

Overview

Through the U.S. Department of Energy's Better Buildings Alliance, leading organizations are working to develop and accelerate integration of energy efficient technologies and solutions into new and existing buildings. An area of interest is the demonstration of multi-load washers used by the commercial industry. In particular, washers are among the most energy-intensive equipment used in healthcare and hospitality facilities. Wastewater recycling is a market-ready solution that can save an average of 365 thousand gallons/month of combined water and sewer and 1,119 therms/month in hot water heating energy



Multi-load washer in Grand Hyatt Seattle.

Demonstration Site

The Grand Hyatt is a four diamond hotel located in downtown Seattle, has 425 guest rooms, 3 restaurants, and over 25,000 square feet of conference space. Laundry from Hyatt's nearby Olive 8 property is also processed in the Grand Hyatt laundry facility, almost doubling the facility's wash load. To service both hotels, the laundry facility runs continuously and averages ~9,300 pounds of laundry per day.

Demonstration Results

The wastewater recycle system at the Grand Hyatt Seattle was installed at an approximate installed cost of \$100,000. Between Nov. 2013 and Feb. 2014, the wastewater recycle system saved an average of 365 thousand gallons/month of combined water and sewer and 1,119 therms/month in hot water heating energy, while adding an electrical load of 1,922 kWh/month.

Wastewater Recycling System Retrofit Results

Energy Savings	Using recycled wastewater saves 15,850 therms of hot water that would otherwise be heated annually
Utility Savings	5,175 kgal of water and \$135,000/year reduction in utility costs
Simple Payback	Less than 1 year
Installation and Maintenance	Laundry operations were unchanged once the system was fully integrated and adjustments were made to the chemical detergent program
Overall Performance	Linen quality met the expectations of Grand Hyatt's management and clientele
Energy Savings	Using recycled wastewater saves 15,850 therms of hot water heating energy annually

Wastewater Recycling Technology

A wastewater recycling system filters and sterilizes the laundry discharge water and recycles the discharge water, allowing it to be used in the next load. The wastewater discharge is sent through a series of filtration steps to remove lint, organic material, and other solids, followed by several stages of disinfection. The cleaned water is housed in a holding tank where it continues to be treated with oxidizing agents until it is ready to reuse. The water is treated in a final disinfection process using ultraviolet light before being returned to the laundry system washers along with makeup hot water, reducing the amount of new hot water needed for each load. Wastewater recycle systems are skid-mounted and require up to several hundred square feet of floor space.

Demonstration Laundry Equipment

The central laundry facility at the Grand Hyatt Seattle houses five hard-mount Alliance Laundry/Speed Queen commercial washers: two 165 pound, two 135 pound, and one 55 pound machine. These washers receive cold water from a dedicated connection and hot water from a steam-to-hot-water heat exchanger. To save energy and water, the Grand Hyatt Seattle partnered with the City of Seattle Public Works to install a wastewater recycle system from AquaRecycle™ of Marietta, GA.

Conclusion

The significant cost savings provided by the wastewater recycle system at this location result in a simple payback period of less than 1 year and indicate that this technology is financially attractive for hotels with similar laundry throughput and utility characteristics. It also shows the system can be integrated at a high-end hospitality facility while maintaining quality standards.

Learn More

The final report is available through the [Pacific Northwest National Laboratory's website](#).

If you have any additional questions, please contact techdemo@ee.doe.gov



Wastewater recycling system control panel