Hungry for Fuel

FEATURES - OPERATIONS FOCUS

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Food waste in Sacramento, Calif., is being converted to CNG with the help of a high-solids anaerobic digestion system.

Kristin SmithOCTOBER 16, 2013

Fueling a vehicle with food waste was a concept made famous by the movie Back to the Future. But now, almost 30 years later, what was once a futuristic idea, has become reality.

The Organic Waste Recycling Facility at the South Area Transfer Station (SATS) in Sacramento, Calif., began accepting 25 tons of food waste per day in December 2012, collected by Atlas Disposal Industries from area food processing companies, restaurants and supermarkets. Through anaerobic digestion (AD), the food waste is converted into renewable natural gas, electricity and heat, with material remaining from the process being turned into fertilizer and soil amendments.

Clean World Partners, Gold River, Calif., broke ground on an expansion of the facility in June, allowing the facility to accept 100 tons per day of food waste. Atlas Disposal has opened California's first AD-based renewable natural gas fueling station, which uses natural gas produced at the recycling facility to fuel the company's fleet as well as other area vehicles running on compressed natural gas (CNG). Currently CNG powers 25 percent of Atlas Disposal's vehicles.

Once the expansion is complete, the Sacramento biodigester is expected to produce 700,000 gallons per year of renewable CNG. Atlas calls the fuel it produces ReFuel and describes it as a carbon-neutral fuel that is chemically identical to fossil natural gas and 100 percent compatible with existing CNG combustion systems. The system is expected to reduce greenhouse gas emissions by 5,800 tons per year.

In addition to the ReFuel, the Clean World facility will produce 8 million gallons per year of organic soils and fertilizer products and will generate 1 million kilowatts of electricity that will power the facility and fueling station.

“With the Sacramento biodigester, Clean World has taken an historic step forward in developing innovative and cost-effective waste management and energy solutions,” says Shawn Garvey, Clean World’s vice president of communications and public affairs.

Technology Overview

Clean World’s AD technology, developed at the University of California, Davis, uses natural microbes to break down organic waste, generating biogas and other forms of renewable energy. Clean World says its biodigesters are prefabricated, modular and require no additional water, meaning they are a less expensive system with significantly shortened construction time and requiring a much smaller footprint than other systems.

The expansion is expected to be complete in December, Atlas Disposal says. At 100 tons per day, nearly 40,000 tons of organic waste will be converted to vehicle fuel. For every 2 tons of food waste, the biodigester produces 50 diesel gallon equivalents of CNG.

BioCNG, Madison, Wis., has provided the conditioning equipment for the project. This equipment cleans the biogas and prepares it for vehicle fuel. Dennis Fenn, a professional engineer and western region sales manager for BioCNG, explains that the unit takes out the impurities and the carbon dioxide “to produce a biogas of substantial quality to then be piped over into the fueling station, where it is compressed for CNG fuel.”

When BioCNG expands its upgrading system to accommodate the increased material intake, it will be able to produce 1,500 diesel gallon equivalents per day from the digester biogas produced. According to Atlas, ReFuel will cost about $2.25 per gallon compared with traditional diesel, which sells for $3.80 per gallon.

While BioCNG’s units have been employed at several landfills in the Midwest, the Sacramento biodigester is the first project for the company using an organic food waste digester. Fenn says he sees quite a bit of potential from AD gas. “Typically an anaerobic digester is 60 percent

methane. A landfill is in the low to mid 50 percent range," he says. "You get more product fuel [from AD] because it has a higher methane content."

Growing Interest

Fenn says interest has grown in AD biogas to CNG projects, which he attributes to the conversion of fleets to CNG as well as Renewable Fuel Standards, or RINs (Renewable Identification Numbers) and requirements by municipalities. He says using CNG reduces carbon use and if a fleet uses a renewable CNG from biogas, it can reduce carbon usage even further. "It saves money on fuel, and its greener," Fenn says.

He adds, "We are seeing engineering opportunities in the whole organics utilization area."

According to Atlas Disposal, the Atlas ReFuel Station is the first negative-carbon fuel being commercially dispensed in the United States. In the next five years, the Sacramento biodigester is expected to provide fuel for up to 150 trucks and 80 school buses.

Clean World Partners and Atlas Disposal are working with Otto Construction, Sacramento County, University of California, Davis, and the Sacramento Utility District to develop the new facility.

The author is managing editor of *Renewable Energy from Waste* and can be contacted at ksmith@gie.net.