

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, as they are among the most energy intensive equipment used in these facilities. Ozone cleaning systems are a market-ready solution that can reduce energy consumption in commercial laundries. DOE funded evaluations of ozonation at the Charleston Place Hotel in Charleston, SC, and the Rogerson House assisted living facility of Boston, MA.

Demonstration Site

The Charleston Place Hotel is a luxury facility featuring 320 deluxe rooms, 80 club-level rooms, and 40 suites, and processes 5,000 pounds of laundry per day. The Rogerson House assisted living facility accommodates 66 overnight residents and processes 500 pounds of laundry per day.

Demonstration Performance

Retrofitting the laundry systems of the Charleston Place Hotel with ozone technologies resulted in significant water heating energy savings of \$842 per month (65%), and water/sewer savings of \$460 per month (15%). Though the ozone system operation increased electrical energy use by \$59 per month to operate the system, the overall cost savings resulted in a simple payback period of 2.6 years.

In contrast, while the Rogerson House demonstration showed significant hot water energy savings of \$80 per month (63%), it also demonstrated a water/sewer increase of \$73 per month (19%). In addition, the ozone generation system resulted in an electricity cost increase of \$5.50 per month. The net utility savings of \$1.50 per month resulted in no payback for this system.



Multi-load washer at Rogerson House

Ozone Laundry Retrofit Results

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

Ozone and Ozone Systems

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 reacts with insoluble soils, making them soluble so they can be separated from the fabric through the laundering process. Ozone is effective as a disinfectant in cold water, so washing temperatures can be reduced to realize hot water energy savings. Ozonation systems require very little space, so they can be easily retrofitted onto systems where minimal space is available.

Conclusion

The results of this study indicate that ozone laundry technology is a financially attractive investment for hotels with similar laundry and utility characteristics as the Charleston Place Hotel.

Despite the energy savings provided by the ozone system at the Rogerson House, the additional water usage resulted in negligible monthly cost savings and thus essentially no financial payback. These results indicate that unlike energy savings, water savings is not ensured by the installation of an ozone system.

Careful attention is required during the reprogramming of the wash cycles to ensure that total water usage is not increased arbitrarily as a result of equipment modifications that require washer program changes. Assuming the system could be readjusted to achieve net neutral water consumption, the results of this study indicate that for a location with similar utility costs, a minimum laundry throughput of around 1,500 pounds per day would be required for ozone laundry technology to be cost effective.

Learn More

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

<http://www.pnnl.gov/publications/abstracts.asp?report=502480>

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



Washers at the Charleston Place Hotel.