RUNREADY™

TOROMONT Power Systems CAT®

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EYE OF THE STORM

Cat® Rental Power network provides strong, coordinated response to customers affected by Hurricane Matthew

As the first Category 5 Atlantic hurricane since Hurricane Felix in 2007, Hurricane Matthew wrought widespread destruction and catastrophic loss of life during its journey across the western Atlantic in October 2016.

The storm caused damages estimated in excess of $10.5 billion, making it the costliest Atlantic hurricane since Hurricane Sandy in 2012. More than 1,600 deaths were attributed to the hurricane, including more than 1,000 in Haiti, and 49 in the southeastern U.S.

Even before Matthew made landfall in Florida on Oct. 6, the Cat Rental Power network started working to meet the urgent needs of thousands of customers across the Southeastern U.S.

"We started shipping equipment out on Monday, Oct. 3—that's when the phones started to ring almost non-stop," said Scott Lundy, the rental power manager at Gregory Poole Power Systems in North Carolina.

By the following Sunday, Cat dealers across the U.S. had deployed over 400MW of Cat diesel generator sets—ranging in size from 20kW to 2MW—between Florida, Georgia, South Carolina and North Carolina. Cat dealers from as far as west of the Mississippi River supported the effort, as did dealers from the Northeast.

Utilizing hundreds of pieces of equipment from dealers' rental fleets, Cat Rental power managers across the country functioned as a single network, working together to deploy power and satisfy customers' emergency needs.

"Whatever the need and however long the duration, we were prepared to meet it," said Robb Homolka, a regional sales manager for Caterpillar Global Power Solutions.

In addition to emergency power, the Cat Rental Power network supplied technicians and ancillary equipment for a complete solution.

"The dealers had their technicians volunteer to deploy to the Southeast, it was almost like a National Guard scenario," Homolka said. "The teamwork and coordination exhibited during this critical time demonstrates how we pull together as one team, showcasing the strength of our Cat dealer network."

The Cat Rental Power network is a close-knit group of independent dealers who work together across territorial boundaries to meet customers' emergency power needs, wherever they may be, says Chet Hasting, a rental power manager for Blanchard Power Systems in West Columbia, S.C.

"We all know each other, it's a small world," Hasting said. "We tend to share resources, people, equipment and best practices."

Adds Kevin Chmela, a rental power rep for Yancey Power Systems in Savannah, Ga.: "The Cat Rental Power network is an unbelievable family," said Chmela,

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whose customers range from local farmers trying to preserve produce to a large aerospace manufacturer. "During the hurricane, we all got together and everyone provided information as far as what they had available, and how quick they could get it to us. They were all willing to help with whatever we needed—from H.O. Penn in Long Island to Ring Power in Florida."

In an emergency such as Hurricane Matthew, rental power managers routinely work long hours to ensure that generators are deployed when and where they are needed.

"For about two weeks we were very busy, working somewhere between 14 and 16 hours a day," Hasting said. "You don't have enough arms to answer ringing phones. Most of the time, people are desperate when they call us for help, so it's important to stay professional and assess their power needs to ensure we provide the right solutions —that's what we're here for."

"We all know each other, it's a small world... We tend to share resources, people, equipment and best practices."

CHET HASTING
Rental Power Manager
Blanchard Power Systems

Delivering power

The need for power during an emergency is universal. From municipalities to food processors, and everything in between, customers called and the Cat Rental Power network delivered.

Based in Hemingway, S.C., Keith Baxley receives peanut shipments from area farmers before they are sold to Golden Peanut Co. When the storm hit on Oct. 8, Baxley required power to run huge 3,600 rpm fans attached to semi trailers that dry the peanuts and prevent rot. With 20 trailers of peanuts at 2,200 pounds each, he faced a potential $200,000 loss.

"Blanchard found an XQ300 generator for us in Louisville, and they shipped it that evening," Baxley said. "We had it running the following afternoon, and we ran it for five days. We were fortunate we didn't lose anything, and we would have without it. I was real pleased, they did a great job for me."

Heavy rains from Matthew brought widespread flash flooding and record flooding to eastern North Carolina. Major rivers like the Lumber, Neuse, and Tar remained at flood levels 10 days after the storm had passed, resulting in the closure of 660 separate roads statewide. In Kinston, N.C., torrential rains from the hurricane caused widespread flooding in both the city and Lenoir County, resulting in four deaths and significant damage to businesses and residences, while knocking out power in several parts of town.

Lenoir Community College in Kinston served as an emergency shelter for a three-week period during and after the hurricane. Several days before the onset of Matthew, Lenoir County officials realized the standby generator at the college was inoperable. On short notice, Gregory Poole obtained an XQ2000 from Blanchard's inventory in neighboring South Carolina.

"We put in a call, and within 48 hours Gregory Poole had the generator delivered, which was a big load off our minds because when you put people in shelters they come with all types of needs," said Roger Dail, emergency services director for Lenoir County. "Some of them might have oxygen concentrators that they need to have plugged in all the time. So power is a life-sustaining thing that you need to have, especially at your main shelter."

Located 25 miles south of Charleston, S.C., Island Fresh Seafood, Inc. requires the proper conditions to produce white shrimp in 12 large ponds. Pumping saltwater from the nearby estuary and running aerators in the ponds requires electric power.

"We have to have continuous 24/7 capability of pumping water," said owner Bill Cox. "The higher the water quality, the less stress on the shrimp, the higher quality product we have to go to market. So it's very important to have power at all times."

During the warmer months, running the aerators is critical, especially overnight, to keep the oxygen level in the ponds at the proper level.

"So if we have a storm and we lose grid power, we've got to have the backup generators," Cox says. "The backup Cat generators provided by Blanchard are lifesavers for us and the shrimp."

Gulfstream Aerospace is the world's leading private business jet manufacturer. With 14,000 employees and 6.8 million square feet of company facilities at its headquarters in Savannah, Ga., providing continuous power is critical.

"We have our own backup systems in place for critical areas like our data center, but what we don't have is backup power for some of the facilities that deliver critical aircraft components

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"It gives me peace of mind knowing that I can call and get Cat® power when I need it... So it lets you sleep better at night, and that's a big thing."

KEITH BAXLEY
Owner
Hemingway Fertilizer & Peanut Co.

to the rest of the world," said Mark Hopkins, group assets manager for Gulfstream. "So we have an immediate need of two to six megawatts of power, and it needs to be mobile and continuous service.

"Even though we were well prepared, with the onset of the hurricane we knew we were going to lose power," Hopkins adds. "So I contacted Yancey Power Systems, and I was able to secure backup generation in a timely fashion. They provided the technical expertise to set up the unit, start it, and assure that everything was functional. We got the power we needed just in time before the storm came."

Rich O'Brien operates the 46-room La Fiesta Ocean Inn in St. Augustine Beach, Fla. The hotel features a heated pool and breakfast delivered to the rooms of hotel guests.

Having standby power during a major weather event provides the inn with a competitive advantage and provides the business with a steady income stream, O'Brien says.

"So it's important to have that relationship with Ring Power, and I can tell you when we call them, they answer and they come to our aid," O'Brien said.

When the hurricane was coming, Ring Power brought the generator out and sent a representative to provide instruction on how to operate it.

"He told us A to Z what to do, so when the storm came and the power was out, it was very easy to get it up and running," O'Brien said. "We were very impressed with the training we received and the high quality equipment."

"They are very knowledgeable people, and a pleasure to work with," he adds. "We're in the hospitality business, so we know service—and I can tell you that Ring Power knows how to take care of the customer."

Baxley said it was the first time he had to rely on rental power for his peanut collection point, but it won't be the last.

"Now that we've been through the experience, it gives me peace of mind knowing that I can call and get Cat power when I need it," he said. "So it lets you sleep better at night, and that's a big thing."

Kinston, N.C. following Hurricane Matthew

READY to ROLL

In an emergency, Caterpillar's Defense & Federal Products (D&FP) Division is prepared to deliver mobile power when and where it's needed to the Federal Emergency Management Agency (FEMA).

On the morning of October 6, D&FP received a request for quote (RFQ) for tasking instructions from the Defense Logistics Agency (DLA) to mobilize (10) XQ1000 and (12) XQ800 Mobile Generator Sets capable of producing 19.6 MW of total power for U.S. federal government emergency requirements within 24 to 36 hours to Orlando, Fla. At 6:30 pm, this RFQ was finalized and awarded to D&FP, and mobilization began.

When Hurricane Matthew changed its course the following day, the staging destination was changed to the Yancey Cat equipment yard in Austel, Ga.

John Holland, a New Jersey-based rental power manager for Cat dealer Foley Inc., began soliciting dealer inventory to establish the closest resources to meet the quick delivery requirement.

Holland organized the 22 generators, and all necessary cables and hardware for operators. The mobilization required 22 semi-tractors with 44 drivers to comply with DOT driver on-duty limitations. Holland dispatched a Foley service technician to Austel, Ga. with 22 Product Link™ PL 131 (GPS) tracking devices for installation once the units arrived.

The hurricane subsequently weakened, therefore the generator assets were not required. The units were ultimately returned to their respective Cat dealers (Ohio Cat, H.O. Penn and Foley).

"Even though the generator sets were not needed, it was still a useful exercise," Holland said. "It demonstrated that we can respond on short notice. We got the equipment there and met the timelines—everything was delivered and ready to roll."

POWER ON THE PRAIRIE

ALBERTA'S 65 MW PLANT IS ANYTHING BUT RUN OF THE MILL

Since its inception in 1990, Alberta Newsprint Company (ANC) has embarked on a strategy to manufacture the highest quality newsprint in North America.

CUSTOMER PROFILE

Alberta Newsprint Company

Location: Whitecourt, Alberta, Canada

Application: Paper manufacturing

Cat® Equipment: 10 G16CM34 generator sets

As Alberta's first and only paper mill dedicated to newsprint, it boasts the biggest and the fastest newsprint paper machine in North America. Dubbed "Wild Rose" after Alberta's provincial flower, the four-story, block-long behemoth produces an average of 750 metric tonnes daily. ANC newsprint is renowned for its unmatched print quality and brightness.

Located in central Alberta just outside the lumber industry town of Whitecourt, the mill produces cost-effective newsprint with a lean workforce of 185 employees.

But with the rise of the Internet, demand for newsprint has decreased, forcing once thriving mills to close down at a precipitous rate. More than 30 paper machines have closed down throughout North America over the last decade, meaning that ANC must find new ways to compete in a declining industry.

In order to remain viable, ANC has adopted several measures to ensure its standing as a leading producer of high quality newsprint. That includes taking a socially responsible approach to the environment, which includes the use of leading-edge manufacturing processes.

ANC uses wood chip byproducts from nearby sawmills in the pulping process. The chips are collected from local sawmills that would be otherwise incinerated. Burning them is a low-value proposition both in terms of financial return and environmental stewardship.

The wood chips are steamed in a thermomechanical pulp (TMP) refining process. Steam treatment significantly reduces the total energy needed to make the pulp and decreases the damage to fibers.

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Continual optimization of its effluent treatment system has minimized the impact of the discharge to the nearby Athabasca River. The ANC plant represents the "best newsprint mill technology" in Canada for effluent treatment as reported by the Canadian Pulp and Paper Association. Wood fiber and effluent-treatment solids from the TMP waste stream are spread as fertilizer on nearby farmlands.

"Our effluent discharge is one of the cleanest in industry," says Surendra Singh, ANC's director of energy and technology. We are very responsible with respect to timber harvesting, water management and energy management, as we take our role as an environmental steward seriously."

Diversified strategy

Five years ago, ANC developed a strategy to spin off several thriving businesses from its existing operations as a means of countering the risks and volatility associated with the newsprint business.

The company invested $1.6 million in a trans-loading facility that opened in the spring of 2013 just east of its plant. Oil is trucked from local production facilities to the trans-loading site, where it's transferred onto railway tank cars. While 10 tank cars loaded daily is fairly modest compared to similar facilities, one million barrels were shipped in the first year of operation. It has also become an offloading point for sand, hydrochloric acid and other products used in nearby hydraulic fracturing operations.

Besides providing ANC with an added revenue stream, trans-loading allows use of an underutilized rail marshaling area once dedicated to boxcars carrying paper and newsprint to market (75 percent in the U.S., the rest in Canada). Now, the majority of the newsprint is shipped in over-the-road trucks.

A more ambitious project took shape in 2014 when a 65 MW natural-gas-fired power plant was commissioned at the ANC site. The stand-alone facility is powered by 10 Cat® G16CM34 generator sets. This capacity represents more than half of ANC's overall 125 MW power consumption. The newsprint mill is the largest single point user of power in the province.

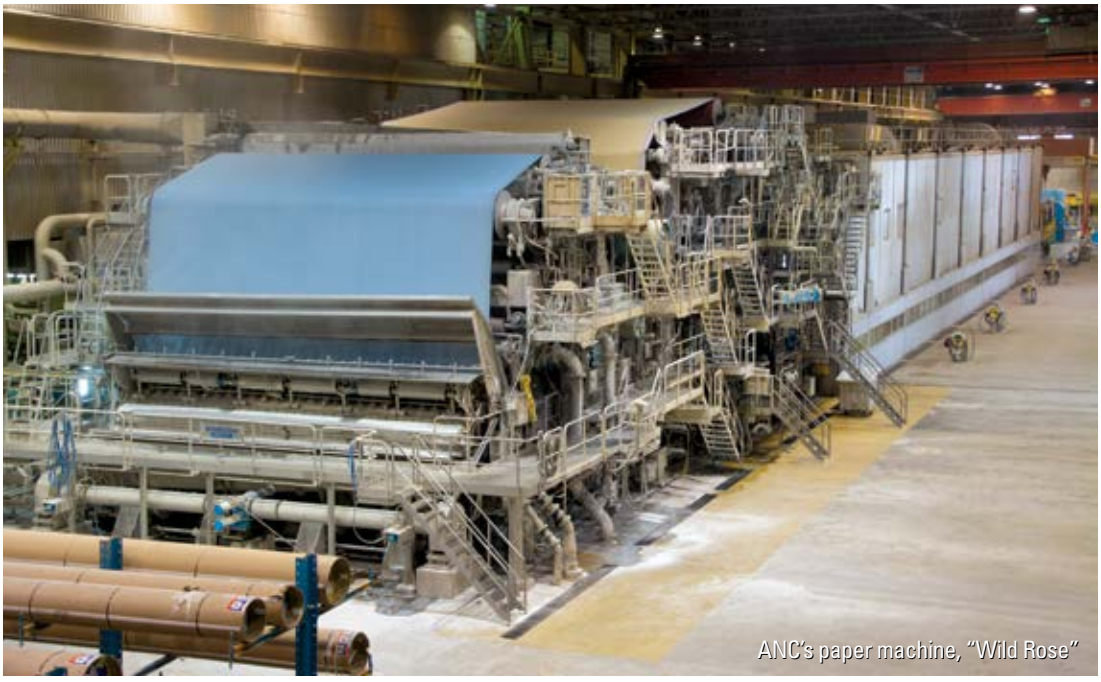
Singh says ANC's decision to build its own power plant was driven by the rising cost of power from the grid. Recently, the Province of Alberta elected to phase out all the coal fired generation. As a result of deregulation, gas-fueled generation—as well as other alternate sources of power including wind and solar—has been encouraged for both base and peak loads.

"The price of power from the grid does get very high at times, and one of the reasons we built the power plant was to run the power plant during those times when prices are very high," Singh says.

The Cat power plant runs about 25 percent of the time, ramping up quickly to meet demand. The majority of the energy from power plant is used by the mill, Singh says. When the price of power is high, the mill does not use as much power from the grid. During those peak periods, excess power generated onsite is sold back to the grid at the higher price, netting ANC a profit.

"These Cat engines can start very fast, and the ramp time is also very fast," Singh says. "So when grid prices are high, it needs to run fairly quickly when we get a dispatch from the power pool."

Adds Bill Newcombe, a former manager of engineering at the plant: "The plant needs to be able to get



ANC's paper machine, "Wild Rose"

on and off the grid very quickly and several times during the day. So we can actually fire these engines up, get them all going, synchronized and loaded on the grid in about seven minutes."

Flexible power

With the addition of renewable energy to the electric power grid, energy markets are undergoing significant change, especially in North America, says Claudio Martino, regional director of sales for Caterpillar Energy Solutions in Houston, Tex.

With more and more wind and solar energy coming online—especially in the Midwest and other regions, including Alberta—Caterpillar Energy Solutions is seeking to provide clients with the best solution for addressing not only the addition of renewable power, but the fluctuating loads they add to the power pool.

"So the GCM34 engine technology that provides fast start and fast ramp rates represents a very efficient and effective solution to offset those swings from renewable sources," Martino says.

The Cat G16CM34 reciprocating engines can ramp up and down

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ANC plant control room

continuously with little effect on heat rate, while requiring relatively little maintenance and support compared to more complex gas turbine–based plants. What engine-based plants give up in efficiency compared to combined cycle plants, they more than make up in providing greater flexibility.

The advantage comes in the modular nature of the plant. Unlike gas-turbine plants that may have only one or two units to ramp up and down, multi-shaft engine plants can scale their output by taking individual units offline, while the remaining units can continue running at or close to their highest efficiency rates.

"If we have one engine down for planned maintenance, it takes only one out of the equation, so there's a lot of flexibility in whether we run five, six, or nine of the units at a time," says Newcombe, who now works for ANC as a dedicated consultant. "It suits the mill well because we have three lines of refiners that require 25 MW each, so we can run as many or as few as we need."

Integrated solution

The GCM34 engines are sold as an integrated solution with after-sale support, Martino says.

"We work closely with our clients to help find the best solution for their projects," Martino says. "We analyze life-cycle solutions, and that includes the cost of the total solution, from the capital cost of the equipment to the operating and maintenance costs."

Once Caterpillar was selected by ANC, the entire process—from equipment selection to engineering the project—took three months to complete.

"Caterpillar worked well with us for the scope of what we wanted," Newcombe says. "We sat down with about three or four of the Cat people and developed the scope of work that we wanted for this plant. Based on that, they came back to us with a price for the 10 engines installed, as well as commissioning and getting us ready to go on the grid.

"They used a lot of the mill specifications we provided," he adds. "From the people they had onsite to help with construction management and also during the commissioning phase, they were easy to work with."

> **"We count on availability, and these engines are available 98 percent of the time."**
>
> **BILL NEWCOMBE**
> Engineering Consultant
> Alberta Newsprint Company

Each GCM34 engine is factory tested before shipment from Germany.

"The big thing that we liked about this setup is that they were fabricated in a modular concept," Newcombe says. "They had already tested them in Germany for 24 hours. They came fully assembled on the skids. So we had them installed, and it took Cat technicians five days per engine to do all the testing. They went through all the steps, and then put them online."

ANC technicians run the plant and perform the majority of equipment maintenance.

"We haven't had a lot of downtime on any of the 10 engines," Newcombe says. "We count on availability, and these engines are available 98 percent of the time."

Growing demand

A growing market in renewable energy combined with the decreased use of coal power plants and the vast availability of natural gas in North America is giving rise to electric generation based on reciprocating technology fired by natural gas.

Between gas compression projects and power generation, Caterpillar has installed more than 100 of the GCM34 gensets in North America to date, Martino says.

As Alberta phases out coal-fired power generation over the next 15 years, Singh predicts there will be more demand for natural gas-fired reciprocating power plants.

"They are very well suited for an industrial site like ours," he says. "And I'm sure you'll see more plants like this coming online here in Alberta, and beyond."

FAIL SAFE

Data center maintains reliability with N+1 setup

In today's cost-sensitive IT environment, enterprises are increasingly turning to third-party vendors to manage their mission-critical applications. Using the cloud can save as much as 80 percent of a company's IT costs by eliminating the need to build a data center or purchase equipment.

Based in Southfield, Mich., Secure-24, Inc. has 15 years of experience delivering managed IT operations, application hosting and highly compliant managed cloud services to enterprises worldwide.

Secure-24's Plymouth, Mich. data center is considered a Tier 4 facility, which places it in the top tier of data centers across the U.S.

"When you compare our data center to others in the U.S., it's a very measurable, low risk option and delivers support for compliance for our existing and potential clients going through the selection process," says Clark Massey, who manages the Plymouth facility. "More and more companies are realizing the innovation and value we deliver with high availability hosting and enterprise-class solutions."

The Plymouth Data Center opened in 2009 and hosts mission-critical, highly compliant applications—such as SAP, Oracle E-Business Suite, PeopleSoft, JD Edwards, Hyperion and other critical enterprise applications—across all industries for businesses of every size.

Secure-24 targets its managed hosting, disaster recovery and managed application services to organizations that require a superior service experience in hosting highly compliant systems, including many large-scale government projects.

By outsourcing those services, organizations avoid the need to build their own data centers, and can focus their IT efforts on improving their products or services. Secure-24 also helps clients with compliance issues that arise with regulatory requirements, such as Sarbanes-Oxley, ISO, PCI and the Health Information Portability and Accounting Act (HIPPA).

CUSTOMER PROFILE

Secure-24, Inc.

Location: Plymouth, Mich.

Application: Data Center

Cat® Equipment: Three C32 ACERT™ diesel gensets

Secure-24

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Secure-24 is dedicated to serving clients to ensure that the data center meets their specific requirements through a detailed Service Level Agreement (SLA) that backs the performance of the entire IT experience from the application, to backup and recovery, and overall service responsiveness.

For security purposes, government and financial institutions require that their equipment is separated from the rest of the general population within the data center, so their cabinets are set up in a different way. This includes where they are positioned, maintaining a higher degree of physical security and how the data is logically separated.

When it comes to rack space at the Plymouth site, Secure-24 has roughly 250 cabinets at 43 percent utilization. In simple terms, the goal is to maintain plenty of room for growth, while not overtaxing the systems, and providing backup to all systems in case of the unlikely failure.

As the technology industry evolves, Secure-24 is achieving greater levels of density with the hardware that occupies the data center. With the influx of virtualization technologies, smaller amounts of space are required to host hundreds of virtual servers, resulting in increased square footage capacity and the ability to drive more revenue.

2N+1 redundancy

For a data center, maintaining high availability is critical. Throughout its 20,000-sq.-ft. Plymouth facility, all of Secure-24's systems are redundant. This goes beyond ensuring that the generators and UPS units are backed up, but extends down to a device level.

"We know that in the unlikely event of a mechanical failure of one of the components of the power path supporting each device, there will occur a seamless failover to a redundant N+1 source," Massey explains.

This failover protocol is demonstrated in no stronger fashion than with the Cat® generator sets deployed on-site at the Secure-24 Data Center.

Currently, the data center power infrastructure utilizes a symmetrical approach, whereby two Cat C32 ACERT™ diesel generator sets back up both sides of the data center's electrical system in case of a power failure. A third Cat C32 was commissioned in 2015, providing full N+1 coverage to the primary generator sets, yielding a sustainable 2N+1 generator solution.

The switchgear methodology at the Plymouth data center is open transition, providing single utility support with a single generator backing each side of the system, says Steve Talbot, president of The Talbot Corporation, whose electrical contracting firm serves as the design-build consultant for Secure-24. In

the unlikely event that either of those two generators fail, Generator 3 is available to support both sides.

"When we began our engagement here with Secure-24, we were pleased to see an existing Cat generator," Talbot said. "We have a long history in our company with Cat equipment. We've done a number of partnership projects with them in wonderful reciprocal agreements. We have a very high comfort level with Cat equipment, and especially with Michigan Cat, locally."

Providing a steady source of cooling to the servers and other electronic components is critical, and the Plymouth data center has a custom-designed cooling management system with both glycol and DX-based cooling systems—either one is capable of handling the data center on its own.

"Consistent and reliable power is imperative as powering the critical IT systems and cooling of the full data center must remain constant throughout a loss of utility power," Massey says. The Cat generators help fill this role and ensure uninterrupted service."

The Power of Three

The third generator will guarantee full 2N+1 backup, especially during periods when one of the other two generator sets is undergoing preventative maintenance. With the integration of the third generator, losing grid power while generator maintenance is performed is no longer a concern, as two of the units are still available.

Anytime Secure-24 Data Center vendors perform preventative maintenance on the core physical infrastructure, the generators are engaged as a proactive, precautionary measure.

Every week, each of the C32 generators starts and runs for 15 minutes. During that time, the Secure-24 data center team checks to ensure there is sufficient battery voltage, along with visually monitoring critical aspects of the engine's operation.

As part of a Customer Support Agreement Secure-24 has with its Cat dealer, technicians from Michigan Cat visit the facility twice a year to perform oil changes and conduct an inspection of the units. Michigan Cat also conducts a full load bank test at least once a year.

A complete record of the load bank test is saved and made available for facility audits.

"We have a longstanding relationship with Michigan Cat, and there's a peace of mind knowing that they are located within our immediate vicinity," Massey says. "They are extremely responsive and we have a great relationship with their technicians.

"When our clients tour the data center, they are reassured to see the Cat generator sets standing at the ready," he adds. "It's a highly recognizable brand with a great reputation, and that resonates with our clients and strengthens their overall perception of our data center."

> **"When our clients tour the data center, they are reassured to see the Cat® generator sets standing at the ready."**
>
> **CLARK MASSEY**
> Manager - Data Center Operations
> Secure-24, Inc.

OFF THE GRID

Electric co-op self generates to offset utility rate

Dating to 1937, when it was the first to bring electricity to rural parts of Northern Kentucky, Owen Electric Cooperative has been a pioneer when it comes to delivering power to its customers.

In 2001, it became the first electric utility in the state to promote and sell green power. Since its inception in 2001, the EnviroWatts program has become a significant portion of East Kentucky Power's renewable energy portfolio. Six landfill gas power plants in Kentucky now generate 20 megawatts of electricity—enough to power about 9,000 homes.

In 2003, with well over 50,000 members throughout its nine-county area, Owen Electric Cooperative moved to a new facility located approximately eight miles north of Owenton on Highway 127. The corporate headquarters and service center were combined, and the building was designed with the hope of meeting the needs of the co-op's members for at least the next 50 years.

One of the most technologically innovative changes Owen Electric undertook began in 2006 with the transition to Automated Metering Infrastructure. This process involved changing from traditional hand-read mechanical meters to new electronic meters that are capable of being read remotely from the Owen Electric headquarters. This eventually eliminated the need for meter readers to travel to each meter to gather readings monthly, saving time and costs for labor and fuel.

More advanced metering and co-op technology has paved the way for more innovative energy conservation programs, including Simple Saver, a direct load control program launched in 2011. GPS mapping has also been incorporated for a more comprehensive overview of Owen Electric's system.

No stranger to innovation, Owen Electric also received a federal grant in 2011 from the Department of Energy to launch an array of Smart Home and Smart Grid projects. These pilot projects have been instrumental in gathering member and energy data that will be key in developing Owen Electric's member energy efficiency programs and incentives, as well as shape the co-op's endeavors to increase member choices for power quality and reliability.

Low-cost power

Last spring, Owen Electric made another forward-looking decision when it installed a Cat® G3516H generator set, which is designed to offset the higher cost of power from the utility grid.

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CUSTOMER PROFILE

Owen Electric Cooperative, Inc.

Location: Owenton, Ky.

Application: Distributed generation

Cat® Equipment: G3516H genset, Utility paralleling Switchgear 12,470 VAC


CAT

Under Owen Electric's contract with East Kentucky Power Cooperative—its utility power supplier—the co-op is allowed to supplement a portion of its load with power from alternative sources. An amendment with East Kentucky Power allows any of the 16 member co-ops to self-generate up to five percent of their own power.

With 60,000 members covering nine counties, Owen Electric saw an opportunity to offset a portion of the cost of grid power it distributes by generating 2 MW of power. Commissioned in June, the Cat generator set is expected to run almost continuously—or about 7,500 hours annually.

"Given the availability of a natural gas pipeline directly in front of our headquarters and the favorable price of gas, it made sense to take advantage of this opportunity," said Mark Stallons, president and CEO of Owen Electric. "Carrolton Utilities is a small municipal gas utility 20 miles away from us, and we know the owners well," Stallons said. "They are small, like us, so we could sit down and talk with them. We buy natural gas from them and it's a good arrangement.

"We had a level of comfort knowing that East Kentucky Power chose Whayne to do all of their maintenance work—and that relationship goes back 15 years."

MARK STALLONS
President and CEO
Owen Electric Cooperative, Inc.

Several years ago, Stallons became familiar with the energy management consulting firm Harshaw Trane through a Kentucky Dept. of Energy collaborative process designed to promote combined heat and power (CHP) applications.

"When we launched the RFP process in 2014, they were one of the bidders on my list," Stallons said. "I was impressed with how they handled themselves and with their skill set, and the Harshaw Trane salesman really earned my trust.

'We vetted the process, and after evaluating it and running it through our economic models, we concluded the best option for us was to own a distributed generation unit, and to purchase that unit from Whayne Power Systems," Stallons said, adding that Harshaw Trane specified the Cat 3516H genset.

The proven reliability of the Cat genset at a competitive price point along with Whayne's partnership with Harshaw Trane were all deciding factors, Stallons said.

"The combination of Harshaw Trane, Caterpillar and Whayne Power Systems really gave us a good feeling," he said."We knew that the genset would be reliable and would run well, and the economics proved that it was just a good investment to make."

"Harshaw Trane basically managed the project and brought their skill set so that we didn't have to learn how to manage a project of this scope," he said. "We had a nice combined project with

Harshaw Trane doing the construction and the project management part of it—and Whayne doing all the design work on the unit itself and the switchgear—and then building it and connecting to the pipeline. So it all came together nicely."

The genset installed outside Owen Electric's headquarters facility feeds 2 MW of power to the Bromley substation, which is located a mile away.

"The design parameter is to have it run 100 percent of the time and feed into a substation—we didn't want to feed power back to the transmission grid," Stallons said. "We just wanted to feed the distribution grid to the residential customers in this area.

"Had we back fed power back onto the transmission system, it would have complicated our agreement with East Kentucky Power and our compliance with Amendment 3," Stallons said. "So we stayed with a pure distributed generation project that serves residences on Bromley sub, and that's all it's designed to serve."

$9 million savings

When Stallons and his team calculated the electric rates that Owen Electric would pay East Kentucky Power over 20 years and compared it to the cost of producing the same amount of power using the G3516H Cat unit, they saw a $9 million dollar savings.

"When I took those numbers to my board of directors, they were pleased to move forward," Stallons said. "We had a lot of discussion, but you need to have positive cash flow from the first year to really convince the board to invest $2.6 million dollars.

Harshaw Trane and Owen Electric originally considered another genset, but the higher efficiency rate of 44 percent for the G3516H made it the right choice, Stallons said.

"We want to run around the clock because that drives the economics to a faster payout," Stallons said.

Another plus Stallons cites with the selection of the G3516H is lower life-cycle costs.

"Never before have we had an engine that only requires four services a year," he says. "And when you start looking at 150 gallons of oil every change, it all adds up—the previous engines would not go to 2,000 hours between oil changes. So lowering the overall cost of maintenance, ownership, and the higher efficiency of the G3516H all goes to the bottom line and makes sense."

Maintenance is performed on a quarterly basis by technicians from Whayne Power Systems.

"We had a level of comfort knowing that East Kentucky Power chose Whayne to do all of their maintenance work—and that relationship goes back 15 years," Stallons said. "We have found that they're responsive whenever we have a problem. They know the system very well whether it's the SCADA system, the mechanical side of it, or something involving the generator or the switchgear. It's kind of amazing, the technicians from Whayne are really jacks of all trades."

Based on the current price of natural gas, the projected payback on the Cat genset is seven years.

"One of the main reasons we wanted to do the project was to learn about the technology, get comfortable with it, and decide how we want to utilize it in the future," Stallons says.

"We want to be prepared for whatever the future brings, should distributed generation become a real viable method for utilities in the future to serve their members."

OWEN ELECTRIC

Owen Electric Cooperative is a member and one of sixteen owners of East Kentucky Power Cooperative (EKPC), which is made up of 16 rural electric co-operatives in northern and eastern Kentucky, as well as central and southeastern portions of the state.

Owen Electric is a distribution utility that receives its power from EKPC. Its coverage area includes nine counties and 60,000 members, ranging from the northern Kentucky suburbs of Cincinnati all the way down to Georgetown, 20 miles north of Lexington. The three counties that border the Ohio River are more developed and make roughly 60 percent of the customer base, while the other six counties are rural.

EKPC supplies electricity to its members through two coal-fired stations comprised of six generation units. It also generates power using combustion turbines, which run on natural gas or fuel oil, and operate when peak electric demand is highest (usually the hottest and coldest days of the year). In 2003, EKPC became the first utility in Kentucky to generate its own renewable power when it began operating its first plant fueled by methane gas from landfills. Today, EKPC has six landfill gas plants generating nearly 20 MW, all powered by Cat generator sets.

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