

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 multi-load washers used in the healthcare and hospitality industry because they are among the most energy- and water-intensive pieces of equipment used in these facilities.

Wastewater recycling and ozone cleaning technologies are market-ready solutions that save water and reduce energy consumption in commercial laundries.

Demonstration Site

DOE funded an evaluation of both: a wastewater recycle system at the Grand Hyatt Seattle and evaluations of ozone systems at the Charleston Place Hotel and the Rogerson House Assisted Living Facility.

Demonstration Performance

A wastewater recycling system filters, sterilizes, and recycles the laundry discharge water. 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 for reuse. Wastewater recycle systems are skid-mounted and require up to several hundred square feet of floor space.

Ozone is a natural disinfectant that eradicates organic matter, bacteria, and pollutants, and can be used as an alternative for traditional disinfectants in commercial laundry systems. Ozone is generated and injected into cold water supply to the washers, saving substantial water heating energy. Ozone reacts with insoluble soils, making them soluble so they can be separated from the fabric through the laundering process. Ozonation systems require very little space and therefore can be easily retrofitted onto systems where minimal space is available.



Wastewater recycling system control panel

Results: Wastewater Recycling

Costs and Savings	\$135,000/year reduction in utility costs Less than 1 year simple payback
Installation and Maintenance	No changes were reported in staffing or workload, and 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

Results: Ozone Systems

Energy Savings	Over a 60% reduction in hot water energy requirements. Payback period varied in each evaluation location.
Installation and Maintenance	The transition to an ozone system did not affect laundry routine or change staffing, workload, or maintenance requirements
Overall Performance	No complaints were reported regarding the cleanliness of the laundry, an important consideration for service-oriented industries

Table 1. Performance by Location

	The Grand Hyatt	Charleston Place Hotel	The Rogerson House
Technology	Recycle	Ozone	Ozone
Throughput	9,300 lb/day	5,000 lb/day	500 lb/day
Utility Savings	\$11,200/month	\$1,255/month	\$1.50/month

Demonstration Results

The Grand Hyatt achieved significant water/wastewater savings of 80%, and modest energy savings to heat water. The overall utility savings are \$11,200 per month, resulting in a simple payback, including a utility rebate, of less than 1 year.

The Charleston Place Hotel achieved significant water heating energy savings of 65% and utility savings of \$1,255 per month. The simple payback period is 2.8 years.

The Rogerson House demonstration showed significant hot water energy savings of 63%, but an increase in water use and electricity use for the ozone generator, resulting in a net utility cost savings of \$1.50 per month. The ozone system retrofit was therefore not found to be cost-effective at this site.

What’s Next?

The significant cost savings provided by the wastewater recycle and ozone systems at two of the three demonstration sites indicates these technologies are financially attractive for hotels with similar laundry throughput and utility characteristics.

The table below provides a summary of considerations for selecting an appropriate efficiency laundry retrofit technology:

Table 2: Selecting an Appropriate Laundry Retrofit Technology

Tech.	Capital Cost	Space Required	Savings	Additional Benefits
Wastewater Recycle	\$100-200K	Significant space required Skid-mount modules	Significant water and waste-water savings	Disinfects Chemical use can be reduced
Ozone	\$10-50K	Minimal space required Wall-mount	Significant water heating savings	Disinfects Chemical use can be reduced Potential reduction in drying time

Learn More

The final reports are available on the Pacific Northwest National Lab’s website:

[Wastewater Recycling](#)
[Ozone-Based Laundry Systems](#)

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