Helen Putnam Award for Excellence
Grease to Gas to Power Puts Riverside on the Road to Energy Independence

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The City of Riverside won an Award for Excellence for this project in the Planning and Environmental Quality category of the 2007 Helen Putnam Award for Excellence program. For more information about the award program, visit www.cacities.org/helenputnam.

When the City of Riverside sought solutions to two pressing problems --- finding a viable way to dispose of restaurant grease and the need for a new cost-effective source of gas --- creative thinking turned up a way to use grease wastewater to generate power.

The city operates a publicly owned treatment works plant with a design capacity of 40 million gallons per day and anaerobic digestion processes. The treatment plant also features a cogeneration facility with the capability of generating about 3 megawatts of power per day. The cogeneration facility's three internal combustion engines use the methane gas produced by the digesters as a fuel source. The city's Public Utilities Department also owns an electric utility that must meet the California Public Utilities Commission requirement that 20 percent of all its electrical energy be derived from renewable resources, such as wind, solar and geothermal, by the year 2017.

The City of Riverside has about 258,000 residents in an 87.4- square-mile incorporated area with 820 miles of sewer lines. The sewer collection system was experiencing overflows due to grease discharges from restaurants, typically from restaurants without grease interceptors (underground tanks connected to the restaurant wastewater drains) and those not adequately maintaining their grease interceptors. The restaurant industry in the city desperately needed an economically feasible solution to grease interceptor maintenance and wastewater disposal.

Disposing of grease interceptor wastewater is problematic for several reasons. Many sanitation agencies refuse to accept out-of-area grease interceptor waste, and landfills ban the disposal of grease interceptor wastewater. This results in illegal disposal into sewers, storm drains and remote areas.

Multiple factors prompted discussions to craft potential solutions. The city needed to prevent sewer overflows, provide a viable and economical disposal option for grease interceptor wastewater, acquire a source of unlimited methane gas production to aid in the cogeneration of electricity, develop a renewable energy resource and achieve energy independence from outside sources of electricity and natural gas. The possibility of using grease wastewater as an alternative fuel not only reduced grease disposal costs, but also prevented sewer lines from clogging and overflowing. This led to the solution of collecting grease wastewater and injecting it into the anaerobic digesters.

Turning Grease Into Electricity

The city researched the use of grease wastewater additions to the existing anaerobic digestion process to increase digester gas production and discovered this was a viable solution. On April 27, 2005, the city launched the Grease to Gas to Power project. The city negotiated a contract with a vacuum truck service to provide the grease wastewater. The company agreed to charge local restaurants 15 cents per gallon to pump the grease interceptors. The city in turn charged the vacuum truck company 3 cents per gallon to receive the grease wastewater, totaling more than $256,000 to date. The project currently receives about 33,000 gallons per day of grease wastewater from restaurants throughout Southern California, primarily from Riverside. To date, nearly 16 million gallons of grease wastewater have been processed.

The Grease to Gas to Power project qualified for a $16,237 grant for renewable energy resources from the city's Public Utilities Department in 2005. The total cost in labor, laboratory analyses and equipment has been approximately $100,000 to date.

Achieving Energy Independence

The project's outcomes significantly exceeded expectations. The electrical power generation of about 1.6 megawatts per day is enough to provide the electrical needs of 1,203 homes for one month.

The effects on the sewer system were equally favorable. The overflows caused by restaurant grease blockages in sewer lines were reduced from 30 percent of all calls to public works for service to less than 1 percent.

A primary goal of this project was to achieve energy independence. This project has reduced the natural gas requirements of the cogeneration power plant by 80 percent. This yielded a monthly savings of $80,000 to $85,000. The energy cost reductions created by this project saved the city nearly $1.3 million in one year.

An additional benefit of the project was a reduction of biosolids created from the treatment process. Since the introduction of grease wastewater into the digesters, the number of methane-forming bacteria has increased dramatically, resulting in an overall reduction in biosolids production of about 25 percent.

A Model Project

With a viable alternative for grease waste disposal, the city provides a valuable service to its restaurant community and generates a much needed gas supply to power the cogeneration power station. And this program puts the City of Riverside on the road to energy independence. The U.S. Environmental Protection Agency estimates that only 2 percent of all publicly owned treatment works with digesters use the gas generated to create electricity. This project proves that using restaurant grease wastewater can dramatically increase the methane gas output of an anaerobic digester without any serious deleterious effects.

The city's Grease to Gas to Power program demonstrates that success can be achieved through innovatively reusing and recycling a problematic waste product. Perhaps best of all, the program proves that positive results and cost benefits can be achieved while remaining sensitive to the environment.

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