SOUTHCENTRAL

CHP
TECHNICAL ASSISTANCE
PARTNERSHIPS

PROJECT PROFILE

Hornsby Bend Biosolids Management Plant

850 kW CHP System

850 kW Biogas Renewable Energy System

Hornsby Bend Biosolids Management Plant – Austin, Texas
SOURCE: Austin Water

Quick Facts

LOCATION: Austin, TX
MARKET SECTOR: Wastewater Treatment Plant
FACILITY SIZE: 1.5 million gallons per day
FACILITY PEAK LOAD: 850kW
EQUIPMENT: 850 kW Reciprocating Engine
FUEL: Biogas— (Digester gas)
USE OF THERMAL ENERGY: Heating of Anaerobic Digesters
ENVIRONMENTAL BENEFITS: Plant electric load offset by renewable energy source
TOTAL PROJECT COST: $ 5.03 million
YEARLY ENERGY SAVINGS: Approximately $550,000
PAYBACK: Less than 9 years
CHP IN OPERATION SINCE: Initially 1986 and upgraded in 2012.

Site Description

Austin Water's Hornsby Bend Biosolids Management Plant is a centralized Biosolids handling facility in operation since 1957. The system manages 1.5 million gallons per day (MGD) of both primary and secondary waste activated sludge which is received via pipeline from the city's two large wastewater treatment plants, Walnut Creek and South Austin Regional. Hornsby Bend is a zero-discharge facility that utilizes Anaerobic Digestion to produce Class B biosolids. They then compost all biosolids produced to meet Class A standards. Residential yard waste is diverted from the landfill to the site and mixed with the digested biosolids to produce about 110,000 cubic yards of compost on a yearly basis.

The City of Austin added Anaerobic Digesters to Hornsby Bend in the mid-1980s. A combined heat and power system (CHP) was installed with the express intent of utilizing the biogas from the anaerobic digestion process. After several years of operation, the CHP plant was brought offline due to mechanical failure caused by siloxanes in the digester gas. In 2012, through a performance contract with Chevron Energy Solutions (now Engie), Austin Energy assisted Austin Water in installing a new CHP system to generate power, offset the plant's power usage and heat the process.

Reasons for CHP

CHP was deemed to be the most economical choice to utilize the methane gas and provide thermal energy to the anaerobic digesters, as well as offset the electricity used to operate the facility. Utilizing the gas that is produced in the process instead of flaring it helps the City of Austin combat air quality concerns and puts the potential energy to a good use. This in turn benefits ratepayers and citizens of Austin.

The redevelopment of the CHP plant in 2012 was motivated by the need to offset power consumption at the facility, reduce the amount of digester gas being flared and to meet the City of Austin's 100% clean energy goal.

850 kW Reciprocating Engine
SOURCE: Austin Water

CHP Equipment & Operation

The first CHP system installed in 1986 was made up of two 400 kW diesel-generators converted to burn biogas. These systems eventually failed due to siloxane build-up. This build up caused internal engine damage that significantly increased operational costs and made their operation too costly. In 2012, with Department of Energy American Recovery and Reinvestment Act funding support and a partnership with Austin Energy, Austin Water installed a new 850 kW reciprocating engine. The project included upgrades to gas conditioning, hot water piping and instrumentation and control systems. The new biogas conditioning system removes siloxanes, moisture and sulfur compounds. The system operates continuously at full capacity. Heat recovered from the reciprocating engine warms the digesters. During winter months, biogas fueled boilers provide additional heating to digesters. All power from the system is exported directly to the grid, and a credit is issued against all power consumed. At the end of the day the new system meets the power demand of the facility, with a little extra energy to spare.

Food Waste, Oil and Grease (FOG)

Austin Water is focused on their commitment to a sustainable biosolids facility and are looking into the feasibility of possibly adding fats, oil and grease, along with food waste to the feed stock that comes to Hornsby Bend. This could potentially divert some of the waste stream that goes to the local landfills and use that resource in the Anaerobic Digestion process. The potential outcome could be more gas production, less biosolids production and that in turn gives the facility more options for utilization of any additional gas that is produced. Greater renewable energy production could help the City of Austin meet the 100% clean energy goal.

Lessons To Share

- Although biogas is an excellent resource that should be used to its full extent, it must be treated appropriately to reduce wear and tear on the CHP equipment.
- Food waste should be treated more as a resource rather than a waste product. Identifying ways to capitalize on the benefits of anaerobic digesters to treat both food waste and FOG will reduce landfill waste and result in a value-added product that can provide additional revenue to a community.

> ***"We are beginning to transform our thinking from just handling biosolids to taking a broader role as a site for resource recovery." – Austin Water***

For More Information

U.S. DOE Southcentral CHP TECHNICAL ASSISTANCE PARTNERSHIP (CHP TAP)
Gavin Dillingham, PhD, Director
281-364-6045
gdillingham@harcresearch.org
More CHP Project Profiles:
www.scchptap.org

Austin Water
Daryl Slusher
Assistant Director Environmental Affairs and Conservation – Austin Water
512-972-0218
Daryl.Slusher@AustinTexas.gov

https://betterbuildingssolutioncenter.energy.gov/chp/chp-project-profiles-database

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