

POWER PROFILE

Customer: City of Fargo Regional Water Reclamation Facility

Location:

Fargo, North Dakota

Customer Business Issue:

Fargo faced rising power costs and aging infrastructure

Solution:

Cat® G3512 gas gensets (4)

Cat® Dealer:

Butler Machinery Co.



As a result of rapid population growth and increasing demand for water, the City of Fargo Regional Water Reclamation Facility needed more capacity and improved energy resilience.

POWER NEED

As Fargo grows, so do the surrounding communities of North Dakota's largest city. From 2010 to 2020, the city's population grew by more than 10 percent, and recent estimates suggest it has continued to grow at a similar pace.

The expansion of businesses in various sectors – including healthcare, finance, and agriculture – has bolstered the region's economy. In response, the city has made significant investments in infrastructure to support its growing population. This includes an expanding treatment facility, large enough to accept wastewater from surrounding communities.

In 2020, Fargo embarked on a \$151 million plant modernization and expansion in north Fargo that also serves West Fargo and Horace. The current plant expansion effectively doubles its peak treatment capacity to 50 million gallons (mgd) per day, says Jeffrey Hoff, control system manager for the City of Fargo Regional Water Reclamation Facility.

"In addition to Fargo proper, we're taking in the wastewater for all of the businesses and infrastructure as far away as eight miles north of us to 22 miles south," Hoff says. "And to the west, we will take all of West Fargo, which is outside the city limits. So when we started this project, we had to increase our capacity because we're serving so much new territory, which includes 15 sewer agreements with various municipal sewer districts and subdivisions outside the city."

The expanded system enables the facility to far exceed clean water standards. Compared to the existing treatment plant on the east side of the facility, the improvement achieved by using the new state-of-the-art treatment system will result in an 85 to 90 percent reduction in ammonia-nitrogen levels and 80 percent in phosphorus.

"The new portion is an anaerobic biological system that's all in one train," Hoff says. "It's an excellent system that really makes some nice, clean water."

SOLUTION

As part of the plant expansion, a new onsite power plant with four Cat® G3512 gas generator sets has been added for higher reliability and the ability to peak shave and lower energy costs.

The Central Generation Station (CGS) is a 3,480-square-foot building at the northwest corner of the wastewater treatment plant. Inside the CGS, the paralleling switchgear acts like a traffic cop, directing the flow of utility and generator-produced power to the rest of the plant.

And if the water reclamation facility loses utility power due to a storm or other reasons, all the generators come online and run the plant in island mode.

"We're located at the end of a line in a residential section, so we've had a lot of issues," Hoff says. "While utility power reliability has improved, having these Cat generators will help us through these blips that we sometimes experience."

The Fargo Regional Water Reclamation Facility is one of the largest energy users in the area. Wastewater treatment facilities typically require significant amounts of energy due to the extensive processes involved, such as pumping, aeration, and chemical treatment.

During times when facility power usage is at its highest and the utility electric rate is most expensive, the paralleling switchgear can call any number of generators online to peak shave and generate electricity with low-cost distributed energy.

Peak shaving, also called load shedding, is a cost-saving technique used by businesses to reduce electricity expenses by minimizing peak electricity demand, thereby reducing demand charges.

By the time all facets of the expanded plant come online this summer, the facility will require about 3.5 MW of continuous power to run the entire operation on a daily basis. And it's during those high usage times when peak shaving will come into play.

"We're not at full expansion yet, so our plant load hasn't reached the minimum threshold for bringing the generators online to peak shave," Hoff says. "However, we're under contract with our utility to do it, so we are realizing savings because we're under contract. But this power plant is designed for peak shaving, which should save us a bunch of money on our energy bill in the future."

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RESULTS

In addition to peak shaving, the City of Fargo saves on its electric bill by consolidating what was once multiple electrical services into a single service. One large utility feeder means fewer fees, penalties, and extra charges; and the simplified billing and elimination of metering and multiple generators around the property mean fewer headaches for plant operators and city personnel.

Prior to establishing a centralized power plant, the facility had four Cat generators of varying sizes that were dedicated to different areas of the facility.

"We had generators for every building; we had to go around at two o'clock in the morning and fire up all the generators and bring them online."

Matt Sytsma, a customer account manager for Cat dealer Butler Machinery Co., formerly served as a technician servicing the wastewater facility for 16 years.

"With this new centralized power plant, everything's in one building, so it's easy to access and easy to maintain," Sytsma says.

"The four G3512 units in this new power plant are identical. Facility staff can have one set of parts on hand for ease of use, whereas in the past they had four separate generators of different ages and sizes."

Adds Hoff: "It just made sense to the engineers to have one central power station instead of multiple generators all over the place that powered this facility. If we have a power outage, it doesn't take very long before things start going bad very quickly around here. So we need to have continuous power, and these Cat generators will come up in three seconds, and that's basically what we need to keep things running smoothly."

All service, including regular maintenance for the Cat gensets, is performed by Butler Machinery.

"For as long as I've been here, we've pretty much only dealt with Butler for all of our power systems needs," he adds. "Through the years, Matt and Butler have always been there for us – they're experts and really good to work with."



The reclamation facility is now served by an on-site power plant equipped with four Cat® G3512 gas generator sets, resulting in higher reliability and the ability to lower energy costs by peak shaving.