

RUNREADY™

10
YEARS OF
RUNREADY
2010-2019

RAMPING UP SAVINGS

New Cat® power plant saves
on the high cost of power

LEAN BURN

Cat G3516C gensets run on lean coal mine methane gas

QUICK START

G3512 gas genset accepts 100% load in 7.5 seconds

REMOTE MONITORING

Connected services are a quantum leap from SCADA systems



Get Connected

Just as it's possible to have a computer technician diagnose problems with your laptop by linking into your network, connectivity is beginning to transform the operation of generator sets.

There's an easier way to monitor and manage your power generation assets, no matter where they're located. Cat® Connect Services lets you turn your data into insights that can improve reliability and profitability.

Now you can receive and share information about your assets in real time. Whether you're managing a single genset or an entire fleet, customized data is at your fingertips—at the power location, on the go or in the office. View the operating status of your generator set, or fleet, from an easy-to-read dashboard on your digital device.

Cat dealer Finning Canada is one of the early adopters of remote asset monitoring, as it connects customer power generation assets across Western Canada. A team of specialists serves as “a second set of eyes” at the dealer's Edmonton headquarters. Last summer, Finning used remote monitoring on a long-term rental project, ensuring that the rental generators were always available to provide continuous power to a remote area.

Meanwhile, another Cat dealer, Wheeler Power Systems, has carved out a niche by coordinating and developing all aspects of distributed energy plants for municipal utilities in Utah.

Also in this issue: Once the exclusive domain of diesel powered units, gas-fueled generator sets are making advances in the standby power market. The Cat G3512 gas generator set can now accept full load in 7.5 seconds.

We welcome your feedback, as well as having the opportunity to share your success story. Thanks for reading, and Happy Holidays.

John Rondy, Editor

262.544.6600 or JohnR@HighVelocityCommunications.com

GLOBAL MANUFACTURING FOOTPRINT

The Caterpillar Electric Power team is comprised of more than 4,500 employees speaking 47 different languages, working in 90 strategic locations in 15 time zones. The principal manufacturing facilities include:

Alpharetta, Ga. (switchgear); **Griffin, Ga.**

(engines for gensets, marine and earthmoving);

Hosur, India (engines); **Lafayette, Ind.** (1,900 employees manufacturing the 3500, 3600 and C175 engines & remanufacturing for 3500 series); **Larne, Ireland** (gas

and diesel engines, acoustic research and test facilities); **Mannheim, Germany**

(900 employees manufacturing highly efficient gas engines for electric power

and CHP plants); **Piracicaba, Brazil** (manufacturing local products, and C80 and

VM 32 gensets for marine applications); **Tianjin, China** (ISO 9001 and 14001

assembly facility that blends high-speed production and tightly controlled processes, producing 5.5 to 900 kVA gensets).



GOOD AS GOLD

An open pit mine in central Nevada is utilizing Cat® natural gas-powered generator sets to power all operations at the site.

Earlier this year, McEwen Mining Inc. declared commercial production at its newest mine site at the Gold Bar mine in Eureka County, located in a rural area approximately four hours east of Reno. According to the company, the mine is expected to produce 65,000 ounces of gold annually.

Cat dealer Cashman Equipment worked closely with the Toronto-based mining company to identify an integrated solution to power mining operations.

The customized solution consists of two Cat® G3516 1,450 kW and one G3512 1,000 kW natural gas generator sets. The Caterpillar power solution also includes a six-section 4160V paralleling switchgear lineup housed in an outdoor walk-in enclosure, complete with emergency standby controls.

Many mining operations take place in remote parts of the world where access to large electric utility feeds is either unavailable or requires significant investments in electrical transmission and distribution, says Daryl Dassinger, a sales and support representative for Cashman.

“Many sites have easier access to natural gas infrastructure and have discovered that liquefied natural gas (LNG) is a cost-saving fuel alternative,” Dassinger said. “LNG is trucked to the McEwen Gold Bar mine site and then vaporized and used as fuel for the generators.”

Design requirements for the project were stringent. Site elevation is 6,400 feet with temperature swings ranging from -20 degrees F to as high as 104 degrees.

“We were working under rigorous emission regulations from the U.S. Environmental Protection Agency (EPA) and the Bureau of Land Management (BLM),” said Simon Quick, vice president of projects for McEwen Mining. “In addition to the emissions requirements, site conditions were difficult. Caterpillar was able to meet our power needs, and they were also able to provide the factory EPA certification we needed.”





IN THE SPOTLIGHT:

6 Ramping Up Savings

In order to keep pace with an exponential increase in power consumption within its service territory, Lehi City Power commissioned a 7.2 MW distributed energy plant last year that is used to offset the high cost of power from the energy grid.

FEATURES



4

4 G3512 Quick Start

Gas genset accepts 100% load from a cold start in as little as 7.5 seconds



12

9 Customized Solutions

New team of Cat® engineers develops sophisticated power solutions

10 Lean Burn

Cat® G3516C gensets run on lean coal mine methane gas

12 Remote Monitoring

Connected services are a quantum leap from SCADA systems



14

14 Guaranteed Performance

Finning Canada monitors the performance of customers' generator sets across Western Canada with Cat® Remote Asset Monitoring



RunReady™ is published by High Velocity Communications Inc. on behalf of your Cat® Dealer. Publisher, Mark Sell • Editorial Director, John Rondy • Senior Art Director, Eric Valk • Director of Client Services, Kelly Pemper. Every attempt has been made to ensure specifications are accurate. Because specifications are subject to change without notice, check with us, your Cat Dealer, for the latest equipment information. Some photography provided courtesy of Caterpillar Inc. High Velocity Communications Inc., 1720 Dolphin Drive, Suite D, Waukesha, WI 53186-1489. Phone (262) 544-6600. Please submit address corrections and changes via e-mail to: Kelly@HighVelocityCommunications.com. © 2019 High Velocity Communications Inc. Printed in the U.S.A. Volume 10 Number 4. © 2019 Caterpillar. All Rights Reserved. CAT, CATERPILLAR, LET'S DO THE WORK, their respective logos, "Caterpillar Yellow," the "Power Edge" and Cat "Modern Hex" trade dress as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission. VisionLink® is a trademark of Trimble Navigation Limited, registered in the United States and in other countries.

G3512 QUICK START

GAS GENSET ACCEPTS 100% LOAD FROM A COLD START IN 7.5 SECONDS

Representing an advance in quick starting and fast loading for standby power applications, the Cat® G3512 gas generator set can start and accept 100 percent load from a cold start in as little as 7.5 seconds.

Ideal for emergency, legally required or optional standby systems, the G3512 is appropriate for office buildings, data centers, retail complexes, schools, government buildings, universities and research facilities.

“When it comes time to run this genset, it’s capable of having a quick start,” says Tom Bruecker of Caterpillar EP Gas Applications. “You can start the G3512, and very quickly it’s at rated speed and able to take on that load and supply power to your facility when you need it.”

The quick start capability is a significant advance from previous models, which took 40 seconds to ramp up and accept 100 percent load.

As one of the first gas generator set models to accept load in 7.5 seconds from a cold start, the G3512 can be used

in some of the same applications that a diesel genset is traditionally used, says Diane Clifford, a Caterpillar EPG market consultant.

The G3512 is modeled after the standby diesel solution to minimize installation costs and commissioning time onsite. A high-power density 12-cylinder engine offers market-leading load acceptance and transient response.

“The combination of performance, certifications, and other critical customer requirements addressed by the Cat G3512 generator set checks all the boxes for the standby market segment,” says Mike Yohe, product line management with Caterpillar Energy Solutions. “This is

built upon a robust diesel 3500 platform with a proven track record, where dependability is critical for customers who use these generators during utility outages.”

Along with taking on 100 percent load in a single, quick step, the G3512 can also execute a 100 percent load dump, which is unique for a gas genset, Bruecker says.

“100 percent load steps are difficult for gas gensets typically because they end up shutting the engine down,” he says. “This product was developed so that it could continue running and take

“You can start the G3512, and very quickly it’s at rated speed and able to take on that load and supply power to your facility when you need it.”

TOM BRUECKER
Caterpillar EP Gas Applications

on additional load steps after a load dump and continue to supply power.


“As your electrical needs move up and down, the engine can adapt to those changes,” Bruecker adds. “You can do load steps, load dumps, and the engine will always be there and available to support the power needs that you have on your site.”

Featuring Caterpillar’s new EMCP 4.3 generator set controller, the G3512 easily integrates with building management systems. The expanded set of features also includes complete SR5 generators, gas train, package-mounted radiators and simplified wiring connections.

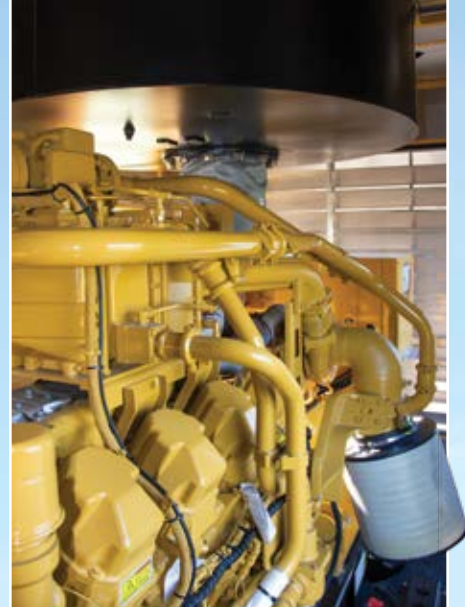
Packaged enclosure

With an updated package design, the G3512 is modeled after the standby

diesel solution to minimize installation costs and commissioning time onsite. The G3512 is available in a customized enclosure. This is a cost competitive solution that includes a radiator and silencer, which saves the customer from installing those components separately.

“The difference in install time of an enclosure like this is that you can put this down on the ground and be running the same day,” says John Hibler, technical solutions manager for Caterpillar EPG. “By utilizing a plug-and-play application, the customer minimizes the onsite installation time.” 

For more information, contact the power systems experts at our dealership.



CAT G3512 GAS ENGINE

- Robust high-speed block design provides prolonged life and lower owning and operating costs
- Designed for maximum performance on low-pressure pipeline natural gas
- Simple open-chamber combustion system for reliability and fuel flexibility
- Leading-edge ignition system technology and air/fuel ratio control for lower emission and engine efficiency
- One electronic control module handles all engine functions: Ignition, governing, air/fuel ratio control and engine protection



RAMPING UP SAVINGS

UTAH COMMUNITY BUILDS NEW CAT® POWER PLANT TO KEEP PACE WITH GROWTH



Located on the edge of Salt Lake and Utah counties at the north end of Utah Lake, Lehi sits at the nexus of technology firms migrating from California. Dubbed the “Silicon Slopes,” the region encompasses a cluster of information technology, software development, and hardware manufacturing and research firms along the Wasatch Front.

With companies such as Adobe, Microsoft and Xactware putting down roots within its service territory—and with a 134 percent increase in population since 2000—Lehi City Power realized it

was time to replace an outdated facility with a new campus to keep pace with the explosive growth.

In 2011, city officials began a four-year planning process that ultimately led to the selection of Cat dealer Wheeler Machinery to serve as general contractor for a \$17.5 million campus, which includes the main office, warehouse, shop, and a new distributed energy facility used for peak shaving to reduce the sometimes high cost of power from the energy grid.

Wheeler has a track record of developing distributed energy systems



for municipal utilities in Utah, including Heber City, Springville, Provo and Hurricane. A unique approach developed by Ken Green, now retired from Wheeler Power Systems, involves the Cat dealer overseeing all facets of power systems installations. This gives the end user one point of contact during the development phase, and an experienced electric power dealer to fall back on for product support once the project is completed.

Before coming to Lehi City Power to serve as director, Joel Eves worked for Provo City Power, a nearby municipal utility that commissioned its own new power plant in 2017 with five Cat G3520H gas generator sets.

“I know those people really well and if I have a problem or I need something, I can call them and they’ll help me out and vice versa,” Eves says. “The fact that they have the same Cat gensets as we do—I know the exacting detail they would have gone through to make that selection. It gave us some comfort when we made the recommendation to our decision makers to go with Wheeler and Caterpillar for our new generation plant.”

Lehi City Power asked for an integrated team to come forward with an architect contractor and the generation technology provider.

“Once Wheeler was selected, we worked hard to come up with the best ideas with our team, Wheeler’s team,

and (subcontractor) Hughes General Contractors until we arrived at the end product,” Eves says. “Once that was determined, things went really smoothly. In the end, it’s amazing the relationship that we maintained with Wheeler, Hughes, and all the subcontractors. To this day, we feel like everyone did a great job.”

Broadbent Generation Facility

Located behind the new 17,000-square-foot office of Lehi City Power, the Broadbent Generation Facility first opened in March 2018. It has three Cat G3520H generator sets that produce 7.2 MW of power during times of peak demand, when energy prices are high. This typically occurs during the summer months.

Peak demand reached 120 megawatts this summer in Lehi. That compares to a peak of 19.1 MW in 2000. Lehi used 396,514 MWh of energy last year, compared to 78,454 MWh in 2000.

“At the rate we’re growing, we wanted a way to help us address the power needed for our city,” said Cameron Boyle, assistant city administrator, during a groundbreaking ceremony in 2017.

“This helps offset the cost of power we’re purchasing from other sources, and during our peak times, in July and August when everyone is using their air

conditioners, we want to have our own ability to generate power to offset the need.”

Lehi belongs to Utah Associated Municipal Power Systems (UAMPS), which provides wholesale electric energy, transmission and other energy services to community-owned power systems throughout the Intermountain West.

As a member of UAMPS, Lehi City can contract with energy providers of its choosing. Some of those energy sources include hydro power, natural gas, and renewables such as wind and solar.

Eves says having the ability to beat the cost of grid power with a local distributed energy system is critical to the future of municipal power systems.

“From all the indicators I’m seeing and all the conferences I’m attending, there’s going to be a huge need for a product like this that is load following, can ramp quickly, and come offline quickly,” Eves says. “And that’s because of all of the renewables and intermittent production that are taking place, which lead to greater fluctuations throughout the energy grid.”

Monitoring the market

Lehi has a specialist who monitors the energy market. When forecasts indicate that prices are about to spike, Lehi City Power notifies UAMPS that it plans to

Continued on page 8

CUSTOMER PROFILE

Lehi City Power

Location: Lehi, Utah

Application: Municipal Utility - peak shaving

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



run the generator sets based on the strike price—which is when the cost of natural gas is cheaper than power rates on the spot market.

“There’s an electric power clearinghouse that forecasts the cost of power, and if it indicates that the price of energy is going to become really high that hour, we will want the generators to run so we can beat the market price,” says Crystal Robinson, forecast and resources manager for Lehi City Power.

“So, for example, when prices reach \$100 per megawatt hour, if I can start these generators at \$35 or \$40 per megawatt hour, we save all that money,” Robinson says.

Including all operating and maintenance expenses, it costs Lehi between \$40 to \$55 per megawatt to operate the facility. Current costs to purchase energy from the grid can vary anywhere from \$20 to \$300 per megawatt hour, depending on demand.

“Having our own source of power generation is a hedge, because if we don’t have it then we know we’re just stuck to the market,” Robinson says. “If the market price is high, now we have another option.”

Once Lehi City Power finishes rebuilding a local substation, voltage on a main transmission line will increase from 46 kV to 138 kV, making its new distributed energy system more reliable and robust. This will enable the Broadbent facility to operate in island mode and provide electricity to the city in the event of a grid outage.

Currently, the time required for the Cat generators to ramp up and fully load is about 15 minutes. Once the substation rebuild is complete and the transmission line is able to carry higher voltage, it should only take about five minutes, Eves says.

“There’s an energy market that we need to be able to play in, and that’s five-minutes real-time,” Eves says. “So that’s where we really need to be.”

Clean operation

The Utah Valley is prone to an inversion that traps pollutants and leads



“From all the indicators I’m seeing, there’s going to be a huge need for a product like this that is load following, can ramp quickly, and come offline quickly.”

JOEL EVES
Power Department Director
Lehi City Power



to a visible haze, particularly in the winter months. Much like the new Cat power plant in nearby Provo, Lehi is now one of the cleanest running plants in Utah, Eves says.

“You have to understand the area we’re in to appreciate what that means because we’re in a very poor air quality area—especially in the winter when the inversion locks everything in, Eves says. “So, to have the Utah Department of Air Quality say we’re clean enough to run 24/7 365 for our whole plant is amazing.”

Based on peak demand, the new generation facility can generate less than 10 percent of the energy needs for Lehi’s 20,000 power customers. The facility has room to expand, and could eventually accommodate three more G3520H gensets, plus two more 4 MW units. Eves



says Lehi will reevaluate its power needs within the next five years and make a decision on expanding the plant.

“As fast as we’re growing, we knew we needed a whole new facility,” Eves says. “We knew we had to have additional capacity and make the generation facility larger than we need today. As we move forward and gain more experience running the plant, market forces will dictate our next move.”



CUSTOMIZED SOLUTIONS

NEW TEAM OF CAT® ENGINEERS DEVELOPS COMPLEX, DESIGNED-TO-ORDER SOLUTIONS

A new team of Caterpillar experts positioned to support the Cat® dealer network by designing sophisticated, customized power solutions for customers and consulting firms was launched this fall.

Initially deployed in North America, Caterpillar's energy systems engineers have decades of experience in the design, specification, installation, commissioning, and maintenance of a broad spectrum of power technologies.


They engage in complex applications to select the appropriate combination of power technologies that deliver reliability, flexibility, and expandability as well as optimized owning and operating costs.

"Caterpillar has a comprehensive portfolio of power technologies, from traditional diesel- and gas-fueled generator sets to advanced controls, paralleling switchgear, renewables, energy time shift and grid stability modules using the Cat

Bi-Directional Power Inverter, and remote monitoring systems," said Joel Feucht, general manager for Caterpillar's Large Electric Power Division.

"Our energy systems engineers have the field-proven industry experience and deep product knowledge needed to develop individually tailored, fully integrated power systems that support our customers' success."

Customers should contact our dealership to learn more about how to engage this new team of energy systems engineers for consulting work.

Caterpillar supplies innovative power systems engineered to deliver exceptional durability, reliability and value. Dealer service technicians are trained to service every aspect of Cat equipment. The company offers worldwide product support, with parts and service available globally through the Cat authorized service and dealer network. 

For more information, contact our dealership or visit cat.com/engineeringmatters, or e-mail Electric_Power@cat.com.



CAT® G3516C GENSETS RUN ON LEAN COAL MINE METHANE GAS

In 2008, Jincheng Anthracite Mining Group Co., Ltd. (JAMG), a Chinese coal mining company based in Jincheng, Shanxi, China became the largest coal mine in China to use coal mine methane to produce power generation for their mine site.

For years, Chinese mining companies have utilized coal mine methane (CMM) to produce power generation for mine sites.

CMM is a byproduct of coal formations in subterranean coal seams and is released before or during active coal mining. CMM can be hazardous to miners if not properly managed. Typically, this means venting the CMM into the atmosphere or burning it off in a flare.

However, methane is a greenhouse gas with more than 20 times the global warming potential of carbon dioxide, so its release into the atmosphere is considered harmful.

Jincheng Anthracite Mining Group has first-class experience in machine selection, construction solutions, and equipment operation management. A long-time Caterpillar customer, JAMG formally commissioned their first power generation plant in 2008 using 60 Cat® gas G3520C generator sets, Cat paralleling switchgear and controls after completing a five-year development project.

By capturing the previously vented methane gas and converting it into electricity, the Cat generator sets significantly reduce greenhouse gas emissions while also improving the capacity of the local power grid.

The Jincheng installation—the largest CMM power plant in the world—has demonstrated numerous benefits since its formal commissioning in 2008. The plant provides power to the electric grid that is equivalent to the demand

of more than 500,000 Chinese homes. This project has also created hundreds of employment opportunities for the local community in Jincheng and the surrounding areas.

Lower methane an issue

As JAMG continues to expand their mine sites and power generation, the company has met with unique challenges. When they first began using CMM to generate power, the concentration of the methane was around 55 percent.

However, in new sites currently being developed at the mine, methane is diluted to 12 to 16 percent concentration. When methane concentration is high it's easy to burn as fuel in an engine. But when it gets down to 12 to 16 percent, it becomes classified as lean coal mine methane gas (LCMM) which requires engine adjustments and supplemental fuels. JAMG has faced an issue with the methane levels where the existing generators are unable to run at full load, decreasing efficiency of the power generation.

In the first phase of the power expansion, six 1000 kW gensets were used, and the pump station had excess gas, so the customer prepared for the second phase. When choosing the equipment, the investment price was not the only consideration. JAMG made a comprehensive assessment of overall owning and operating costs, emissions, and technical development.

Ultimately, they purchased four Cat G3516C low-concentration gas (LCMM) generator sets with power outputs of 1555 kW each. The Cat® G3516C is optimized to run on lean coal mine methane (LCMM) for local mining applications.

“Having the ability to manufacture the LCMM generator sets will provide significant benefits to our local customers,” said Peter Lau, sales manager of the Asia Pacific Region for Caterpillar Energy Solutions. “For the customer, the start of dedicated production from Tianjin will mean shorter lead and delivery times, enhanced product support, and optimized cost efficiencies.”



CUSTOMER PROFILE

Jincheng Anthracite Mining Group Co., Ltd. (JAMG)

Location: Jincheng, Shanxi, China

Application: Coal mine methane

Cat® Equipment: 3520C CMM generator sets (111), G3516C LCMM generator sets (20), Paralleling Switchgear and controls



The G3516C generator has been optimized to burn LCMM, saving customers from additional adjustments that had to be made in the past.


Through the comparative operation of different gensets in Phase I and Phase II, JAMG made an objective evaluation. Cat gensets run stably, with 100 percent power output and power generation efficiency of nearly 40 percent. NOx emissions meet environmental requirements. The genset is highly automated, providing low operating and maintenance costs and low cost of management.

The expansion uses the low-concentration gas in the Duanhe gas drainage station of JAMG's Chengzhuang coal mine. The gas delivery system uses gas-water, two-phase flow delivery technologies, providing a pressure of 12 kPa before entering the genset gas train.

After installation and commissioning in December of 2018, the G3516C generator sets operated approximately 2,380 hours as of early March 2019. With 2,380 hours of operation the accumulative power generation was at 13,076,843 kWh, with an effective use ratio of 91-93 percent, the expected annual effective operating hours should total about 8,000.

The economic benefits are significant. In subsequent projects, the imported Cat genset is preferred.

JAMG is now the world's largest gas power generation corporation, with an installed capacity of nearly 300 MW. It has used 121 high-concentration gas gensets supplied by Caterpillar and 28 (1000 kWe) low-concentration gas gensets from a Chinese manufacturer.

Additionally, JAMG purchased 17 more G3516C LCMM generator sets earlier this year to meet anticipated demand. 

THE REMOTE MONITORING ADVANTAGE

CONNECTED SERVICES ARE A QUANTUM LEAP FROM SCADA SYSTEMS

The days of technicians monitoring generator sets by reading gauges and turning dials or wrenches to make adjustments are long gone.

Years ago, Supervisory Control and Data Acquisition (SCADA) systems replaced most manual checking of performance, fine-tuning of operations, and storage and analysis of data. But today, SCADA is being eclipsed by remote monitoring and control via internet and wireless communications.

Remote monitoring, also commonly called “connected services,” is increasingly accepted for distributed generation sites. Among many benefits, it enables operators to receive continuous data on engine and electrical parameters, receive real-time alerts and alarms, detect engine or generator faults that could threaten a shutdown or failure to start, and generally optimize performance.

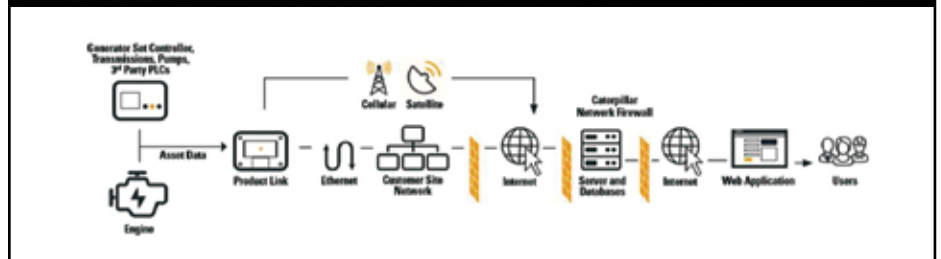
Diverse applications

Distributed generation is growing as electric utilities increasingly rely on decentralized power sources. These can include not just gas or diesel generator sets and turbines, but also wind and solar installations, with or without energy storage. Some installations combine two or more of these sources, providing flexibility to optimize cost, sustainability, and other imperatives in meeting normal and peak electric energy demand.

Distributed resources may or may not be connected to the grid. Common settings include small municipalities, universities, military bases, heavy industries (especially where utility power is unreliable), remote mine sites, small utilities, and independent power producers looking to supplement their centralized generation assets.



END-TO-END ARCHITECTURE OF CAT CONNECT TECHNOLOGY AND SERVICES



All of these, plus backup power systems for hospitals, data centers, and other facilities where uninterrupted power is critical, are candidates for remote monitoring.

Advantages over SCADA

The benefits of remote monitoring significantly exceed those of SCADA systems. The primary function of SCADA is basic control and the setting of limits for alerts and alarms.

Typically, a SCADA system exists inside the facility firewall, so there is limited ability to extract data to the outside and to monitor and compare gensets across multiple sites. The ability

to trend data over time is also limited, usually to about 30 days.

On the other hand, remote monitoring systems such as Cat® Connect from Caterpillar, can monitor an essentially unlimited number of gensets at sites around the world and display them in a single dashboard view. It can synthesize data across multiple sites and geographic areas and help users compare the performance of sites and individual assets. An entire year of data is retained for trending and analysis. In addition, data can be archived for up to 10 years, enabling users to compile extensive reports for compliance documentation and for internal and external audits.

On a basic level, remote monitoring provides more proactive oversight than SCADA typically can. For example, trending capability can detect a condition, such as an obstructed air filter or deteriorating oil or other fluid, before a SCADA alarm is triggered. Acting on this information, staff can handle maintenance and repair before a serious failure occurs.

On a deeper level, remote monitoring lets users combine machinery data with business data to support more effective problem-solving and make better-informed operating decisions that further strategic goals. Remotely collected data can be fed to a web-based asset

extra engineering to create the necessary configuration files because there is no single industry standard for remote monitoring in electric power applications.

A remote monitoring deployment starts with a site assessment that takes an inventory of the gensets, their controls, and the data those controls collect. The results determine the complexity of the required engineering needed to create the desired configuration files. The next step is to test the data to verify that it accurately reflects the generator set operating parameters. Once engineered, deployed, and tested, a remote monitoring application such as Cat Connect can monitor a genset fleet

of operating data. The arrival of virtual reality (VR) and augmented reality (AR) make such presentations seem primitive by comparison, like first-generation video games.

VR and AR help users process and contextualize data by presenting it in three dimensions. For remote troubleshooting, for example, it is already possible for an engineer at a remote monitoring provider to have a digital twin of a genset on screen, overlaid with machine data. Meanwhile, a technician stands in front of the physical genset, but with a matching 3D image on a tablet computer, again with machine data overlaid. This kind of



Remote Monitoring enables operators to receive continuous data on engine and electrical parameters, receive real-time alerts and alarms, detect engine or generator faults that could threaten a shutdown or failure to start, and generally optimize performance.

monitoring application for analysis that helps drive business insights.

Remote monitoring can also help distributed generators deal with the coming wave of retirements among domain experts in power facilities. It enables a smaller number of skilled people to exert control and provide support across multiple facilities and large geographies.

Simple to implement

The monitoring technology itself is relatively simple. Machine data is captured and stored in the generator set controller. A configuration file translates that data into language that can be read by the monitoring application. A telematics device then sends the data to the application as often as once per second for the operators to view and analyze.

Connecting a manufacturer's current-model genset controller to its own remote monitoring application (for example, a Cat generator set to Cat Connect) is generally a simple half- to four-hour procedure. Connecting an older-generation controller, or another manufacturer's controller, may require

of essentially unlimited size with units of different ages and from a diverse mix of manufacturers.


Cat Connect technology's (Product Link™ hardware) end-to-end system is designed with multilayer security controls and safeguards to protect against unauthorized access and disclosure.

Remote monitoring does not completely relieve operators of physical site and equipment inspections. While most data is captured digitally, visual inspection remains valuable for detecting abnormal conditions such as leaking fluid or corroded battery terminals. This information can be merged with remote monitoring data to help operators proactively identify issues that would likely cause downtime or prevent a generator set from starting.

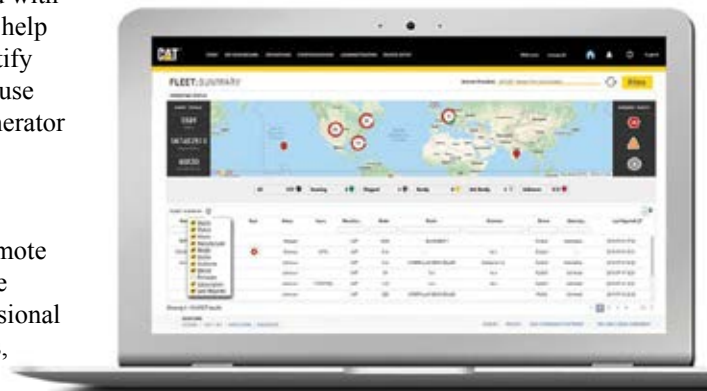
The future is here

Today's SCADA and remote monitoring systems feature interfaces with two-dimensional graphics, alarms and alerts, and simple overviews

collaboration can significantly help the two parties solve problems.

Irrespective of those developments, remote monitoring for distributed generation is here to stay. Given its relative simplicity and low cost and the value users can derive, it has become an essential tool for extracting and maximizing the many business advantages of distributed power applications. 

For more information, contact the power systems experts at our dealership.



GUARANTEED PERFORMANCE

Finning Canada monitors the performance of customers' generator sets across Western Canada with Cat® Remote Asset Monitoring

When a customer commissioned Cat® Finning Canada to provide a 12 MW temporary power plant last summer, a critical component of the project was the ability to provide continuous power for three months while crews worked to replace an aging transmission line.

To ensure 100 percent reliability, Finning guaranteed uptime of the plant through its use of Cat Connect Remote Asset Monitoring (RAM), which provides real-time collection and remote monitoring of site performance data in distributed energy and rental applications.

“On a project such as this, reliability and uptime are important, and with Cat remote monitoring you can see fault codes and know instantaneously that something has happened,” says Amber DeJong, a Cat rental power rep for the western region of North America. “You can monitor how much load is on each generator set, as well as check fuel levels.”

Providing data, visualization, reporting, and alerts from anywhere in the world through an easy-to-use web interface, this technology helps equipment operators and Cat dealers track and manage system operations. With RAM, dealers and power customers can:

- Flag potential problems
- Perform remote troubleshooting
- Record archives of long-term site performance history
- Use data to optimize the system and run at peak performance

“The Cat RAM remote asset monitoring dashboard is a user-friendly way to look at the current operating status of generator sets,” DeJong says. “You can flip through the screens, look at the different generators, unit by unit, or as a group. You can monitor the entire dealer fleet, or just monitor a specific



site or a specific customer or group of customers.”

Finning Canada’s power systems division has utilized conditioning monitoring since 2016. It started with two condition monitoring analysts, and has evolved into a department with six analysts who continuously monitor the performance of customers’ generator sets from a dedicated office in Edmonton, Alberta.

Finning is currently monitoring the generator sets of 63 customers who are connected through the Cat RAM technology, says Olivier Viel, a condition monitoring manager for Finning.

“We are actively monitoring the status of our customers’ generators every day, and we are prepared to monitor the entire fleet as customers choose to connect their assets to the RAM technology,” Viel says.

With six XQ2000 generators that powered the 12 MW temporary power plant, as well as transformers and two 19,813-gallon diesel fuel tanks, having additional backup was important to ensure uninterrupted power to the remote area.

“We had not only our operators onsite making sure all the daily maintenance and checks were done properly, but we also have our people continuously monitoring the condition of the units real-time back in Edmonton,” says Mike Kuzminski, an industry manager for Finning’s rental power division.

“Our analysts in Edmonton can provide real-time feedback to our technicians in the event they see something cropping up that we can recognize in advance which could lead to a shutdown,” Kuzminski says. “So, it plays a significant role in our reliability.”

If any faults pop up, the condition monitoring analysts will see it right away and notify the customer or a Finning technician in the field.

“And in case one of our technicians might be missing something directly while he’s at site, there will be a phone

fleet monitoring, which provides live troubleshooting on issues that may or may not arise on a generator set.

“A lot of customers are not actively monitoring their equipment for issues, so we remotely monitor it for them,” Roshau says. “We’re able to



call placed to the technician or to myself, and we will further investigate the issues and correct them as needed,” says Nathan Biederstat, a field service supervisor for Finning Power Systems in Calgary.

“Having our fleet connected to remote asset monitoring really gives us a second set of eyes to view the equipment and provide real-time status back to our team in the field,” Kuzminski adds. “By knowing the condition of the units, we can schedule preventative maintenance in advance.”

According to Brad Roshau, a condition monitoring analyst in Finning’s Edmonton office, the greatest benefit to the customer is remote

address issues before they turn into real problems and cause unexpected shutdowns. We can get in touch with our customers directly and protect their equipment by letting them know what’s going on and get one of our technicians out to service the generator set right away.”

Ultimately, Cat Connect with Remote Asset Monitoring is a form of insurance for customers who are either renting power or have permanent installations.

“They can concentrate on their business,” Roshau says. “And we are here to make sure their power systems or rental units remain in peak operating condition.”

“Having our fleet connected to remote asset monitoring really gives us a second set of eyes to view the equipment and provide real-time status back to our team in the field.”

MIKE KUZMINSKI
Industry Manager
Finning Canada - Rental Power Division



MORE VALUE, LESS STRESS

Extend the life of your product with hassle-free maintenance, easy access to asset information, expert advice on equipment and operation, component protection, and single monthly payments.

Contact your local Cat® dealer to sign up for a Customer Value Agreement, or visit us at www.cat.com/cva to sign up for FREE Cat Connect Remote Asset Monitoring (limited time offer).



© 2019 Caterpillar. All Rights Reserved. CAT, CATERPILLAR, LET'S DO THE WORK, their respective logos, "Caterpillar Yellow", the "Power Edge" and Cat "Modern Hex" trade dress as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission.

CAT[®]
LET'S DO THE WORK.™