Market Segment: Landfill Gas to Energy

POWER PROFILE

Customer: Montauk Energy

Location:
Orange County, California, USA

Customer Business Issue:
Renewable power generation using landfill gas

Solution:
Seven Cat® CG260 generator sets

Cat® Dealer:
Cleveland Brothers
Quinn Company

Montauk Energy specializes in the development, ownership and operation of landfill methane recovery and processing projects.

POWER NEED

As a sprawling 725-acre operation, the F.R. Bowerman Landfill is one of the largest landfills in the United States. The landfill, located in Orange County, California, contains an estimated 31 million tons of waste.

When solid waste in a landfill decomposes, a natural by-product with high amounts of methane is released. This potent greenhouse gas can potentially affect global warming, climate change, ozone depletion and sea level rise, as well as having a negative impact on biodiversity. In order to better manage and reuse this onsite waste, Montauk Energy worked with Caterpillar Financial Services Corporation to develop and commission a $60 million, 113,000-square-foot, state-of-the-art renewable energy power plant to generate electrical power by capturing and conditioning the landfill gas.

"We've had successful gas energy landfill projects in Texas and Oklahoma, but this project was unique not only for its immense size but also for the strict emission requirements in place in California," said Dave Herrman, CEO and President of Montauk Energy.

The Bowerman project is subject to regular inspections from the California Integrated Waste Management Board and the Board's local enforcement agency, the California Regional Water Quality Control Board, in addition to the South Coast Air Quality Management District to ensure compliance with those regulations.

"With every new project, we look to leverage technology and innovation to increase efficiency and productivity with less impact on the environment and help our customers do the same," added Patrick Barrett, a territory manager with Caterpillar.

In order to convert the waste into a renewable resource, Montauk Energy required generator sets with gas cleanup and emissions reduction technology to meet stringent standards.

SOLUTION

Montauk Energy worked with Cat dealer Cleveland Brothers to develop a sustainable solution for converting waste from the anaerobic digestion process into renewable energy. Seven Cat CG260 generator sets with reciprocating engines were supplied to create 22 MW of electricity.

"By law, the landfill gas must be flared because it can't be put directly into the atmosphere as methane, however, now it becomes wasted energy. We were approached to capture it and generate electric power for the residences, schools and businesses of Orange County, California," said Kurt Hertzler of Cleveland Brothers.

Due to the strict emission standards in California, the supplied generator sets feature technology designed to help the operation meet all local, state and federal air quality requirements. A fuel cleanup system treats the landfill gas to ensure it stays within acceptable limits of the engines, while selective catalytic reduction (SCR) and oxidation catalyst units were installed on each engine exhaust system to specifically reduce NOx, CO_2 and VOC emissions.

"Beyond this essential balance-of-plant equipment, the generator sets are also built with drop-over enclosures to dampen noise. It was important to lessen the noise impact on nearby residential neighborhoods," added Hertzler. "The enclosures also allowed us to create a very compact site, which helped. Although the landfill is vast, the space for equipment is actually quite limited."

By selecting the large-scale CG260 generator sets, Montauk Energy ultimately required fewer units, thus lowering installation and maintenance costs.

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RESULTS

As the largest gas-fueled reciprocating engine project in California, Montauk Energy is committed to helping the people of Orange County discover new ways to process and more efficiently use landfill gas.

The seven Cat CG260 generator sets add 160,000 megawatt hours annually to put into the grid, which is enough energy to power 26,000 homes. In addition, the generator sets and associated emissions controls prevent approximately 53,000 tons of CO_2 emissions annually.

"This is the largest project of its kind utilizing landfill gas that combines gas cleanup, largescale Cat reciprocating engine-generators and SCR technology to meet strict emission requirements," Herrman stated. "The result is efficient operations with high online availability, coupled with ample and steady gas supply from the landfill, to ensure reliable production of renewable energy and all its benefits 24 hours a day, 365 days a year."

Montauk Energy relied on Cleveland Brothers to develop, deliver and commission the project while Quinn Company will provide service for the plant under a 20-year long-term service agreement to ensure the plant is operating at peak levels for years to come.

"While the emission requirements were a considerable factor in this project, it was much more than simply meeting those obligations. A close collaboration between Montauk Energy, Cleveland Brothers and Quinn Company delivered the first successful gas-to-energy facility with sophisticated clean-up systems with SCR and oxidation catalysts to the market," added Barrett.

For more information, please visit cat.com/powergeneration

Seven Cat® CG260 generator sets consume landfill gas and create 22 MW of power to deliver to the residences, schools and businesses of Orange County.

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