SOUTHWEST

U.S. DOE

CHP Technical Assistance Partnerships

PROJECT PROFILE

Southside Water Reclamation Plant

6.6-MW Renewable CHP System

Site Description

The Southside Water Reclamation Plant is the largest wastewater treatment facility in New Mexico, serving over 563,000 people and treating a peak of 120 million gallons per day. The plant uses activated sludge and UV disinfection to treat the wastewater from the city of Albuquerque and Bernalillo county.

The SWRP has used clean energy for over 25 years, currently supplying about 30% of its total power needs with renewable biogas-fueled combined heat and power (CHP) and up to the remaining 70% with natural gas-fueled CHP.

Reasons for CHP

CHP is a key part of Southside's energy management. The main reasons the plant originally installed CHP and continue to use it include:

- Cost savings for Albuquerque and Bernalillo county water users
- Making use of a renewable gas supply available on-site
- Providing back-up power to the plant as required by the EPA

Quick Facts

LOCATION: Albuquerque, NM

MARKET SECTOR: Wastewater treatment

FACILITY SIZE: 76 million gallons per day (MGD) design, 120 MGD peak

FACILITY PEAK LOAD: 7.4 megawatts (MW)

FACILITY AVERAGE LOAD: 4.5 MW

EQUIPMENT: Two 1.1-MW biogas-fueled Cooper engines & two 2.2-MW natural gas-fueled Caterpillar engines

OPERATION: 30% of load supplied by biogas CHP, remainder from natural gas CHP or grid depending on price

USE OF THERMAL ENERGY: Heating digesters; building heat

ENVIRONMENTAL BENEFITS: Use of a renewable fuel, reduced fossil fuel use, high total efficiency

New Mexico's largest wastewater treatment plant uses combined heat and power to manage costs, increase reliability, and generate renewable energy.

CHP Equipment and Configuration

Gas Supply

- From mesophilic digesters
- 65% methane, 25% CO2, plus nitrogen, hydrogen, hydrogen sulfides, and misc.
- 600-650 BTU/ft3
- Cleaned/conditioned with a dryer and compressor

South CHP Facility

- Installed in 1986
- Two Cooper Superior 12 GTLA engines
- Rated 1.1 MW each
- Heat rate of 14,000 BTU/kWh
- Fueled by digester gas, with ability to run on natural gas or a fuel blend

North CHP Facility

- Installed in 2002
- Two Caterpillar G3612 engines
- Rated 2.2 MW each
- Heat rate of 8,500 BTU/kWh
- Run on natural gas
- Also functions as emergency back-up power

Optimizing the Economics

The plant's average electric needs are 4.5 MW. The digesters supply enough biogas for 1.6 MW, leaving the rest to be generated by natural gas or purchased from the utility, Public Service Co. of New Mexico (PNM).

The CHP facilities currently cost the plant about $521,000 per year to fuel and maintain, with natural gas prices at just over $4/MMBtu.

The plant carefully monitors and limits the amount of power it purchases from PNM, because according to its contract, it incurs substantial standby penalties for peak demands of more than 5 MW in any given month. Southside doesn't typically export power back to PNM because PNM's buy-back rates don't justify it. However, it sells renewable attributes of the digester gas-fueled energy (called renewable energy certificates, or RECs) on the open market.

The north engine room at Southside, with CHP supervisor Trinidad Padilla. Heat from the engines is recycled to warm the digesters, pump rooms, and other buildings.

Lessons Learned and Future Plans

According to Jeff Romanowski, Southside Plant Manager, "CHP adds a level of complication that requires a unique skill set that may be difficult to find at some facilities." Southside's future plans include reducing the plant's electric load by upgrading to efficient high-speed blowers, upgrading and increasing the digester capacity (which will increase the biogas supply), and then replacing the aging engines with a couple of turbines that can burn all of the digester gas.

For More Information

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