

Ten years after the hospital began its water efficiency efforts, staff estimated that it had reduced water use 59 percent compared to its 1998 use. In fact, the hospital realized cumulative savings of $1.5 million and 31 million gallons of water between 1999 and 2011. This savings was achieved despite an expansion of the campus by 17 percent and an increase of 22 percent in patient days between 2004 and 2009.

Acknowledgements

The U.S. Environmental Protection Agency's (EPA's) WaterSense program acknowledges Providence St. Peter Hospital Facility Director Geoff Glass, Stirrett Johnsen Mechanical Contractors employee Troy Aichele, and Mazzetti Nash Lipsey Burch Senior Environmental Performance Consultant Laura Brannen for providing information for this case study.

Learn More

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Table 1. Retrofit and Replacement Project Water Savings

Project	Water Savings (gallons per year)	Estimated Payback (years)
Medical Equipment Retrofits and Replacements		
Steam Sterilizer Pump Replacement and Condensate Collection	1,600,000	1.9
Replacement of Non-Water-Using Medical Air Compressors (reciprocating system)	790,000	5.0
Waste Anesthesia Gas Pump Replacement	530,000	5.7
Mechanical System Replacements		
Replacement of Single-Pass Cooling Ice Machines, Air Conditioning, and Refrigeration Equipment	more than 330,000	1.1
Sanitary Retrofits and Replacements		
Retrofit of Flushometer-Valve Toilets With Dual-Flush Valves and Handles	2,300	4.8
Installation of 1-Pint Urinals	10,000	3.4
Installation of Some Dual-Flush Flushometer-Valve Toilets	9,800	6.8
Installation of 1.5 GPM (gallons per minute) Showerheads	3,700	2.1
Installation of Reduced Flow Rate Faucets	1,500	4.5
Commercial Kitchen Replacements		
Installation of a More Efficient Tunnel Dishwasher	660,000	18
Installation of a Food Separator and Garbage Composting System	1,000,000	Not available
Outdoor Replacements		
Installation of a Weather-Based Irrigation Controller	1,000,000	Not available
Total	**Approximately 5,900,000**	