



Santa Clara Converts Low Concentration Landfill Gas to Clean Energy

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Designed to be flexible even on landfills from which the flow or concentration of methane is too low for conventional technology, Ameresco's landfill gas-to-energy plant that uses the FLEXENERGY FLEX TURBINE™ MT250 IS CAPABLE OF CONTINUOUSLY GENERATING ELECTRICITY.

LANDFILLS ARE AN EXCELLENT SOURCE OF methane-rich gas that can be used to generate renewable power. Methane is produced at a landfill as trash decomposes and can be used as fuel for a gas generator to produce electricity. Since 1986, the City of Santa Clara had successfully done this, and had been able to export power to a local utility. However, over time, gas production at a closed landfill began to decline, and the original solution had to be taken offline.

In 2006, the City of Santa Clara started the process to identify a replacement energy solution. Santa Clara and Ameresco's (Framingham, MA) team investigated the potential for a new power project at the same landfill to make use of the naturally occurring methane gas that was still being produced at the site and generate renewable

energy in the process. The City then partnered with Ameresco, Inc. to design, build, own and operate a new landfill gas-to-energy plant at the closed Santa Clara All Purpose Landfill.

A Practical Solution

The old 2.5 MW reciprocating engine had been shut down in the 1990s due to the decline of adequate gas flow from the aging site. While the landfill continued to produce some gas, there was not enough to run the original large platform engine and the gas was once again flared to meet environmental requirements. In order to keep the flare burning, it required supplemental natural gas because the landfill gas stream was too low in concentration. The City was seeking a new practical solution for the remaining landfill gas, rather than have it continue as an expense and waste stream.

To eliminate the need for the City to put up capital required for the project, the City of Santa Clara entered into a contract with Ameresco, one of the largest independent energy solutions companies in North America, to design, build, own and operate the innovative system. In turn, the City's electric utility, Silicon Valley Power, purchases the renewable energy resource from Ameresco for its customers. This project lets the City once again use a waste stream as a resource without burdening the City with capital costs and project risk. The new plant provides a long-term resource of renewable energy that meets the stringent California Air Quality standards.

Ameresco Santa Clara's three FlexTurbine MT250 produce 750kW of electricity per hour from methane in a landfill gas-to-energy generation program at the closed Santa Clara All Purpose Landfill. The landfill is located on Lafayette Street near the Santa Clara Municipal Golf Course in Santa Clara, CA. This project was developed and built, and is owned and operated by Ameresco, Inc. for the City of Santa Clara and its electric utility Silicon Valley Power. Photo courtesy of FlexEnergy, Inc.



Challenges Solved

This project had many of the challenges that older and/or smaller landfills face, including low gas production and tighter air quality standards for electrical generation. The Ameresco solution for Santa Clara enabled the City to continue using the landfill gas from their closed landfill in a beneficial way for the City and rate payers of its electrical utility. This project, along with many others that Ameresco has successfully completed in California, helps support the state's ambitious goal of 33 percent renewable generation by the year 2020 and create a more sustainable environment.

The new plant consists of three microturbines generating 750 kW. As an independent provider of energy solutions, Ameresco solicited for both equipment and services to meet its new efficient design. Ameresco's engineering team selected FlexEnergy Inc.'s (Irvine, CA) Flex Turbine™ MT250 as the best solution, as it is able to operate with low gas flow and low levels of methane. The 750 kW project comprising of three 250 kW gas turbines was commissioned during the fall of 2009. Projections indicate that the gas flow of 400 cubic feet per minute at 40 percent methane gas will be sufficient to run the three gas turbines for at least five years. "After review of available products, Ameresco found that the Flex Turbine™ MT250 features a simple, powerful single-shaft design with a synchronous generator to provide continuous, clean energy," said Joe Perry, CEO, FlexEnergy. "The ability of the Flex Turbine™ MT250 to operate on low Btu fuel enables an aging facility such as Santa Clara's All Purpose Landfill to continue generating power many years even when gas production begins to decline."

The 750 kW per hour of green energy currently produced by the innovative system is exported to Silicon Valley Power and provides power for more than 477 homes. Using calculations provided by U.S. EPA, Ameresco Santa Clara reduces emissions of greenhouse gas equivalent to planting nearly 996 acres of pine or fir forest and saves the equivalent of approximately half a million gallons of gasoline annually.

Commitment to Green Power Sources

This landfill gas-to-energy project is an important part of Santa Clara's continuing commitment to develop sustainable, renewable

energy and green power sources for the Santa Clara community and its electric utility customers. The project also contributes to Silicon Valley Power's Renewable Energy Portfolio. California regulations call for 20 percent of retail sales of electricity to come from renewable energy sources by the end of 2013, and for this percentage to increase to 33 percent by December 2020.

The California Air Resources Board (CARB) regulates emissions of methane, a greenhouse gas, from municipal solid waste landfills. The Santa Clara All Purpose Landfill is in the Bay Area Air Quality Management District, and has been certified as meeting the requirements of CARB 2008.

Powering Homes

Designed to be flexible even on landfills from which the flow or concentration of methane is too low for conventional technology, Ameresco's landfill gas-to-energy plant that uses the FlexEnergy Flex Turbine™ MT250 is capable of continuing to generate electricity. In the case of a Santa Clara, CA closed municipal landfill, electricity is now being sold back to Silicon Valley Power to power more than 477 homes with clean renewable base load energy. | **WA**

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