

A New York District Drives Down Power Consumption While Pushing up On-Site Power Production

The Great Neck Water Pollution Control District drives down power consumption while pushing up on-site power production.

- Appeared in print as "*Saving Both Ways*"
- By **Steve Lund**
- [August 2018](#)
- Sustainable Operations
-





Christopher Murphy, superintendent of the Great Neck Water Pollution Control District.

Christopher Murphy is trying to put wastewater to work. As superintendent of the Great Neck (New York) Water Pollution Control District, he believes society too often looks at wastewater as an expensive problem and ignores its productive potential.

“We’ve been trying to tap into the energy and revenue potential of having a wastewater plant,” he says. “There’s a lot you can get out of it.” The district, just outside New York City, has launched a \$30 million upgrade — three new digesters, a grease receiving station, another microturbine, improvements to two pump stations and repairs, and improvements to the plant bulkhead. It will all be done without raising rates: A state grant will provide \$12.29 million, and the rest will be covered by energy savings and revenue from the grease station.

Sold on biogas

The district serves more than 25,000 residents of Great Neck, Saddle Rock, Kensington and a few other communities on the north shore of Long Island, the area called West Egg in the novel, *The Great Gatsby*. The treatment plant (5.3 mgd design, 3 mgd average) uses anaerobic digestion, UV disinfection and advanced water treatment to reduce nitrogen and phosphorus. The effluent goes into Manhasset Bay.

Great Neck has been producing methane from its digesters since the 1980s, originally to fuel boilers that heated the digesters. In 2013, the boilers were replaced with two Capstone Turbine 65 kW microturbines that produce heat and electricity. When the current upgrade is completed, the grease mixed into the digesters will enable the plant to produce biogas for a third turbine.

The Great Neck staff has been researching grease for gas enhancement since 2006, but that wasn’t feasible with the existing digesters because the mixing was inadequate. The new digesters will have the appropriate mixing equipment.

The grease receiving station will be the only one in Nassau County. Market research showed a great need for grease drop-off sites, and the district expects to generate more than \$100,000 in a year in tipping fees from haulers.

Major savings

The treatment plant's original boilers produced only about 20 percent of digester heat. With the two microturbines, the same amount of biogas produced 80 percent of the plant's heat requirement, plus 130 kW of electric generating capacity. To date, those turbines are saving the district about \$125,000 a year. When the grease station and the third turbine come online in 2019, they'll produce all of the plant's heat requirements and 50 percent of its power, Murphy estimates.

To get to that point, the district significantly reduced its power demand. "When we did our main upgrade in 2013, we wanted to make the plant a lot more efficient," Murphy says. "We no longer have light switches.

"If you're a wastewater operator working on a pump or taking a sample and you have sewage on your gloves, the last thing you're thinking about when you walk out of a building is hitting a light switch. Most plants have lights that are on 24/7. In all of our buildings, we incorporated motion and sound and heat sensors. If there is no movement or heat signature or sound for five minutes, they shut themselves off."

The district also changed all light fixtures from fluorescent to LED and reduced the number of light fixtures by one third. With the external lighting, the district also put in a sequencing controller. "The lighting around the perimeter is on from dusk to dawn, but all the lighting inside the fence is on sequence timers," Murphy says. "We save a lot of energy there."

The district also put variable-frequency drives on almost every pump and motor and connected them to the SCADA system. "In 2018, to have a pump that would benefit from a VFD and not have it is a crime," Murphy says. "We get maintenance alarms when a pump is not operating efficiently, and we can check to see if it's a problem with the impeller or whatever it might be. Any electric motor over 5 hp has a VFD."

Reusing water

The district also saves by using its effluent as wash water and process water. "We are very passionate about water usage," Murphy says. "Wastewater plants in general use a tremendous amount of drinking water, whether for washing hoses or treatment processes."

At Great Neck, an on-site water main and pump station supply all the hoses in the plant with treated effluent. "Our city water usage is almost negligible," Murphy says. "We're reusing the water that we've treated and keep the drinking water from being pumped out of our aquifer."

He thinks every wastewater plant should have to report monthly on its use of drinking water: "Once a month there should be a spot where you report how much city water you used. That would call attention to the gross amount being used, and you'd have accountability."

Murphy believes conserving water makes a statement for the community. He notes that on-site power generation also benefits the community, greatly reducing the amount of electricity pulled off the grid and so increasing the capacity of transmission lines for others to use.

More standardization

In making changes to its plant over the years, the district has put most equipment purchases out to bid and as a result has a wide variety of pumps, controllers and other devices. Now, the district is moving to standardize some equipment. Murphy sees a safety and training benefit when workers have fewer models to operate. There's also an economic benefit in having a smaller variety of replacement parts to stock.

The district commission has passed several resolutions of standardization authorizing the superintendent to purchase certain items, including the N-Pump series and MultiSmart pump controllers from Flygt - a Xylem Brand, Muffin Monster grinders by JWC Environmental, Carbtrol odor control systems, Toshiba International LF Series metering devices, Capstone Turbine microturbines, Unison Solutions gas conditioning systems, and emergency standby generators from Kohler Power Systems.

Turkey day collections

Even before receiving FOG to enhance energy production, the Great Neck Water Pollution Control District collected fat from residents on the day after Thanksgiving.

“We’ve been doing it for many years,” says Christopher Murphy, superintendent. “A lot of people like to deep-fry their turkeys. That takes 5 to 8 gallons of oil. We send out a mailing to let people know that if they call, they can schedule a pickup on the Friday after. They keep the oil in their cooking vessel, and our employees go out in a pickup truck and collect it.”

With the home visits plus people dropping off grease, the collections can bring in up to 100 gallons of grease. “It’s definitely public relations, but it’s more of a preventive maintenance thing,” Murphy says. “A lot of this oil otherwise tends to find its way into the sewer system. There could be a lot of blockages created, and we don’t want that.”