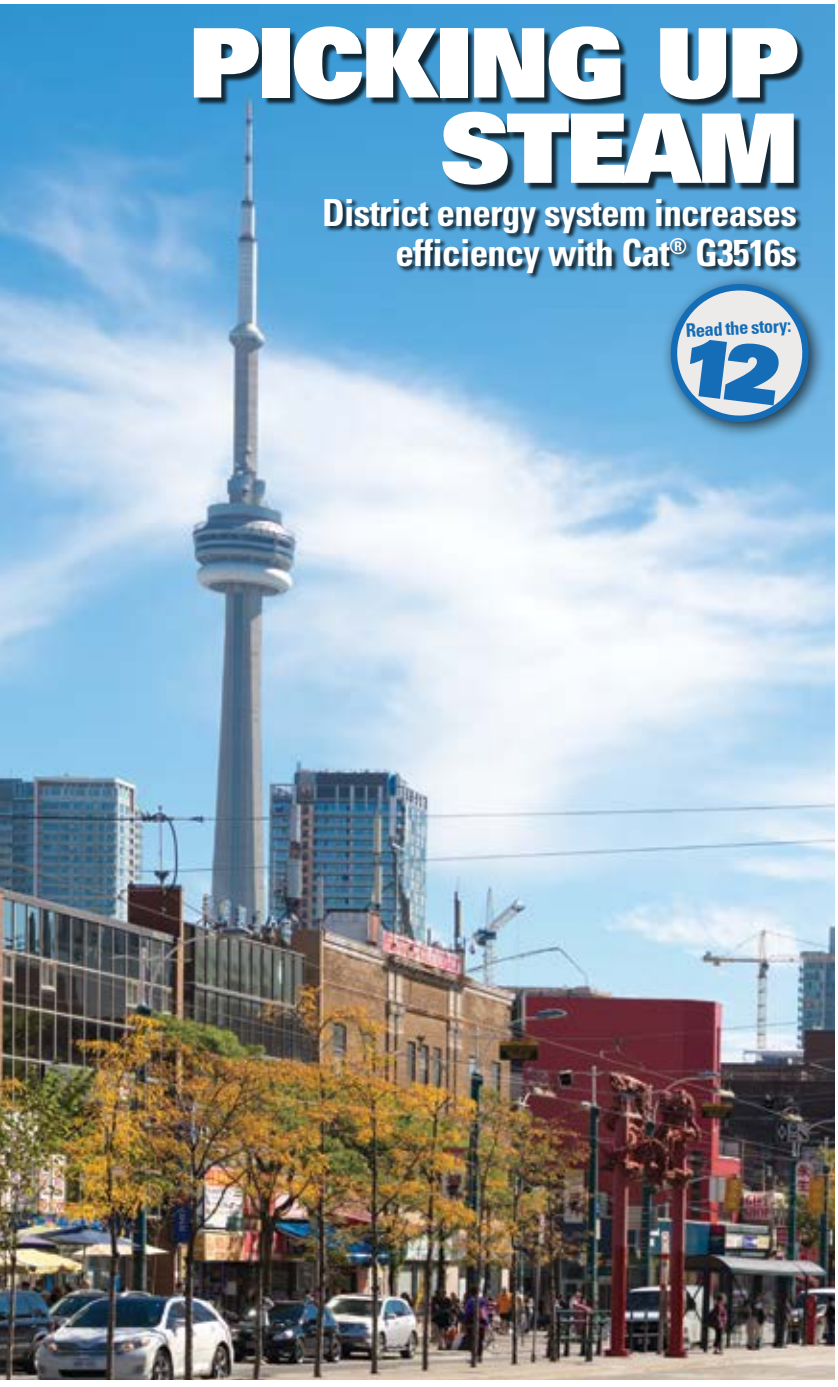
RUNREADY™



TOROMONT Power Systems CAT®

www.toromontpowersystems.com

BACKUP PLAN

BUSINESSES WEATHER HURRICANE HARVEY WITH CAT® RENTAL POWER

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Hurricane Harvey caused mass destruction when it hit the Texas Gulf Coast on Aug. 25 as a Category 4 hurricane with sustained winds of 130 mph near Rockport, Texas. Then, Harvey meandered around southern Texas for days as a weakening hurricane and tropical storm, dropping 40-61 inches of rainfall in southeast Texas and creating catastrophic flooding in the greater Houston area.

All told, the storm caused 82 deaths and an estimated $180 billion in damage. An estimated 13 million people were affected, with 135,000 homes damaged or destroyed, and up to a million cars affected by the flooding. Harvey caused significant disruption to the electrical grid of south Texas, the Energy Information Administration (EIA) reported, knocking out power to hundreds of thousands of residents for an extended period.

At the storm's peak, outages affected more than 10,000 MW of capacity, and a substantial number of transmission and distribution lines were downed. EIA reported the outages were mostly caused by rain or flooding, affecting generator fuel supplies, outages of transmission infrastructure and personnel unable to reach the generating facilities. Most of the transmission line outages, including six 345 kV lines and more than two hundred 69 kV–138 kV lines, were in the immediate area along the Gulf Coast where the hurricane made landfall.

As ground zero for Hurricane Harvey, the coastal communities of Rockport and neighboring Fulton received some of the worst wind and storm surge damage from the Category 4 storm.

"It was amazing the stuff that was down and the destruction to the trailer homes and the other stuff that wasn't tied down," said Brian Brock, sales manager for Builder's First Source, a lumberyard in Rockport. "It was just an ugly storm. It was very concentrated.

"We were hit really hard and had no power, no water and no gas to start back up," Brock recalls. "So we went back to the old school method by issuing hand tickets—load yourself, come back later and pay us because we didn't have any credit card processing capabilities and people couldn't get cash. We wrote it down, and people took what they needed.

"But the big thing was getting power up here, and that's where Holt Power Systems came in and helped us immensely, providing a rental generator set so we could get going again."

Contingency plan

Businesses that secured Cat® Rental Power before the storm not only helped themselves, but were able to help others in the wake of Hurricane Harvey.

Scott Milligan, president of Energy Rental Solutions (ERS), a Cat dealer in Houston, says that many oil and gas companies have contingency plans in place in preparation for a storm.

"We do hurricane plans down here in Texas and on the Gulf Coast, so many of our customers, particularly in the oil and gas industry, have emergency plans in place." Milligan said. "When it arrives in the Gulf, they start to make some preparations. So we had some plans in place already with a number of customers."

But not everyone has a backup generator or a contingency plan in place. The reality is, the majority of businesses are in a race against time to find a generator and keep the power on after a storm hits.

Northeast of Corpus Christi, a grocery store in the small community of Woodsboro was in the eye of the storm.

"It was scary, we could hear the ceiling joists popping in the roof," said Cody Tuttle, of Tuttle's Grocery & Market. "We had plywood over the plate glass windows in the front, but they were flexing back and forth with the pressure from the storm. It was a long, long night."

Tuttle made 60 phone calls before he was finally able to secure a rental

Continued on page 4

Junior Medrano and Rene Sanchez of Almeda-Genoa Constructors inspect a rental power generator set provided by ERS Cat.

generator set through Holt Cat. With the help of a local electrical contractor, Tuttle Market disconnected from the grid a day before Harvey hit, and ran continuously on generator power through the storm and for twelve days altogether.

"With Caterpillar's help, we were basically the only one in the county that was really prepared for this," said owner Stanley Tuttle. "I've been thinking about buying a generator for several years, but just never made the investment. "But I knew that I better have some backup power if I wanted to avoid losing thousands of dollars of inventory."

In the wake of the storm, nothing was open in Refugio County. Gas stations were left in ruins, while fast food restaurants were destroyed.

"That Saturday afternoon, we were able to open up and people who went without electricity for 18 to 20 hours were able to come here for lunchmeat, bread, water and other foodstuffs," Cody Tuttle recalls. "We were the only store open in the whole county. We had lines down both aisles."

Transportation planning

Contractors working on the $815 million State Highway 288 toll road expansion in Houston utilize large office trailers that are not connected to the power grid.

"We have a primary and a backup generator, so we were prepared," said Junior Medrano, an equipment foreman with Almeda-Genoa Constructors, a joint venture building the toll road on the south end of Houston. "We were ready to go. So if anything bad happened, which it did, we had backup ready. Even our primary generators never failed us.

"ERS Cat did help us out," Medrano said. "They had one of their guys come in here and just go ahead and run all the wiring, and it was pretty much plug and play. All we had to do was just make the phone call, and ERS took care of everything else."

Continued operation of a batch plant is very important to the 288 project, as day in and day out, concrete is constantly being delivered to the jobsite, notes Rene Sanchez, assistant equipment manager with Almeda-Genoa Constructors.

"For the duration of the hurricane, the batch plant never went down because of the support of the Cat generators," Sanchez said. "And neither did our work trailer compound."

In Victoria, Texas, auto dealer Mac Haik Ford was able to resume selling cars the Thursday after the storm.

"A lot of people needed some vehicles to get back going, so we were very fortunate to be able to help them," said sales manager Greg Gunn. "It was really nice to be able to get up and going and have power, even though businesses around here didn't get the power turned back on for another four or five days.

"Because we had power from our Cat rental generator, we were actually able to produce and store ice and different things here," Gunn said. "We ended up serving as a donation drop for some of the victims who were affected by the hurricane.

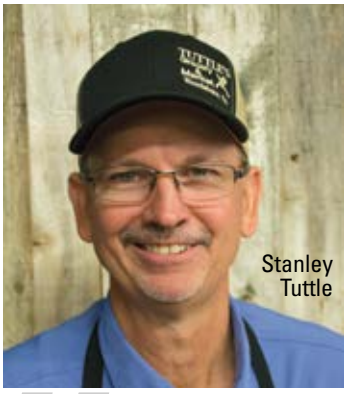
Storm preparedness

With the intensity and frequency of tropical storms in 2017, businesses are rethinking their storm preparedness plans.

"We have protocol on what to do before a disaster hits, and that's protecting the store and doing certain things like moving vehicles," Gunn says. "But one thing that really needs to be addressed is having power ready to go, having a contract in place, so we're on standby and have a relationship with a company that can provide a rental generator if a storm is going to hit—because we forget how much we need the power."

Next time a hurricane or tropical storm hits, Stanley Tuttle plans to be ready. He knows he was fortunate to have rental power at the ready this time around, both to save inventory and serve as an emergency food source.

"Immediately after the storm, people here were in dire need," he says. "And without Holt Cat's help, we wouldn't have been able to help the community the way we did."


Stanley Tuttle

"WITH CATERPILLAR'S HELP, we were basically the only ones in the county that were really PREPARED FOR THIS."

STANLEY TUTTLE
Owner
Tuttle's Grocery & Market

BEEF IT UP

SNACK MAKER CONVERTS WASTEWATER TO ENERGY

As a byproduct from making beef jerky and other pickled products, Monogram Snacks has leftover oils and fats that need to be disposed of. In the past, that liquid waste stream was sent to the local wastewater treatment plant in Martinsville, Virginia.

But as a result of increased production, the food processing plant started incurring high monthly surcharges from the Henry County Public Service Authority for processing Monogram's wastewater, which exceeded levels of total suspended solids (TSS) and biological oxygen demand (BOD).

That quandary drove the need to develop or find a solution that would prove less costly in the long term. With the help of two consulting engineering firms, Monogram elected to start construction of an in-house wastewater pre-treatment facility in May 2016.

Continued on page 6

CUSTOMER PROFILE

Monogram Snacks

Site Location: Martinsville, Va.

Application: Wastewater/ pre-treatment

Cat® Equipment: CG132-08 gas generator set

Monogram

Cat® CG132-08 genset

When it began operating the new clean energy plant in June, Monogram Snacks started funneling the waste stream downhill to an anaerobic digester.

A day's worth of production water (75,000 gallons) from Monogram Snacks is run through the waste treatment system. The digester also breaks down 3,000 gallons per week of grease, and another 19,000 pounds per week of inedible solid waste.

The waste is broken down in the digester and converted to methane gas, which is used to fuel a Cat® CG132-08 gas generator set that is capable of producing 400 kW of electric power.

Currently, the generator set is running at half its designated power rating and producing 200 kW of electric power that is used to power the waste treatment facility.

"With the addition of our bioenergy production capacity, Monogram now has the ability to capture and convert that methane gas into a renewable form of electrical energy," says Brian Neal, manager of environmental health and safety for Monogram Snacks.

The treated water is returned to the Henry County facility for further treatment.

"The last time that we tested our BOD, it was running at about 155 mg/L, so we've really come down a lot with the BOD level," says Jerry LaPrade, Monogram's maintenance wastewater operator. "Before, the suspended solids level was 1,000 mg/L, and I believe my last solids count was 110 mg/L, so you can see where we're at now compared to where we were before. So now we are well under our surcharge limits."

Beyond serving an important need for waste treatment, Monogram's clean energy plant reduces net carbon emissions by 2,687 metric tons a year by reducing the use of fossil fuel-derived electric and natural gas for heating. The environmentally safe digestate from the pre-treatment process is trucked off site and applied to agricultural lands in the Shenandoah Valley to fortify the nutrient content.

Production workers prepare beef sticks at Monogram Snacks.

"It's a huge cost savings for us because we're not paying nearly as much as we otherwise would for our electric utility bill to operate the clean energy plant."

BRIAN NEAL
Manager of Environmental Health and Safety
Monogram Snacks

Biogas Project of the Year

In naming the Martinsville plant as the "Biogas Project of the Year" for 2017, the American Biogas Council recognized Monogram's clean energy plant as a model for financial ingenuity, energy efficiency and sustainable waste treatment.

The total project cost of approximately $12 million was financed through a combination of bank loans, $1 million in sponsor capital, New Markets Tax Credits and Investment Tax Credits.

"It's a huge cost savings for us, because we're not paying nearly as much as we otherwise would for our electric utility bill to operate the clean energy plant," Neal says.

Adds LaPrade, who operates the clean energy plant on a daily basis:

"We knew we had to treat the wastewater, and it would produce methane. Either we had to just burn it in a flare—but you can't release methane into the atmosphere—or get a Cat generator and run it on methane. So now we're producing heat and electricity, and it's a win-win for everyone."

The Cat genset is equipped with both jacket water and exhaust gas heat recovery systems, and generates 1.4 MMBTU/hr (409 KWT) of heat energy, which is used to heat the digester.

Flexible fuel usage

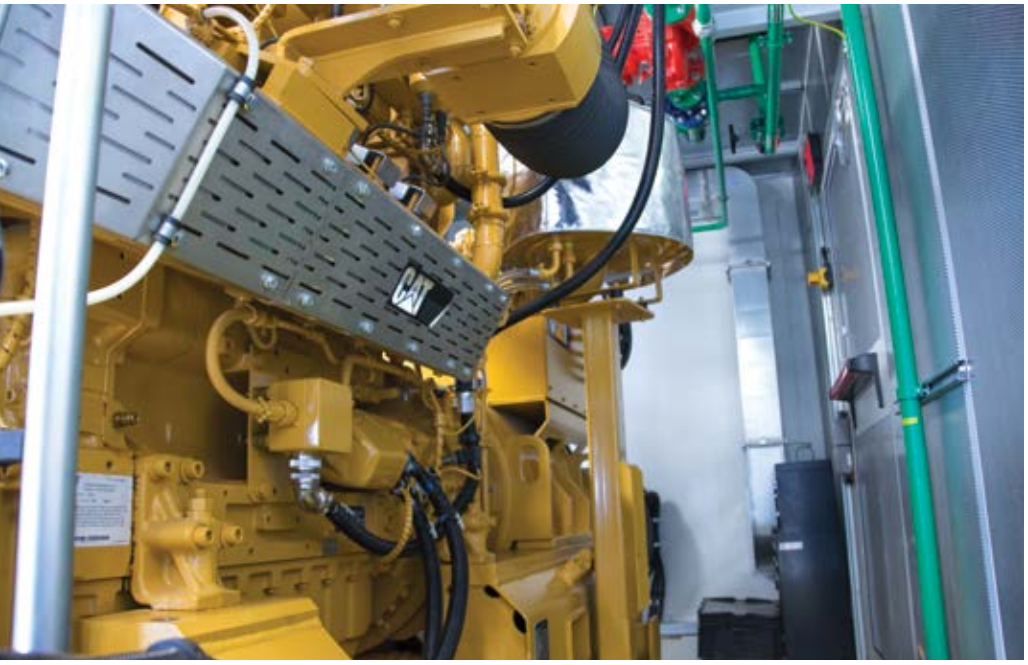
The Cat CG132-08 generator set engine was built in Mannheim, Germany, and delivered to Monogram as a complete package, with the generator and switchgear installed inside the enclosure.

The CG132-08 is designed to run on biogas, which tends to have a lower methane number, says David Morel, gas

Continued on page 8

engine business development manager for Carolina Cat Power Systems. Thanks to built-in gas mixer technology and the Cat Total Electronic Management System, the engine can still run effectively on a lower concentration of methane.

"Caterpillar's engine division in Germany has developed this over many years of practice in Europe, and it's just



a great engine for this application—it's a very heavy-duty engine," Morel says.

The consulting engineering firm, CHA Tech Services, elected to use Carolina Cat as the equipment vendor on the Monogram clean energy plant due to its planning and expertise on multiple biogas projects across the U.S.

"We know how to project manage something like this, which can tend to be a little bit complicated," Morel says. "One of the biggest challenges for a project like this is making sure that you get the right equipment designed for the right flow rate and the right kW, and also that the heat exchangers are designed for the flow rate of the heat that they need for this project. So that all has to be designed up front, and that takes time and technical expertise to get it done correctly."

While plans call for expanded production at Monogram, until then, the snack maker is looking for outside sources of waste to produce more methane and increase the output of electric power.

Technical support

In the meantime, Carolina Cat Power Systems is providing technical support and periodic maintenance, including checking spark plugs for wear, conducting voltage regulator checks, greasing the generator bearings, and taking coolant and oil samples.

During the startup and commissioning phase, Carolina Cat provided a classroom training session for Monogram. Product support rep Tom Wommack conducted a review of the operation and maintenance manual of the generator set and the switchgear.

"After the classroom setting, I take them out to the generator set and walk them through the day-to-day functions, pointing out what they need to pay attention to," Wommack says. "Then we'll actually put the generator set online and put it in basic day-to-day operation for them."

Trained technicians from Carolina Cat Power Systems are available to support Monogram at any time. All LaPrade needs to do is place a call to Womack indicating that he needs help.

MONOGRAM FOODS

Monogram Food Solutions produces and distributes packaged meat products, snacks and appetizers.

A broad portfolio of products includes beef jerky, sausage, hot dogs, pre-cooked bacon and other processed food items. Monogram brands include Circle B®, King Cotton®, and Trail's Best Meat Snacks®. Its products are offered through retailers/vendors and partners in the United States.

Monogram Food Solutions, LLC was founded in 2004 and is based in Memphis, Tenn. The company has eight facilities in Boston, Bristol, Ind.; Harlan, Iowa; Chandler, Minn.; Martinsville, Va.; Plover, Wisc.; and Schulenburg, Tex.

Since 2005, Monogram Foods has been named to the Inc. 5000 list of fastest growing privately held companies for eight years. The company has achieved a 42 percent compounded annual growth rate since it was founded.

Based in Martinsville, Va., Monogram Snacks is a 160,000 square-foot plant with a 180,000 square-foot finished goods warehouse. Since 2009, the plant has undergone more than $50 million in capital improvements, including seven new production lines.

"The Cat unit runs extremely well," LaPrade says. "We're learning as we go, but whenever I've picked up the phone, I've been able to reach someone, and they get back to me in a relatively short period of time. They've been good."

SUSTAINABLE APPROACH

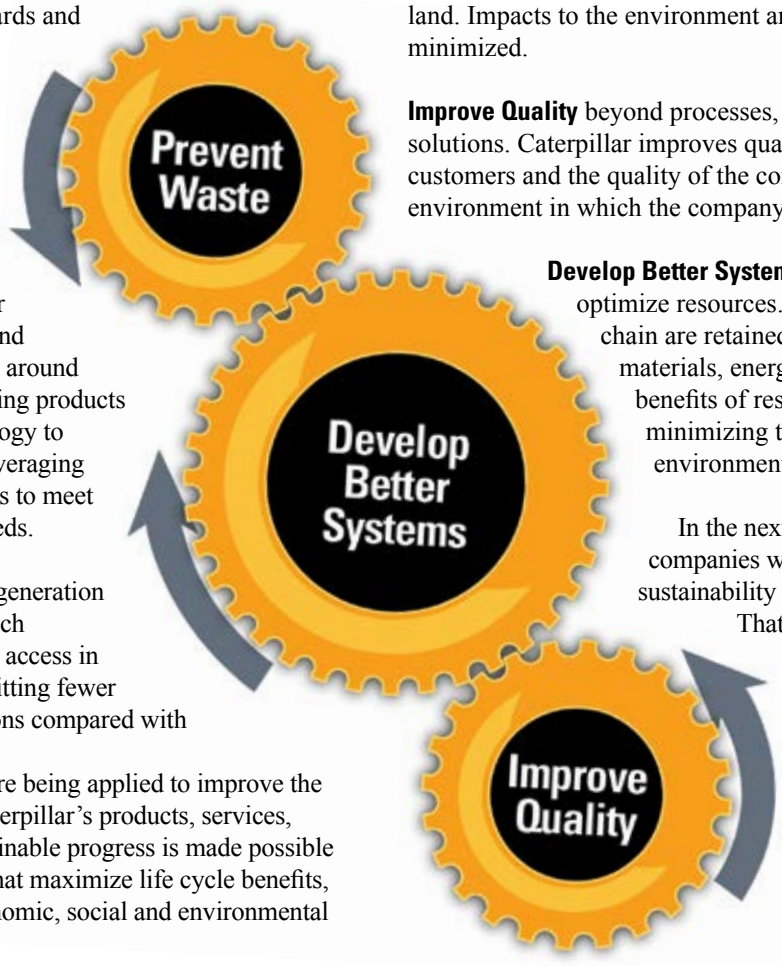
CATERPILLAR INTEGRATES SUSTAINABILITY INTO ITS CORE BUSINESS

Energy is a key requirement for sustainable progress and development around the world. Global demand for energy is expected to increase significantly over the next 25 years, based on projections from the International Energy Agency. Energy consumption is rising rapidly, driven by worldwide population growth, swiftly developing economies, improving global living standards and the rapidly increasing use of ever more energy-dependent technologies.

As a global energy consumer and industrial manufacturer, and a major manufacturer of energy conversion and power-generation products, Caterpillar has a fundamental interest in, and understanding of, energy needs around the world. Caterpillar is providing products with leading integrated technology to various energy markets, and leveraging its technologies and innovations to meet the world's growing energy needs.

Caterpillar has implemented hundreds of distributed power generation systems all over the world, which contribute to improving energy access in developing countries while emitting fewer greenhouse gas (GHG) emissions compared with traditional power grid systems.

Innovation and technology are being applied to improve the sustainable performance of Caterpillar's products, services, solutions and operations. Sustainable progress is made possible by developing better systems that maximize life cycle benefits, while also minimizing the economic, social and environmental costs of ownership.



SUSTAINABILITY PRINCIPLES

Three principles guide Caterpillar's commitment to make sustainable progress possible:

Prevent Waste by improving the efficiency of products, processes, services and solutions—not only reducing cost, but also minimizing use of materials, energy, water and land. Impacts to the environment and communities are also minimized.

Improve Quality beyond processes, products, services, and solutions. Caterpillar improves quality of life for its employees, customers and the quality of the communities and the environment in which the company operates.

Develop Better Systems that integrate and optimize resources. Resources in the value chain are retained through a circular flow of materials, energy and water. The life cycle benefits of resources are maximized, while minimizing their economic, social and environmental costs.

In the next decade, the most successful companies will be those that integrate sustainability into their core businesses. That's what Caterpillar is doing, and Cat dealers are helping customers do the same.

To learn more about Caterpillar's sustainability goals, please visit:
www.caterpillar.com/en/company/sustainability

ALWAYS PREPARED

PILOT FLYING J IS READY IN THE EVENT OF A STORM

We hope for the best, but prepare for the worst," said Curtis Dukes, Pilot Flying J facility support manager, as he started a conference call with managers of Pilot Flying J stores across the country.

With the next hurricane season in mind, the conference call served as a reminder to managers regarding what to do when inclement weather or other disasters strike near their locations.

Dukes, who leads the Pilot Flying J emergency preparedness and response team, reviewed the basics on how they should assess the situation, described when to shut off power or gas in a store, and gave managers general tips on how to navigate the aftermath

of a nearby disaster. All of this is done with one major goal in mind: make sure that Pilot Flying J stores are among the first, if not the first, places to open after disaster strikes.

"We pride ourselves on being the first store to open," Dukes says. "We set up hubs for emergency agencies to operate out of."

It's not just pride that necessitates an open Pilot Flying J travel center, it's also economics. The trucks for which the company provides fuel need to continue to their respective destinations to ensure their goods are delivered.

"Our biggest priority is taking care of our customers, and just because some type of weather activity happens doesn't mean those trucks stop running," Dukes said. "This country doesn't stop because of a natural disaster."

He keeps the weather channel on at all times in his office, and he has a team of experts that track daily forecasts and monitor any potential inclement weather. If an area is at risk for something big, such as a hurricane, the team rushes to get nearby Pilot Flying J stores ready.

"We make sure the stores have plenty of supplies to last, and a power source and a fuel line to the store," Dukes said. "There's a lot of collaboration that goes on with logistics, but a power source doesn't matter if we can't get a fuel line to the store."

As for the power source, the stores don't have onsite generators. Rather, Dukes arranges with Stowers Power Systems to rent portable generators, either from Stowers or through other Cat® dealers that may be closer to the store in need.

"We've had a solid communications pipeline with Stowers," Dukes says. "If we see something that's potentially going to happen and we start to plan for activity, we'll call Stowers. A lot of times, we look and see how the demand is. If supply is diminishing, we'll go ahead and secure extra generators."

The emergency team has been known to shift generators from one location to another as the winds literally change the path of a storm. Everything is as planned as possible, except for nature itself—

> **"Our biggest priority is taking care of our customers, and just because some type of weather activity happens doesn't mean those trucks stop running."**
>
> **CURTIS DUKES**
> Facility Support Manager
> Pilot Flying J

whatever nature throws at the team, they do their best to handle. There are 600 Pilot Flying J stores across the country, some in areas more prone to disasters than others. Dukes credits his own team, as well as collaboration with Stowers, for getting power generation resources to the right stores at the right times.

"Obviously the resources of the Cat dealer network are a big piece of the success, but I have to acknowledge the level of service that we receive from Stowers. They answer the phone promptly and go the extra mile to make sure they're communicating," Dukes said. "Somebody is always on the other end of the phone, even at 9 o'clock at night."

Besides having portable generators and a fuel line in place, Dukes' team has an electrician on standby to connect generators at a store. They're prepared for just about every contingency, and think on their feet when they can't prepare in advance. Dukes enjoys sharing one story about a Pilot location that had lost power. The store manager ran to the closest food store, bought some charcoal grills, and he and the employees cooked burgers from the store restaurant for all of the emergency workers and other nearby folks affected by the storm.

Because the stores are often the first places open and with power and fuel, they become hubs for emergency personnel, Dukes said.

"We work with local, state and sometimes federal government as a network operations center," he said. "We have food, we have showers, we have coffee, and we always allow them to use our facilities."

When the next disaster strikes, Dukes and his team will be prepared to be the first ones open in the aftermath.

HEAT WAVE

LEADING DISTRICT ENERGY SYSTEM ADDS CHP TO THE MIX

When Ontario shut down the last of its five coal-fired plants in 2014, it effectively legislated further development of renewable power resources to meet provincial energy needs.

Since 2005, Ontario has procured 570 MW of small-scale Combined Heat and Power (CHP) projects by providing government incentives that encourage development of CHP. The Ontario Power Authority underwrites projects that support economic development, while reducing carbon dioxide emissions.

Another factor contributing to the rise of renewables: While the existing fleet of nuclear power plants supplies 60 percent of Ontario's energy, the nuclear fleet is aging and in need of costly updates in the billions.

CUSTOMER PROFILE

Enwave Energy Corp.

Location: Toronto, Ontario

Application: Demand Response

Cat® Equipment: G3516H gas generator sets (2), ISO Switchgear

On a local level, ever increasing electrical loads within Toronto—resulting primarily from population growth and higher connected loads per person—continue to add strain to the existing transmission infrastructure within Canada's largest city.

Against the backdrop of an overburdened urban energy grid, Enwave Energy Corp. provides district heating and cooling to over 160 commercial customers in downtown Toronto via a 40-kilometer (25-mile) network of underground pipes that provides steam and chilled water. Utilizing water drawn from Lake Ontario, a closed-loop Deep Lake Water Cooling (DLWC) system recycles energy from downtown buildings by pumping over 80,000 gallons of water per minute at its peak to over 70 large customers and depositing that heat into the City of Toronto's potable water system. Enwave currently has the capacity to air condition over 3.4 million square feet of office space, with ambitions to grow significantly.

Meanwhile, Enwave's steam heat system sells more than 1.6 million pounds per hour of steam to over 140 commercial, government, hospital, university and residential buildings in downtown Toronto, representing over 40 million square feet of real estate. Furthermore, they are expanding their heating district to include high-efficiency hot water.

Pearl Street Energy Center

Gathering steam

Established 50 years ago, Enwave's Pearl Street Energy Center was one of the first steam plants built before the larger district energy system was established in downtown Toronto. Following a C$30 million modernization six years ago that added new, highly efficient boilers, the flagship plant in the heart of downtown Toronto supplies steam to all downtown hospitals, as well

as downtown condominiums and office buildings.

Earlier this year, Enwave increased the efficiency of the Pearl Street plant by adding two Cat® G3516H gas-powered generator sets. Electricity from the 4 MW power plant is exported to the grid based on the market electricity price as part of the Combined Heat and Power Standard Offer Program (CHPSOP 2.0), which provides government incentives to produce power at a lower cost than higher-priced grid power during times of greater energy demand.

Under a 20-year contract with the Ontario Power Authority, the gensets at the Pearl Street plant are expected to run up to 2,000 hours a year, particularly during the hottest and coldest days of the year when demand on the grid increases, says Kris Landon, Enwave's director of construction and project management.

"The government pays us to provide electricity when the cost to operate the generator sets is less than the cost of power from the grid—that's when we run these engines," Landon says. "And from what we've seen, that is usually during the summer peak days."

The Ontario Power Authority places high value on the heat component of

Continued on page 14

CHP plants, and views electricity as a byproduct. CHPSOP 2.0 participants must demonstrate that projects can achieve a useful heat output percentage of no less than 30 percent annually, starting after the third contract year.

At Pearl Street, heat from the gensets' exhaust is captured and used to generate low-pressure steam and hot water, thereby increasing efficiency by 33 percent as a result of not having to use a separate source of natural gas to warm up the water.

"A lot of these conventional power generating plants in the province produce electricity and give off a tremendous amount of heat, but they just let that heat escape into the atmosphere through a cooling tower or up the stack after the combustion process," Landon says.

"In our CHP system, we generate electricity first and then harvest the heat out of the exhaust gas so that we're actually doing two things at the same time versus just running," he continues. "We're doing the two processes together, so we're saving on natural gas and emissions because we're doubling up on a process."

Because the Pearl Street steam plant runs continuously—hospitals and medical facilities in the northern part of the district energy system such as Toronto General Hospital use a tremendous amount of steam year round—Enwave never has a problem with the generator sets not running enough to adequately utilize the waste heat, Landon says.

"The biggest thing with CHP is that you need a thermal host, and our thermal host is ourselves so we control that completely," he adds. "This plant operates 24/7, 365 days a year. So the Cat G3516Hs were a perfect match for us—they are highly efficient and reliable, and the biggest engines we could put down here in the basement."

The cold water from the DLWC system is utilized to cool the generator sets, thus negating the need for space-eating radiators or cooling towers on the roof of the three-story building.

"The fact that we have a 4 MW plant installed in downtown Toronto is

"It's the dependability that we've come to expect from Caterpillar, and our Cat dealer."

KRIS LANDON
Director of Construction and Project Management
Enwave Energy Corp.

Kris Landon

unbelievable," Landon says. "And the deep lake water cooling is the reason why it can be done, because we don't need any of that excess equipment."

Toromont provides technical expertise

The Pearl Street Energy Center has a cutting-edge process automation control system that connects to intelligent field instruments.

All of the boilers and ancillary equipment installed in the steam plant have to work seamlessly with the automated control system, Landon says. Because the primary purpose of the facility is to provide reliable steam service to Enwave's critical hospital customers, incorporating CHP into the control system can't negatively impact any of the operations of the Pearl Street plant.

"The CHP project was a very complicated installation—we put some very large engines into a very small place, and we had tremendous support from our partners at Toromont Power Systems and Caterpillar throughout the entire process," Landon says. "Everybody understood what our time and technical constraints were.

"Toromont really stepped up and brought in all their expert personnel to get these pieces of equipment up and running and hit our aggressive project deadlines," Landon continues. "Their technicians were very reliable, as they provided us with plenty of help right through our commissioning process to make sure that we had no problems or issues."

The Cat dealer will provide regular preventive maintenance on the generator sets as part of a five-year Customer Support Agreement. Enwave is counting on the technical expertise of Toromont technicians to provide timely service when needed.

"These Cat engines have to be operational because we could see the run-time hours on the CHPSOP model increase," Landon says. "So these engines need to be continually operational for us to hit the required hours and derive the full economic benefit from this system.

"We've had no complaints or problems at all," he says. "It's the dependability that we've come to expect from Caterpillar, and our Cat dealer."

ENWAVE ENERGY CORP.

Enwave was originally established more than 20 years ago as a non-profit cooperative, known as the Toronto District Heating Corporation, with a mandate to provide efficient, environmentally friendly heating to institutional and government buildings in downtown Toronto.

In the two decades that followed its creation, the company tried to keep pace with the burgeoning growth of Toronto's downtown core by expanding its steam service to include users in the commercial and entertainment sectors. However, its not-for-profit corporate structure and restrictive legislative covenants made it difficult for the company to raise the capital needed to support financial growth.

In 1998, the company's chairman initiated a restructuring plan that ultimately gave rise to the private, for-profit entity called Enwave. Privatization brought the financial discipline to make the company profitable and the capital and resources to develop Deep Lake Water Cooling (DLWC)—an innovative method of air-conditioning buildings which recycles energy, utilizing cold water drawn from Lake Ontario.

By the time DLWC was commissioned in 2004, Enwave had become a market leader in sustainable energy. With the financial support of its new shareholders, Enwave was no longer just a district heating company, but a fully-integrated sustainable energy services provider.

Today, Enwave Energy Corporation operates in 12 cities across North America. In Toronto, they own and operate three modernized steam plants, and a number of cooling plants which support the state-of-the-art DLWC system in downtown Toronto. The district energy system has received numerous awards, including the International District Energy Association's system of the year award in both 1999 and 2011. Enwave also operates large district energy systems in Chicago, New Orleans, Houston, Los Angeles, Las Vegas and Seattle, London (Ontario), Windsor and Charlottetown (PEI).

Enwave Toronto provides heating and cooling services to more than 160 customers in downtown Toronto. The centralized steam heating system started in the 1970s at the Pearl Street steam plant, and steadily expanded over the years through mergers with other district energy systems.

With 40 kilometers of pipes buried deep in the municipal rights-of-way, Enwave distributes steam and chilled water with unsurpassed reliability to more than 51 percent of the potential market in Toronto.

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