

POWER PROFILE

Customer: Electric Power Board of Chattanooga (EPB)

Location:

Chattanooga, Tenn.

Customer Business Issue:

Standby power, reliability

Solution:

Customer Value Agreement (CVA),
Extended Service Coverage (ESC)

Cat® Dealer:

Stowers Machinery



The EPB smart grid delivered \$2.9 billion in community benefit from 2011 to 2020.

POWER NEED

EPB is an electric power distribution and telecommunications company owned by the city of Chattanooga, Tennessee.

In 1935, an act of the Tennessee Legislature established EPB as an independent board of the City of Chattanooga to provide electric power to the greater Chattanooga area. Today, EPB remains one of the largest publicly owned electric power distributors in the country. EPB serves more than 180,000 homes and businesses in a 600-square-mile area that includes greater Chattanooga and Hamilton County, portions of surrounding southeastern Tennessee counties, and areas of north Georgia.

In 2010, EPB was the first company in the United States to offer 1 Gbit/s high-speed internet, over 200 times faster than the national average. In October 2015, Chattanooga implemented the world's first community-wide 10-gig internet service, available to all homes and businesses in EPB's service area.

EPB's smart grid plans were a key driver for the build-out of a fiber optic network across its service territory in 2009. With a stimulus award from the U.S. Department of Energy, the smart grid became operational with smart metering and other automation technology in 2012.

EPB's fiber optic network serves as the primary means of communication for all smart grid equipment, including an advanced metering infrastructure (AMI) system, an energy management web portal, and distribution automation (DA) equipment on essentially all of EPB's 12kV circuits.

The project delivers time-based rate programs to customers to create incentives for peak load and overall bill reductions. The EPB smart grid has enabled a new kind of partnership with customers aimed at reducing peak loads, overall electricity use, as well as operations and maintenance costs. The distribution system upgrades increase operational efficiency, reduce line losses, and improve service reliability for customers.

"Chattanooga's smart city infrastructure was designed as a platform to give our customers the power to do more," said David Wade, EPB president and CEO. "From education and innovation to job creation, it's amazing to see how our customers are realizing possibilities we could only imagine ten years ago."

Subsequent agreements with Oak Ridge and other national laboratories use the Chattanooga smart grid as a living laboratory to test new energy technologies. EPB also continues to explore other applications of its smart grid including microgrids, optical sensors for substations, and battery energy storage.

The EPB smart grid delivered \$2.9 billion in community benefit during the period 2011 to 2020, according to the study by the University of Tennessee at Chattanooga. Almost half the value has accrued to business development, while households and community benefits are other beneficiaries.

The study found that more than half the benefits of the Chattanooga smart grid can be attributed to avoided costs of outages during major storm events. Almost one-third is due to a reduction in outage minutes and interruption, with other benefits including a reduction in power theft and reduction of peak demand charges.

"One of the benefits of the smart meters is they notify us when the power goes out or if there's a voltage sag or swell—we get an alert for those," says Jim Glass, EPB's manager of smart grid development. "The self-healing technology that we put in has improved our reliability by over 50 percent. So that's probably the piece of the smart grid where customers have seen the most benefit.

"And having the smart meters means we don't have to go out and physically read the meters anymore, so that saves us about \$2 million a year in meter reading costs," Glass says. "Some of the other technology that we're utilizing through our control system reduces our demand charges that we have to pay to our energy supplier, the Tennessee Valley Authority (TVA), and that saves us about \$3 million a year."

SOLUTION

The smart grid is connected by dual rings of nine supernodes, which house fiber optic equipment for data, voice, and video, while also connecting EPB's smart grid network. The supernodes are housed in small buildings strategically located throughout Chattanooga and are backed up by Cat® 100 kW diesel gensets located adjacent to each communications facility.

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Because supernodes have climate control systems inside, and the battery power backup is not powerful enough to run an HVAC unit, the backup generator is needed in case utility power is lost. As soon as utility power cuts out, an automatic transfer switch activates the backup system and the generator fires up within seven to eight seconds.

Maintaining power at all times is critical in order to provide the range of services that the utility's customers have come to depend on, says Chris Johnson, a field supervisor for EPB.

EPB relies on its Cat dealer, Stowers Machinery, to help maintain the generator sets at two supernodes to ensure that they will run when called upon. An annual Customer Value Agreement (CVA) also covers two Cat generator sets at EPB's downtown headquarters, as well as a G3412 gas genset that is part of a microgrid at the Chattanooga Metropolitan Airport.

Stowers technicians perform bi-annual maintenance, which includes a complete inspection of the genset, taking fluid samples, as well as oil and coolant changes when required.

The CVA platform enables customization of maintenance requirements, says Matt Hagy, a product support and service representative for Stowers Machinery.

"In EPB's case, the bi-annual maintenance fits really well. Once a year we do a major service, which includes changing the oil and all the filters and performing a multi-point inspection. We also do a load bank test.

"Then we get all that information back to the customer to keep them informed about the performance baseline, how the units are doing," Hagy says. "We keep good documentation as part of our inspections and stay on top of maintenance and any other issues that might come up in order to keep uptime to a maximum."

Everything is documented through the Cat Inspect app, which is available to customers. Invoices, inspections, and fluid sample reports can be viewed in one place on my.cat.com.

EPB renews its annual service agreement every year. As an added layer of protection, the utility opted for Platinum-level Extended Service Coverage (ESC), which provides cost certainty. The benefits of an ESC include:

- Protects your investment with coverage for parts and labor expense on covered components (less any applicable deductible)

- Locks in parts and labor repair costs up front
- Ensures repairs are done right the first time with factory-trained technicians using genuine Cat parts
- Get back up fast with covered repairs from the best dealer network
- Returns your engine or generator set to its operating specifications prior to failure, meeting all requirements for safe use and environmental compliance
- Choose from multiple coverage levels and deductible options to fit your budget and operational needs

RESULTS

"Anytime that we have needed Stowers to come out, it's been really quick—within a couple of hours," Johnson says. "They're very prompt and provide us with good service through regular preventive maintenance, as well as taking care of any issues that might come up."

When it comes to replacement parts, the Cat dealer will usually have it in stock, Johnson says. If not, the part arrives the next day and a Stowers technician installs it.

Johnson cites several instances when Stowers has provided a replacement backup generator set until repairs are made to an existing unit.

"For a customer like EPB that wants to minimize any downtime issues, a CVA backed by Caterpillar's Extended Service Coverage represents peace of mind," Hagy says. "We're the Cat dealer, and we have trained personnel inspecting their genset. We have the trained eye looking for something that could potentially fail, so this provides the maximum opportunity for the generators to run when they are needed."

In critical load environments, if losing power means incurring a significant cost to the business if a backup generator is down, customers need to ensure that a genset is going to run, Hagy says.

"You can buy a generator, but if you don't maintain it, it's not going to work right," Hagy says. "So, the maintenance after the sale is just as important as the brand you buy up front. And I think this is where Caterpillar excels is the support we provide after the sale.

"It's by providing regular maintenance and staying with the customer and advising them of what they need to be looking at in the future, and just keeping them on the right path to have the best outcome."



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