

# POWER PROFILE

**Customer:** Enerdyne Power Systems

**Location:**

Alcoa, Tennessee

**Customer Business Issue:**

Utilize landfill gas as a renewable fuel source

**Solution:**

One Cat® G3516 generator set  
10-year Customer Support Agreement  
Cat utility-grade paralleling switchgear  
Cat custom enclosure

**Cat® Dealer:**

Carolina Cat



Since installation in August 2011, the Cat® G3516 has run 3,000 hours at an average of 98 to 99 percent capacity, with downtime only for utility outages or routine maintenance.

**POWER NEED**

Headquartered in Charlotte, North Carolina, Enerdyne Power Systems is one of the most experienced landfill gas-to-energy developers on the East Coast. Enerdyne develops, owns and operates more than 30 projects throughout the southeast United States. Municipalities and landfill management companies that partner with Enerdyne do so to be proactive within the community in terms of reducing harmful landfill gas emissions.

One such entity is the Alcoa Landfill located near Alcoa, Tennessee. To make their operations more environmentally sustainable, the landfill operators issued a Request for Proposal (RFP) to install a landfill gas-to-energy power generation plant. The project would be completed under the guidelines of the Tennessee Valley Authority's (TVA) Green Power Providers initiative, which enables businesses to install renewable power generation resources up to one MW capacity on their properties. Green Power Providers participants generate revenue by selling this power back to the TVA for use on the grid. For this project, Alcoa Gas Producers, LLC, holds the rights to the gas drawn from the landfill and generated power is sold back to the TVA."

**SOLUTION**

Enerdyne partnered with Cat dealer Carolina Cat to respond to the Alcoa RFP. To achieve the criteria of the RFP, the team needed to create a custom solution that would meet the TVA's power generation limit, be capable of running on corrosive landfill methane gas and be fully operational in 12 months.

"This was a great opportunity for us to partner with Enerdyne to create a unique solution to a very specific situation, and with some pretty strict parameters set forth by the TVA," said David Morel, Senior Sales Engineer at Carolina Cat. "The unit we customized is a very efficient generator set that meets the output requirements and emissions standards."

To meet the one MW limit, a factory uprated Cat G3516 generator set that would run efficiently on landfill methane gas was

specified for the project. Used extensively for a variety of low-energy applications globally, this particular G3516 configuration has come to be nicknamed the "A+" by Caterpillar customers. While the standard Cat G3516 wet manifold 1200 rpm low energy generator set is nominally rated at 815 ekW, the "A+" custom configuration includes a higher output 1500 rpm engine for increased power density, dry exhaust manifolds for higher turbo boost, and a high-efficiency generator that results in a nominal power output rating of 1062 ekW at 60 Hz.

When adjusted for local operating conditions, the generator set produces 999 ekW while still meeting federal and local emissions standards. An identical power plant is being used at a similar Enerdyne project at the Bi-County Landfill in Clarksville, Tennessee.

"We have a long-standing relationship with our local Cat dealer, and we knew they could offer a superior product," said William Brinker, vice president and operations manager for Enerdyne.

"But the Caterpillar team really stepped up to the plate in terms of offering us a unique, 10-year extended service coverage plan on the generator set. That, combined with our relationship and comfort level with Caterpillar, was really the difference."

Brinker said the 35 wells at the landfill were drilled in June 2010, the collection system was completed in August 2010 and the blower/flare station was put in place in November 2010. The fuel treatment skid was finished in July 2011, and the Cat engine/generator and switchgear were installed in August 2011.

The Carolina Cat team worked side-by-side with Enerdyne on the installation of the power plant. Carolina Cat and Enerdyne turned to Caterpillar's Gas Solutions engineering team to design and build a turnkey solution tailored to meet Enerdyne's functional requirements, as well as short delivery time.

Steve Johnson, lead Caterpillar Gas Solutions engineer, proposed a sound-attenuated outdoor container that houses the generator

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and all of its associated mechanical and electrical components, a solution that allows the generator to operate seamlessly with the landfill's ongoing gas collection and flaring operations.

The containerized powerhouse included Cat paralleling switchgear with master controls, a radiator cooling system, fuel train and fuel safety devices, AC/DC electrical distribution, motorized louvers and a lube oil transfer system, as well as a stray methane gas detection device for safety. The entire package was designed with serviceability in mind, with plenty of side and overhead engine clearance, and removable sections for major rebuilds.

To ensure efficient, on-going operations, Enerdyne entered into a Customer Value Agreement (CVA) with Stowers Machinery Corp., the local Cat dealer in Knoxville, Tennessee. Enerdyne's full-time, on-site team of technicians handles routine maintenance, and more extensive service is provided by Stowers' factory-certified service team."

## RESULTS

Installation of the power plant was completed in seven months, four months ahead of schedule. Since project completion in August 2011, the Cat G3516 has run 3,000 hours at an average of 98 to 99 percent capacity. "The little time that the engine has been offline has either been the result of a utility outage or to conduct routine maintenance and testing," said Brinker. "We knew the Cat generator set, though more expensive upfront, would be well worth the investment in the long-term because of Caterpillar's superior reliability."

The power plant converts about 95 percent of recovered methane gas to power, generating a megawatt of electricity – enough to power approximately 750 homes. The amount of greenhouse gas that is being reduced annually by this project is equivalent to the emissions from more than 8,000 vehicles."

For more information, please visit [cat.com/powergeneration](http://cat.com/powergeneration)



*The completed landfill gas-to-energy plant at the Alcoa Landfill is converting 95 percent of recovered methane gas to power, generating enough electricity to power approximately 750 homes.*