

CITY OF VANCOUVER saving over 1.7 million kilowatt-hours and tens of thousands of dollars per year through wastewater energy efficiency improvements.



“In the past, we didn’t systematically think about energy efficiency,” says Frank Dick, Industrial Pretreatment Coordinator for the City of Vancouver. “Today, it’s an integral part of our operations.”

The City of Vancouver, Washington, typically treats more than 20 million gallons of wastewater each day. This requires substantial aeration systems and ultraviolet (UV) light arrays at the city’s two wastewater treatment plants (WWTPs). While these systems are critical for supporting the biological treatment process and destroying harmful bacteria and pathogens, they consume large quantities of power.

“Through a series of workshops and a subsequent energy audit, we found that we could improve our energy efficiency without impacting water quality,” says Dick. “We also learned that we could receive rebates for energy efficient equipment and incentives for power reductions from Clark Public Utilities, so we jumped at the opportunity.”

These incentives and rebates are supported by the Bonneville Power Administration’s (BPA) Energy Smart Industrial (ESI) program, which works with Northwest public utilities and their industrial customers—offering project management, technical assistance and financial incentives—to advance energy efficiency throughout the Northwest. With the help of BPA’s ESI program and Clark Public Utilities, the City of Vancouver has made a series of energy improvements at its WWTPs.

All told, the improvements are saving the city roughly one million kilowatt-hours and tens of thousands of dollars per year. ESI support and utility incentives covered about 30 percent of the project’s capital costs. And more energy upgrades are on the horizon.

CAPITAL AND OPERATIONAL ENHANCEMENTS IMPROVE ENERGY EFFICIENCY

The multi-stage centrifugal blowers at Vancouver’s WWTPs were running just fine, but they were outdated and inefficient compared to newer airfoil turbo blowers. By replacing one of the four existing blowers at each plant with a new turbo unit, the city was able to realize significant energy savings and payback their initial investment in less than two years.

“We used to have two blowers constantly running at each facility,” explains Aaron Kraft, Project Manager for Veolia Water North America, which operates the WWTPs for the

UTILITY

Clark Public Utilities

PROJECT

Waste Water Treatment Plant

COMPLETED CAPITAL IMPROVEMENTS (VERIFIED SAVINGS)

Westside Plant Blower Swap

711,487 kWh/yr

Marine Park Plant Blower Swap

540,330 kWh/yr

IN-PROGRESS CAPITAL IMPROVEMENTS (ESTIMATED)

Westside Mixer Upgrade

161,414 kWh/yr

Westside Lighting Retrofit

196,566 kWh/yr

Marine Park Lighting Retrofit

269,746 kWh/yr

Andresen Pump Station Retrofit

218,500 kWh/yr

HPEM PROGRAM

LOW/NO-COST O&M MEASURES (SAVINGS)

Westside Plant

386,812 kWh (vacuum/compressor timing changes)

Marine Park

161,066 kWh (UV optimization)

SAVINGS TO DATE

1,799,695 kWh/yr

TOTAL ESTIMATED SAVINGS

2,645,921 kWh/yr

City of Vancouver. “Now we can get by with a single turbo blower at each treatment plant most of the time.”

This equipment update resulted in a 35 percent decrease in the power required to operate blowers at the city’s Westside facility. While the energy efficiency gains of the new turbo blower at the city’s Marine Park facility have yet to be measured, Kraft anticipates up to a 50 percent improvement.

The city also installed a variable frequency drive (VFD) on the water recycling system at Marine Park. Instead of running continuously, the VFD automates pump operation based on demand. This has effectively lowered the pressure requirements of the system, saving an estimated 220,000 kilowatt-hours per year (kWh/y).

In addition to capital improvements, the city and Veolia also learned how to adjust and optimize its energy usage for various system conditions. This includes fine-tuning the UV arrays at the two WWTPs to reduce light intensity without impairing water quality. By adjusting the set points of the UV system based on flow and daily water tests, the team reduced its UV energy consumption by 27 percent, representing nearly 15 percent of the entire load at the WWTPs.

“No pun intended, but our UV usage was a matter of overkill,” says Kraft. “We partnered with the ESI team, who helped us measure contact time in relation to flow. We found that we can use less UV during low flow periods and still meet our permit requirements.”

ENERGY SAVINGS LEAD TO REINVESTMENT, SUSTAINABILITY

Based on the success of these projects, the City of Vancouver continues to pursue additional energy improvements.

“As we realize energy and financial savings, we are able to reinvest in the city and fund more capital projects,” says Dick. “These efforts allow us to become more sustainable and keep sewer rates stable for the people of Vancouver.”

The city is currently replacing 24 mixers in the WWTPs’ aeration basins, which support the biological treatment process by keeping solids in suspension. Once the new, high-efficiency mixers are installed, the city anticipates saving 112,000 kWh/y. Vancouver is also making interior and exterior lighting improvements at the WWTPs. By installing motion sensors and high-efficiency lights and ballasts, the city will save an additional 522,000 kWh/y.

“It’s been great working with Clark Public Utilities and BPA,” says Dick. “The Energy Smart Industrial program is unbelievably well organized. They included and motivated our entire staff. They were actively engaged throughout the process, from baseline testing to ongoing monitoring. And they continually look for additional energy efficiency opportunities. We’ve been thrilled with the results.”

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For information about BPA ESI:

Visit www.energysmartindustrial.com or contact your local utility provider.