Market Segment: Municipal Utility

POWER PROFILE

Customer: Town of Berlin, Maryland

Location:
Berlin, MD

Customer Business Issue:
Peak shaving

Solution:
G3520 gas generator set

Cat® Dealer:
Carter Machinery

To lower energy costs, Berlin runs its fleet of generators behind the meter during times of peak demand on the grid.

POWER NEED

Located on the Delmarva Peninsula in Worcester County, Maryland, the quaint town of Berlin is only eight miles from nearby Ocean City. In 2014, the town was voted "America's Coolest Small Town" in a nationwide contest sponsored by *Budget Travel Magazine*.

With a population of approximately 4,700, Berlin has been the setting for two major motion pictures. In 1998, Berlin was the location for the filming of "Runaway Bride" starring Richard Gere and Julia Roberts. Then in 2001, Berlin became the fictional setting for "Tuck Everlasting" starring Sissy Spacek, Ben Kingsley, and William Hurt. Downtown Berlin was transported back to the turn of the century complete with dirt roads, horses and carriages, and period costumes.

The town's historic Main Street boasts over 60 retail shops, galleries, antiques, more than 15 dining establishments, live music venues, coffee shops, bakeries, butcher and a local seafood market. Owing to its rich history that dates back to the early 19th century, 47 structures in town are listed on the National Register of Historic Places. Downtown Berlin's thriving and diverse community was named the BEST Town for Shopping by *USA Today* in both 2018 and 2020. Berlin was twice named a Top 10 Great American Main Street.

Berlin's electric system has been in operation for over a century. Established in 1907, it now serves more than 2,581 total meters, with a system peak of 10 MW. The utility is separated into two divisions: generation and distribution. The electric utility operates a power plant on William Street that generates about two-thirds of the town's energy load during times of peak demand, while purchasing the majority of its power from outside sources.

Although Berlin once had some of the highest electric rates in the country, dedication and thoughtful planning have transformed the town's rates from the highest on the Eastern Shore of Maryland to the lowest in the area.

When Berlin's rates hit a peak high in 2007-2008, the town implemented a number of cost- and energy-saving initiatives. One of the most significant energy savings initiatives involved working with the town's electric utility consultant, Booth & Associates, to use peak shaving to support the town's electrical load.

The adjustment worked well, and in 2012, Berlin was able to reduce residential and commercial rates by 11.5 percent.

When presented to the Maryland Public Service Commission, which approves rates in the state, "Nobody at the commission could ever remember dealing with a rate decrease," said former Berlin Mayor Gee Williams.

In order to offset the high cost of power, Berlin runs its fleet of three generators behind the meter during times of peak demand on the grid. The goal is to run during five peak periods in a year, which results in substantial savings, says Berlin Utility Director, Tim Lawrence.

"The cost of electricity is like mountains and valleys," Lawrence says. "The peak is when they jack the charges through the roof. So by running our generators during these times of peak demand, we're taking the top off of that mountain and leveling it off. Instead of buying 8.7 MW of power and paying those high transmission charges, we'll start our generators and put 5.7 MW into our local distribution system to offset the higher cost of energy."

Based on his previous experience as an electric line superintendent in Manassas, Va., Lawrence recommended that the Town of Berlin join a power consortium to realize even greater energy savings.

In 2015, the town became affiliated with American Municipal Power (AMP) to help identify favorable power purchase contracts. AMP personnel assist member electric systems in assessing and filling the power supply needs of their communities, using a variety of resources to achieve the most economical and reliable blend of energy sources.

The principal advantage of being a member of AMP is the favorable rate it receives when it purchases power on the open market, Lawrence says.

"AMP has around 140 municipalities that they represent throughout the country, so it gives us a stronger bargaining position when we purchase power," Lawrence says. "Before, we were paying close to $77 per megawatt of power we received from the grid, and now we're down to $35 per megawatt."

Even though Berlin made substantial progress in lowering its electric rates in the years before joining AMP, the town's approach to peak shaving still required some fine tuning. The old way of peak shaving was done "from the hip," as the generators ran around the clock when peak periods were anticipated, Lawrence said.

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In consultation with AMP and Booth Associates, Berlin has developed a more targeted approach to peak shaving. This involves analyzing both historical and real-time data to forecast peak events. Instead of running its generators as many as 23 times a year to capture five peak demand periods in a year, as it has in the past, the municipal utility can now achieve that in as few as six attempts.

SOLUTION

Last year, one of the diesel generator sets in Berlin's aging fleet failed. Lawrence contacted the power systems specialists at Cat® dealer Carter Machinery, who suggested installing a natural gas genset.

"Natural gas is a cleaner source of fuel, and it reduces the emissions by about 30 percent compared to the previous diesel generator," Lawrence says. "I reached out to Maryland Department of Environment and told them we wanted get away from the diesel engine and go to natural gas, and their response was pretty much like 'Here's your permit, go ahead and do it.'

"And the Maryland Energy Authority is encouraging the use of natural gas versus running with diesel fuel," he continues. "So it made sense to go with a natural gas engine—it burns cleaner, requires less maintenance, and has a longer operating life. And the cost of natural gas is less then diesel fuel. All things considered, it was just the right thing to do."

The Cat dealer recommended that Berlin install a G3520 gas generator set, which is ideal for use in peak shaving applications. The Cat G3520 is the first U.S. EPA-certified natural gas generator set rated at 2.0 and 2.5 MW for use in 60 Hz power markets.

Designed to minimize installation costs and commissioning time, the Cat G3520 generator set features a high-power density 20-cylinder engine that offers market-leading load acceptance and transient response. It is engineered to meet a wide range of critical market standards, including quick starting and loading capability.

RESULTS

Berlin's new Cat generator was commissioned last September as part of a ribbon cutting event. It is expected to run a total of 70 hours per year during the coldest part of the winter and on the warmest days in the summer.

For the first year the G3520 is in operation, technicians from Carter Power Systems will provide all routine and preventive maintenance, as well as any necessary repairs, while Berlin's utility plant operators become more familiar with operation of the Cat genset.

"From the minute we started the project until it was totally completed, they were always on schedule," Lawrence says of the working relationship with his Cat dealer. "They worked with me and kept me updated constantly on any issues that they had to overcome, and they did a fantastic job. And now if we have any issues, I can call them and they'll be here in a day."

Meanwhile, the town's targeted approach to peak shaving saves on the cost of fuel, and also results in less emissions and fewer operating hours accumulating on the generator sets.

The net result is that Berlin saves up to $550,000 a year in energy costs through peak shaving, says Town Administrator Jeff Fleetwood.

"The one thing that we're proud of is our rates are at the rock bottom price compared to the other utilities here on the Eastern Shore," Fleetwood says.

Adds Lawrence:

"And this Cat gas generator set offers the reliability and low total owning and operating costs that will benefit the town's finances and utility customers for years to come."

As a result of thoughtful planning, Berlin's cost- and energy-saving initiatives help the utility save up to $550,000 a year.

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