

RUNREADY™

SURGE PROTECTOR

New Orleans flood control project backed by Cat® power

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TOROMONT
Power Systems



STORM RUNNING

TRANSFER TO GENERATOR POWER BEFORE GRID POWER FAILS

By Chad Dozier

A full 70 percent of power outages in the U.S. can be attributed to one factor—the weather. In the Midwest, we are right in the middle of tornado season. Along the coasts, hurricane season is rapidly approaching. And with the storms come power outages.

I have been involved in a couple of projects where storm threat avoidance—basically, the ability to initiate a transfer from utility to standby generator set power in the event of bad weather—was required. Looking back at the projects, it was interesting to look at the factors used by the customer to determine the need to include storm threat avoidance in their power plan.

Sometimes the decision to include storm threat avoidance is easy—like when you are already planning to install utility paralleling equipment. In this case, adding storm threat avoidance may be at little to no additional cost.

If utility paralleling equipment was not initially in the facility budget, then it becomes a business risk assessment. An analysis is needed to estimate the likelihood of a weather-related outage and the cost to the business of the outage. The cost analysis should include not only the actual time without power but also the cost to restart the business processes.

For the storm threat avoidance systems I have seen, the switchgear

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controls and protection have been utility-grade equipment, with the associated controls for paralleling the generator set plant to the utility. This is significantly more expensive than a generator set/ATS (automatic transfer switch) setup, and typically requires agreements with the local utility to implement. However, if a utility paralleling system was already planned for the facility, adding the storm threat avoidance mode is relatively simple.

“It’s all **DRIVEN BY POWER** and we’ve got to have that power **WHEN WE NEED IT.**”

A facility manager may say, “But I have a UPS to protect my critical loads.” A UPS will provide power during the outage until either the utility returns or the generator sets come online. But what about other loads not connected to the UPS? They will lose power, and be without power until your backup comes online. Will this loss of power cause a problem with your installation? Or can those loads be without power for the ten seconds it takes to get the generator set(s) started and powering your facility? If your business operations are not significantly impacted by momentary outages, then a simpler transfer switch / generator set system may be sufficient.

Storm avoidance examples

A major defense and avionics corporation with manufacturing and administrative functions in Cedar Rapids, Iowa is an example of a company that practices storm running, which involves switching over to generator power when a storm is imminent.

“Because they also run their e-business out of the Cedar Rapids location, if their lights go out, they’re losing money quickly,” says Steve Kent, director of operations for Industrial Energy Applications (IEA), a turnkey energy systems provider. “Power from UPS units is only designed to last for so long, and their IT infrastructure is at risk if we don’t get the lights back on.

“And so reliability, to us, is really business protection insurance—it’s business continuity insurance,” Kent says. “During the ice storm of 2007, we ran that facility for about 120 hours.”

As the owner-operator of the company’s standby power system, when high winds and lightning approach, IEA has the ability to start the gensets from its control center. Simultaneously, an operator is dispatched to the site to provide onsite coverage.

In the case of shrimp farmer Bill Cox, the consequences of bad weather knocking out power at his aquaculture business outside of Charleston, S.C. are such that he switches over to rental power provided by his Cat dealer in advance of the storm.

“You cannot imagine the stress on a farmer,” says Cox, who operates Island Fresh Seafood in Meggett, S.C. “When we have these thunderstorms coming up and the hurricane season hits, it’s a stressful time—you’re watching the weather every day. When you have

these generators in place it provides tremendous peace of mind, because at any given time all we have to do is shut off shore power and switch over to generator power.”

The aquaculture business is dependent on having continuous power to pump water from the creek and rivers to large ponds located all over the farm. The pumps need to run to maintain the water quality for the shrimp. The higher the water quality, the less stress on the shrimp—and the higher quality product Cox has to take to market.

Having the ability to pump water through raceway water troughs is also critical to feed the clams, which feed off the algae and other organisms in the saltwater that comes from the nearby estuary.

“It’s all driven by power and we’ve got to have that power when we need it,” Cox says. “We can’t afford to have a week off with no power. In the aquaculture business you’ve got to be able to depend on your power.”



Chad Dozier is a product application consultant at Caterpillar Inc.



SURGE PROTECTOR

Pump stations designed to prevent flooding from hurricanes

The greater New Orleans area faces a triple threat when it comes to sources of flood risk: the Mississippi River, rain and hurricane storm surge.

In 2005, Hurricane Katrina brought storm surges between 12 and 15 feet to the New Orleans area. With open canals already overflowing, water poured over the dry side of the levees, degrading the levee material and leading to several collapses. With an unstoppable flow of water coming directly from the sea, the combination of torrential rain from Hurricane Katrina and the levee failures flooded 80 percent of New Orleans, resulting in one of the worst natural disasters in U.S. history.

Since the levees broke nearly 12 years ago, billions of dollars in new flood control projects have been built in and around the Crescent City.

In 2012, the U.S. Army Corps of Engineers awarded a contract to build three permanent canal closure and pump stations to reduce the risk posed by hurricane storm surges at the mouth of Lake Pontchartrain. The three structures at the 17th Street, Orleans Avenue and London Avenue drainage canals in Metairie are the final major post-Katrina improvements to the New Orleans area levee system, and replace interim control structures that were put in place within a year after Katrina devastated the region.

The Permanent Canal Closures & Pumps (PCCP) are composed of permanent gated storm surge barriers and brick façade pump stations at or near the lakefront. The pumps will move

rainwater out of the canals, around the gates and into Lake Pontchartrain during a tropical weather event. The stations are equipped with a stand-alone emergency power supply capacity so that they can operate independent of power from the utility grid.

Temporary pumps and floodgates near the mouths of the three canals will stay in place until the permanent structures are completed later this year. The joint venture building the \$644 million project, PCCP Constructors JV, includes Kiewit Louisiana Co., Traylor Bros. Inc. and the M.R. Pittman Group.

The new stations are designed to reduce the risk posed by storm surge from Lake Pontchartrain caused by a hurricane with a one percent chance of occurring in any year—commonly referred to as a 100-year storm. The structures also take into account expected increases in the lake's water level during the next 50 years. All electrical components within the station that could be damaged by the incursion of saltwater are 9.5 feet above sea level—high enough to withstand a 100-year flood.

The stations must be able to pump rainwater from each canal into the lake at a rate that will keep the water levels in the canals low enough to avoid overtopping or damaging the floodwalls. Huge metal funnels will suck water from the bottom of the drainage canal during storms. The water then will feed upward into huge pumps that will pour it into Lake Pontchartrain.



The 17th Street Canal PCCP has 39 MW of a standby power

Power at the ready

Each pumping station has a generator building, an auxiliary building or control building, a pump station, and a slide gate or bypass structure. The total maximum pumping capacity at the three outfall canal pumps upon completion of the PCCP will be a combined 24,300 cubic feet per



second (cfs). When the surge closures are operated during storms, the pumps will move 12,600 cfs of water from the 17th Street Canal into Lake Pontchartrain.

The 17th Street PCCP consists of 15 Cat® C175-16 generator sets capable of producing 39 MW of electric power. The generator sets will supply power

to six 5,000 horsepower (hp) pump motors capable of pumping 1,800 cfs, and two 2,500 hp pump motors capable of pumping 900 cfs. In the event of a power outage, a Cat C27 generator set will power the basic life safety operations of the facility. The 17th Street Canal station also includes Cat Medium

Voltage (4160V) Switchgear, Low Voltage (480V) Utility Switchboard and Automatic Transfer Switches (ATS).

“When a storm event occurs, we will go off of city power and onto our own power, and utilize our own fuel,” says

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Anthony Bertucci, a commissioning manager for M.R. Pittman Group. “The stations are meant to be totally independent of the grid on power, water and sewerage. It is designed to handle everything on its own.”

At the Orleans Avenue Canal, four Cat C175 2600KW generators and one C18 480-volt generator supply continuous power. The London Avenue Canal has 11 Cat C175-16 2600KW generators and one C27 480V generator.

“It’s a good design as far as multiple redundancies without having multiple pieces of equipment, and it’s the same basic design philosophy through all three sites,” says Ken Johnson, the project manager for Louisiana Cat.

The 17th Street PCCP station has six 50,000-gallon bulk storage tanks that feed diesel fuel for the generator sets through a transfer system out to a day tank. The system has a drain and

recirculation system where it will keep the fuel cleaned and conditioned for long-term use and sustainability. The remote radiators are stationed outside the generator building along with stainless steel mufflers.

A requirement of the project is that all of the gensets are mounted on isolators to stabilize them in the event of an earthquake. All of the Cat generators are seismic rated per guidelines set forth in the International Building Code (IBC 2006). The switchgear exceeds Uniform Building Code (UBC) Zone 4 (California building code Title 24), and the switchboards are rated to meet IBC 2006 and UBC Zone 4 requirements.

As a federally funded project, Caterpillar was selected in a competitive bidding process. Louisiana Cat had help from Caterpillar’s Defense & Federal Products (D&FP) division, which provided the Cat dealer with detailed schematics of the project. The D&FP also assisted Louisiana Cat technicians in sorting out minor technical issues involved with startup and base commissioning of the generator sets, Johnson said.

“What led us to pick Caterpillar for this facility was a combination of economics and long-term reliability,” Bertucci says. “From my perspective,



Cat engines are very reliable. I’ve used them on many of the projects that we’ve completed. We’ve done a lot of drainage pump stations and facilities in the area that are part of the overall flood control system, and they are a very reliable generator and reliable engine package that we’ve used.

CUSTOMER PROFILE

PCCP CONSTRUCTORS JV

Location: New Orleans, La.

Application: Flood control pumping stations

Cat® Equipment:

17th Street Canal: C175-16 generator sets (15), C27 generator set, Automatic Transfer Switches, 4160V MV Switchgear, 480V LV Switchboard

London Ave. Canal: C175-16 generator sets (11), C27 generator set, Automatic Transfer Switches, 4160V MV Switchgear, 480V LV Switchboard

Orleans Ave. Canal: C175-16 generator sets (4), C18 generator set, Automatic Transfer Switches, 4160V MV Switchgear, 480V LV Switchboard



17th Street Canal PCCP

CAT C175-16

Producing reliable power from 2500 ekW to 3100 ekW at 60Hz, Cat® C175-16 diesel generator sets are made to meet mission critical, continuous, standby and prime applications, and match your power standards. The C175-16 is engineered to ISO 8528-5 transient response requirements and to accept 100 percent rated load in one step.

C175-16 generator sets range from low fuel consumption systems to EPA Stationary Emergency (Tier 2). Leading innovation means some models offer emissions reduced by up to 90 percent. Seismic certification is also available for select models, maintaining power after unexpected disturbances. An integrated control system, including Cat UPS, ATS and switchgear, ensures a consistent power supply and connection to your fleet through on-site and remote monitoring options.

The EMCP 4 control panel provides expandable controller options, with management and diagnostic tools, and a user-friendly interface. Because power needs are unique, generator sets can be customized with a broad range of accessories and bolt-on system expansion attachments. Flexible packaging options work with spatial requirements and environmental conditions.



“Caterpillar and Louisiana Cat were able to provide the best solution for the PCCP pump stations.”

ANTHONY BERTUCCI
Commissioning Manager, M.R. Pittman Group

“The Cat gensets have a very good setup with the electronic fuel injection and the overall electronics,” Bertucci adds. “I know when we started these engines up after being in storage for an extended period of time, they started right off the bat and ran.”

As the project nears completion this fall, technicians from Louisiana Cat will train personnel from the New Orleans Sewerage & Water Board on the operation and maintenance of the generator sets. Representatives from the Caterpillar ISO Switchgear factory will also provide training on operation of the ATS’s, switchboards and the switchgear.

“Caterpillar and Louisiana Cat were able to provide the best solution for the PCCP pump stations,” Bertucci says. “From a service standpoint we’ve had great service so far with startup and testing of the engines.

“Having Louisiana Cat involved always improves our decision to go with Cat equipment,” Bertucci adds. “We’ve had a really good relationship with Louisiana Cat personnel on this project and past projects, and we receive really good service from them.

“I can call Ken any time of the day and he comes out to assist, and he provides us with service personnel as needed.”





DON'T SKIP THIS

COMMISSION YOUR GENSET WITH CATERPILLAR

Gas generator sets made by Caterpillar have logged millions of operating hours around the world. To ensure yours delivers maximum uptime and reliability, don't skip the commissioning process.

Here are four reasons to turn to a professional commissioning engineer certified by Caterpillar to ensure your engine is ready to perform to its full potential.

1. OPERATE WITH CONFIDENCE.

When you choose one of our certified professionals to commission your engine, you'll have no doubt the equipment is installed correctly and operating as designed. We start by making sure the installation conforms to recommendations, checking everything from wiring and piping to alignment and cleanliness.

Then, we start the engine and run it at your expected load parameters for at least four hours, verifying temperatures, cooling system pressures, emissions levels and more to ensure they're all within specification. We also perform shutdown tests and hot alignment and detection checks.

The entire process typically takes around five days, and you'll receive a written report detailing the commissioning process within a few weeks.

2. REDUCE YOUR RISKS, DOWNTIME AND COSTS.

Commissioning is a small step that could save you big dollars. We've seen serious issues with engines that haven't been through the process, including damaged turbochargers and crankshafts—big-ticket items that can cost hundreds of thousands of dollars to replace. Even smaller problems, like water pump damage due to

a contaminated cooling system, can be expensive if you need to order parts and send a service technician to fix the problem. Any repair means downtime, which results in lost revenue.

While commissioning can't eliminate the possibility of damage and downtime, it does significantly reduce your risk for both.

3. ACTIVATE REMOTE MONITORING.

Part of the Caterpillar commissioning process is making sure that Cat Product Link™ is connected and functioning properly. That means you can immediately start taking advantage of the data-collection and remote-monitoring capabilities built into your engine.

With Product Link, you can keep track of fuel status, operation time versus idle time, upcoming service needs and more—and customize alerts so critical operations receive immediate attention. This information can help you lower owning and operating costs, improve productivity and make smart, data-driven business decisions.

4. WORK WITH THE BEST.

Our factory-certified commissioners go through extensive online and instructor-led training before they're sent out into the field, and ongoing testing ensures they stay up to date on the latest issues. They also meet regularly to share lessons learned with one another. You can rest assured the commissioner we send to your site is an expert on installation and operation. 🛠️

To schedule commissioning for your engine, contact our dealership.

MAKING THE SWITCH

Commercial cogeneration an engine for economic development

The development team of Kyle Robinson and Drew Loftus had an unlikely beginning, as each worked for large developers running real estate projects in Indianapolis prior to the recession.

When the real estate market crashed in 2008, Robinson and Loftus went to work pursuing their own separate tech ventures—Robinson worked in operations for a robotic mower firm, and Loftus in sales at a software development company.

Then in 2011, the owner of the apartment complex where Robinson lived put the painting project out to bid. Robinson, who was not a professional painter, offered to do the work

cheaper. He got the job and recruited Loftus. They spent nights and weekends painting a 150-unit townhome complex.

“We had to pitch the banks,” Loftus recalled in an interview with the *Indianapolis Business Journal*. “Being one of our first projects, the terms weren’t great, so we had to bring a lot of our own money into it.”

Now, six years later with 12 employees and four projects under their belt, Loftus Robinson looks to refurbish older, historic office buildings

and market the space to tech-type companies seeking trendier digs than traditional downtown towers offer. The firm focuses on high-character projects that promote walkability, sustainability, and progressive design.

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CUSTOMER PROFILE

Loftus Robinson Energy LLC

Site Location: Fishers, Indiana

Application: Cogeneration/ commercial building

Cat® Equipment: G3306B gas generator set




“We’ve always bought office buildings that are heavily in need of renovation,” Robinson says, “and gutted them and tried to make them more efficient.”

Energy efficient

In a departure from its earlier work, in 2015 Loftus Robinson completed a new \$30 million mixed-use project in Fishers, an Indianapolis suburb. Dubbed “The Switch,” the ground-up development includes a 34,000-sq.-ft. office and retail

The Cat G3306B gas generator set is housed in an enclosure that takes up two parking spaces in the corner of the Fishers downtown municipal garage, which is tied in to the development. The compact footprint genset is the ideal size and parallels with the utility grid. It is utilized mostly during times of peak energy demand, when the weather reaches hot or cold extremes.

“We’re always looking to make our buildings more efficient, which is better for everyone,” Robinson says, “It’s

The Cat genset also serves as emergency backup power for the parking structure, automatically powering the elevators and the emergency lights in the event of an outage. It also powers two electric vehicle charging stations in the garage.

Jacket water heat from the generator set will be utilized to provide free hot water to tenants of the mixed-use building, which includes two restaurants.

“We have some pretty technically savvy tenants in the building—one of our tenants is ClearObject, an engineering outreach program of Purdue University,” Robinson says. “We also house a company called the Internet of Things, and they’re technically advanced. So our tenants appreciate the fact that we are on the leading edge of energy efficiency.”

Dealer support

When it came to procuring and siting the generator set, Robinson turned to an old college friend, Chris Cummings, who works in business development of alternative energy with local Cat dealer, MacAllister Power Systems.

“MacAllister helped us all the way through the process with the system design, and they co-authored the grant that we received from the state,” Robinson said. “They also arranged for the containerization of the genset to house it and help us meet sound attenuation requirements.”

The genset was purchased through Cat Financial, which Robinson says was a simple process.

“We have a Cat loan now so we pay that monthly as opposed to paying our electric bill,” Robinson says, adding that he expects the cogen unit to pay for itself in six years. The developers anticipate savings of six cents per kilowatt hour.

Loftus Robinson can monitor the operation and performance of the generator set through a remote monitoring system set up by electrical contractor Newkirk Electric.

“It powers on and off automatically depending on weather conditions and electric demand,” Robinson says. “They provided all of the external



The Cat® G3306B genset has a compact footprint

building, as well as 102 apartments. The Switch draws on the railroad past of Fishers, attracting residents and technology-based businesses into the heart of the rebuilt downtown core.

In a unique twist, Loftus Robinson opted to install a 135 kW Cat® generator set to power the facility with a combined heat and power (CHP) system, receiving a \$100,000 grant from the Indiana Office of Energy Development.

“There aren’t a lot of commercial installations in Indiana with CHP systems,” Robinson says. “We have industrial CHP installations, but not many that are found in commercial applications.”

better for the tenants, more profitable for us, and better for the environment.

“From an operational standpoint, we work really hard to build an energy efficient building,” Robinson adds. “So we’re running energy models in our buildings before we build them to look at tradeoffs and to properly size equipment.”

The Switch is a highly energy-efficient office building with an advanced HVAC system. In moderate weather, the office building will pull 50-75 kilowatts, and in more extreme temperatures—hot or cold—it uses all 135 kW from the genset and supplements with power from the grid.

automated controls—so they have some system level recovery controls for the CHP system, as well as all the utility paralleling requirements—and with that it provides master control of the entire system.

“So we have remote access from our office, enabling us to monitor the status of the generator,” he says. “We also receive reports of any issues via e-mail. Everything is about as intuitive as it can be. We meter about eight separate points of energy usage both for purposes of the generator and just in general to see how the building is performing. Altogether, it paints a pretty good picture of what’s going on.”

MacAllister is providing regular maintenance of the genset through a Customer Support Agreement. Some common service items, including oil and spark plugs, are kept on site to cut down on service time.

“We’re training our facilities manager to handle the day-to-day checks of the generator,” Robinson says. “Up until this point, Chris has really been doing that for us. He stops in on his way to work to check fluids

“MacAllister helped us all the way through the process with the system design.”

KYLE ROBINSON
Co-owner
Loftus Robinson

and do a quick visual inspection. He also assists the Newkirk guys in anything that they may need onsite to further the programming effort. So that’s been really great—I think he has gone above and beyond.”

Hotel cogen is next

Loftus Robinson is currently developing another project in Speedway, which is located right outside the Indianapolis Motor Speedway. The project includes a 150-room hotel and some structured parking and about 100 apartments.

Robinson says the development team is looking at installing cogeneration at the hotel, as well as in future projects.



“I think what we’re most excited about is utilizing cogeneration at hotels we build,” Robinson says. “They have heavy electrical loads and heavy night and day hot water loads, with showers, restaurants and a lot of laundry.

So utilities are a big line item in a hotel’s operating budget, and we’re excited to build a bigger, but similar system for our Speedway hotel project.”

NICKEL PLATE DISTRICT REDEVELOPMENT

Recognized year after year as one of the best places to live in the U.S., Fishers, Ind., has embarked on an effort to develop the area surrounding its downtown area, known as the Nickel Plate District.

There was a time when Fishers was a community of only 800, and served as a railroad switchyard. Nearly the entire community was housed in the city’s historic downtown.

Now a growing community of almost 90,000 people, the Nickel Plate District is transforming the Indianapolis suburb into an upscale dining and retail destination.

While creating a sense of place for the Fishers’ community is important, the Nickel Plate District is also an engine for economic development. The Nickel Plate District redevelopment serves as a catalyst for drawing innovative businesses and attracting creative entrepreneurial talent, resulting in market-driven job creation for Fishers.

Four mixed-use buildings anchor the district, including apartment units, retail stores and office space in the heart of the new downtown. A new municipal parking garage is shared by tenants and the public.

Within the district, “The Switch” is a \$30 million multi-family, retail, and office development located across the street from City Hall and a short walk from the community amphitheater, library, park, and numerous restaurants.

Developer Loftus Robinson worked closely with city planners to incorporate a variety of public uses. Overall project amenities include a fitness center, private courtyard, rooftop decks, shared conference spaces, and bike parking.

A 425-space parking garage was constructed in 2015 and oversized to serve growing public demand. In a corner of the garage, two parking spaces are occupied by a containerized Cat® G3306B generator set, which serves as a



source of electricity and hot water for the adjacent 34,000 square-foot retail and office building.

Asset Type:
Multi-Family, Office, Retail

Property Size:
102 Apartment Units
23,000 SF Office
11,000 SF Retail
425-Car Parking Garage



GEARING UP FOR SAVINGS

Municipal utility increases fuel efficiency and lowers emissions with Cat® G3520H gas gensets

“I expect 20 years from now these Cat generator sets will still be viable.”

SHAWN BLACK
Generation Superintendent
Springville City Power

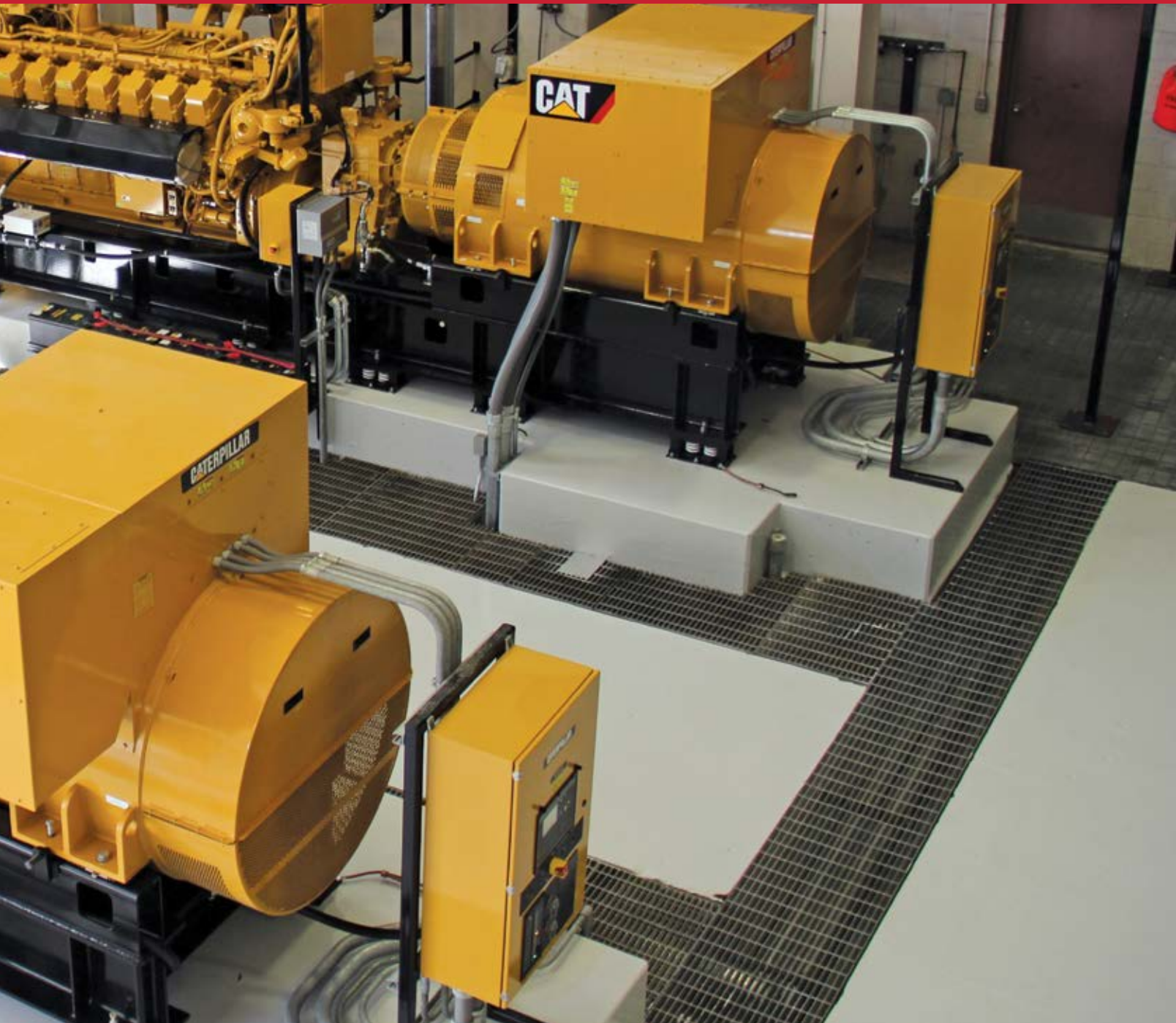
Since 1904, the city of Springville, Utah has enjoyed the benefits of owning its own electric system.

As a municipal power utility, the community just south of Provo receives the majority of its power from a wholesale electrical energy cooperative, and distributes it via a locally owned transmission network to 35,000 residents.

One of the primary benefits of local

ownership is the ability to make decisions that result in reliable power at lower rates. Public ownership and control allows Springville to transfer a percentage of gross retail power sales to the city’s general fund, which helps defray costs associated with the daily operations of the city—thereby reducing the city’s need for additional taxes or fees.

Springville is a member of Utah Associated Municipal Power Systems



(UAMPS), a political subdivision of the State of Utah that provides wholesale electric energy, transmission, and other energy services on a nonprofit basis to community-owned power systems throughout the Intermountain West.

UAMPS serves 47 members, who have the ability to select which projects they participate in based on their system requirements. Springville City Power is also a member of several projects that

include wind, natural gas, hydroelectric, and coal-fired generation.

In order to provide residents with lower rates during periods of peak demand, the municipality also owns generating capacity of its own, with a 28 MW generating plant built in 1986. The original plant had seven dual fuel generator sets that start with diesel fuel and run on natural gas, including three locomotive-type engines that were

converted to a stationary application at Springville's Whitehead Power Plant.

As the city has continued to grow over the last 25 years, having its own source of generation means it can provide cheaper power during times when wholesale electrical rates are high—typically in the heat of summer and the colder periods of winter.

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The Whitehead Power Plant is also capable of black starting when the larger transmission grid fails. If Springville ever becomes an island operating without connection to the main grid, the Whitehead plant becomes the primary backup for the city's wastewater treatment facility, as well as selected circuits.

"We sit on a fault line in the Wasatch Valley, so a lot of these municipalities want to be prepared in the event of an earthquake—it's not unrealistic to think it could happen," says Shane Minor, a government and utilities sales representative with Cat dealer Wheeler Power Systems. "So it's a matter of being prepared in the event of a catastrophe. They just want to know that they have the black start capability."

Filling the void

In 2008, Springville removed all three of the two-stroke engines at the Whitehead plant based on their poor heat rate and high fuel consumption. The slots remained vacant until last year, when Wheeler Power Systems began a partial overhaul of the plant to prepare for the installation of two Cat G3520H gas generator sets.

Initially, Springville considered going with industrial-class engines from Caterpillar MaK and then later a Cat G3616 gas engine before deciding on the G3520H, said Shawn Black, generation superintendent for Springville City Power. What sealed the decision was a design change by Caterpillar to place a gearbox on the G3520H gensets, which lowered rpms from 1,800 to 1,500 and increased overall fuel efficiency by 18 percent.

"The way these engines were designed, the generator wasn't set up on the engine to achieve the efficiency it needed for our specifications," Black says. "Adding the gearbox was a game changer for us."

While initial capital costs are important when it comes to making a decision on generator installations, Springville City Power looked at the long-term implications.

"We believed it was critical to weight our decision by looking at the variable cost of electricity from the grid compared to the fuel efficiency of the Cat gensets," Black says.

The new Cat G3520H gensets were commissioned in December and operated through mid-January,

CUSTOMER PROFILE

Springville City Power

Location: Springville, Utah

Application: Municipal Utility, peak shaving and base load power

Cat® Equipment: Two G3520H gas generator sets (2.4 MW)



accumulating 500 and 200 hours each. They have been idle since that time, as Springville City Power is negotiating a new air permit with the Utah Department of Environmental Quality. With regulations in Utah County becoming more stringent, Black is seeking to have Springville reclassified as a minor source of emissions.

"The Cat engines are probably four times cleaner than the previous units were for the same kilowatt hours of generation," Black says. "So it's a lot better for negotiations with the state. I am impressed with their fuel economy, and emissions levels are good too, especially with the oxidation catalysts that Wheeler added. We may put in another G3520H so they all match."

Springville uses jacket water to heat anaerobic digesters, which process solid waste effluent from the city's wastewater treatment plant. The jacket water heat from the gensets will replace the need to use gas-fired boilers, resulting in a projected savings on natural gas usage of \$6,500 to \$8,000 per month, Black says.

"We anticipate it will take care of 100 percent of our needs once we can tweak a few things," he says. "So this will eliminate or minimize the need to use the boiler—that was one of the big justifications for buying the engines."

"The plan is, we run them when it gets very hot or very cold, and run base load power with one of the generator sets—so one of the Cat engines will



run continuously,” Black adds. “We can choose to buy market power, but if we run one generator continuously, we’re saving on the gas to heat the boiler and not paying higher utility rates for the amount of power that we self-generate.”

Long-term value

Having ownership of generation assets provides Springville with a measure of local control, Black says.

“When you own engines on your property, you control your own destiny,” he says. “A lot of financial guys think it’s a good idea to only do Power Purchase Agreements and financial transactions. For us, there’s a lot of benefit to owning the actual assets, it’s part of the diversity of our portfolio. We like having the control—we can decide whether or not we want to run to meet our exact load needs.”


The Whitehead Power Plant also helps Springville balance disparate sources of power from generation sources that can fluctuate greatly, Black says.

“In terms of when we use these engines, it becomes a matter of: Do we want to purchase power off the grid?” Black says. “Or do we run the engines and burn natural gas, or use the fuel somewhere else?”

For municipal utilities, the growth of renewable sources of energy—including wind and solar power—places more importance on generation assets that can be ramped up or down quickly to balance the loads from those renewable resources.

The G3520H gensets start fast and load fast, making them a good fit for Springville’s power needs. Performance is not compromised at higher altitudes—Springville sits at 4,500 feet—based on updated turbocharger trim options.

“Going forward, I think we will be in a more extreme energy environment that is prone to swings, and owning generator sets that can maintain fuel efficiency all the way through their capacity range is an essential attribute,” Black says. “You can run it, ramp up or down and still maintain your fuel efficiency.

“I expect 20 years from now these Cat generator sets will still be viable.” 

MAKING IT HAPPEN

Wheeler Power Systems succeeds with unique business model

The relationship between Springville City Power and Wheeler Power Systems came about through a long-term association with UAMPS, a non-profit municipal power association that was forged by Ken Green, a 45-year power systems veteran at Wheeler Machinery Co.

“Some of these cities understand peak shaving, and they see the value in that because they realize savings,” says Shane Minor, a government and utilities sales rep with Wheeler Power Systems. “So Ken became a member of this group, and they treat him and Wheeler as though we are one of them even though we are a vendor. We have a product to offer that truly helps them.”

Green began the relationship with Springville City Power 10 years ago, which ultimately led to Springville’s choice to install the G3520H generator sets last year.

“The partnership and the trust was already there,” Minor says. “We helped them build a spec that they could send out for proposal.”

Wheeler acted as the developer on the project, with a general contractor coordinating all site work at the Whitehead Power Plant. This included building new pads for the gensets and installing new switchgear to synchronize and parallel with the utility grid. New radiators were also installed outside the plant on a rebuilt concrete surface.

“When a small power plant is being built with our engines, our part of it can be 80 percent of the cost,” Minor says. “We have the expertise to know how the plant needs to be built to run right. We take the approach to run the whole project. We hire the general contractor, and we get the plant built to function the best. And when the general contractor pulls out, we are the ones that the customer falls back on.”

While signed contracts are in place, the customer doesn’t make actual payment until the gensets are commissioned and the customer is satisfied, Minor says.

“Wheeler will actually fund these projects right up until our customer puts the key in and turns it on and the power plant works,”



Minor says. “Until the customer is completely satisfied, Wheeler covers the cost of everything.

“We have taken the approach that we are the developer, so the whole project is under us,” Minor continues. “People ask us why we are the prime on these projects. That’s because there’s one throat to choke, and that’s us. Our customers get real comfortable when they hear that—we take on all the liability because we know what we are doing. Our model has been a hit with a lot of these people because they can see the value in it.”

Shawn Black, generation superintendent for Springville City Power, is happy with the final result.

“This wasn’t a greenfield build, it was like remodeling a house,” Black says. “Wheeler had a company do the control panel, and we used our own breakers. It was challenging to tie it all together and interface with the switchgear, but they did a clean, quality job, including placement of the piping and the finish painting.

“On the whole, they did everything really well, and they’re very customer conscious, calling us and making sure things are running right,” Black adds. “They are concerned about the long term—they follow up, and they’re good guys to deal with.”

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