

By Caitlin Cunningham

# The Power Lies Within

Oregon WWTP works to achieve—and someday exceed—energy independence

**NAME:**

Gresham Wastewater Treatment Plant

**LOCATION:**

Gresham, Ore.

**PLANT SIZE:**

20 mgd

**INFRASTRUCTURE:**

Pump stations, cogeneration facility, solar array, asset management system



Gresham WWTP serves more than 100,000 customers, with flows averaging about 13 mgd.



A cogeneration engine converts the plant's digester gas into energy for electrical power and heat.



The facility plans to become self-powering and eventually contribute surplus energy to the grid.

**W**ater and wastewater treatment systems account for up to 4% of U.S. energy usage each year, according to the U.S. Environmental Protection Agency (EPA). When considered at a local level, facilities' consumption level may multiply many times over. Gresham, Ore.—the state's fourth-largest city, situated just east of Portland—has set out to serve as a national model for sustainable planning, design and development. As part of its comprehensive plan, Gresham has begun transforming its wastewater treatment plant (WWTP) from an energy hog to an energy provider.

The city's initial goal for the 20-million-gal-per-day (mgd) facility is to have it achieve energy independence. Gresham WWTP serves approximately 108,000 customers in the cities of Gresham, Fairview and Woodvillage. It operates eight pump stations, and actual flows to be treated average about 13 mgd. The local government recognized the potential to practically and cost-effectively reduce the sizable plant's energy expenditure and carbon footprint, and thus support the city's sustainability goals.

**Energy Engine**

Gresham officials commissioned the design of a cogeneration engine that converts methane gas, a natural product of the WWTP's digesters, into energy for electrical power and heat. They selected and installed a Caterpillar lean-burn engine and generator to perform this function.

In November 2005, Veolia Water North America assumed responsibility for operating the 395-kWh cogenerator as part of a seven-year, \$21-million contract with the city of Gresham. Entering into the public-private partnership, Veolia promised Gresham that the technology would be in operation 90% of the time or more. To date, its uptime has been better than 94% annually. The methane-to-energy solution has helped Gresham WWTP cut its electricity costs by about \$23,000 per month, and today the facility produces half of the energy it consumes.

**Support Systems**

Further fueling Gresham WWTP is a 419-kW solar array, the result of a city partnership with SunEdison and REC Solar. Nearly 2,000 ground-mounted solar panels cover an acre and a half of the plant site. City officials predict that these panels will supply 7% of the WWTP's yearly energy needs.

The facility also acquires wind power from in-state wind farms via Portland General Electric's Clean Wind Program. These purchases can generate another 18% of Gresham WWTP's energy.

A final support system is an asset management system tracked by Veolia Water. The city expects its use will reduce asset-related expenses by 15% to 25% before their contract is up.

"The asset management program will help the city clearly identify risk for system failure and consequence of failure, with focus to reduce risk of the most critical assets with a targeted maintenance program," said Paul Proctor, project manager with Veolia Water. "Also, the program has provided a detailed condition-based evaluation of the assets to determine overall health of the plan assets and help to focus funding into areas to reduce failure of high-risk assets."

**Getting Off the Grid**

Since 2005, Gresham WWTP has seen its monthly energy consumption drop from 556,000 kWh to 452,000 kWh—about a 20% reduction. The facility currently produces about 60% of its power on site and continues to make strides toward its goal of achieving energy independence by 2015. A new fats, oils and grease receiving station will increase digester gas production, and a second co-generator will use this gas to fill the plant's energy gap. Furthermore, plans are in place to install high-efficiency aeration blowers and to swap out the current digester mixing system for more energy-efficient technology.

"Veolia and the city meet on a monthly basis to review energy use and to stay focused on the development and reduction of energy in the coming months and years," said Alan Johnston, senior engineer for the city of Gresham.

Ultimately, the facility plans not only to produce enough energy for its own needs but also surplus energy that can be added to the grid for other local needs.

**Energy Credit**

Several groups have recognized Gresham and its WWTP for their sustainability efforts. The EPA has repeatedly ranked the city of Gresham as one of its Green Power Communities, and the wastewater facility has been recipient of the following honors:

- 2009 Platinum Peak Performance Award from the National Association of Clean Water Agencies (for achieving total compliance with National Pollutant Discharge Elimination System permit requirements for five consecutive years);
- 2008 Public-Private Partnership Award from the National Council of Public-Private Partnerships;
- 2006 Award of Excellence from the League of Oregon Cities; and
- 2006 Julian Award for Sustainability from the American Public Works Assn. Oregon chapter. **wwd**

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