



New York State Energy Research and Development Authority

SUNY HVCC

Land Fill Gas Powers College

DG/CHP Program

Project Profile

Combined heat and power for Landfill Gas Recovery



Quick Facts

Location:

Troy, NY (National Grid)

Installation Date:

April 2004

Operating Experience:

22 months (as of February 2006)

CHP Equipment:

Three 1,350 kW, one 825 kW and one 770 kW Gas Fueled Engine-Generator Sets, one 2,200 kW Diesel Backup

Generating Capacity:

5,645 kW

Heat Recovery Application:

HVAC, DHW

Type of Fuel:

Landfill & Natural Gas

Annual Utility Savings:

\$900,000 per year (estimated)

Overview

Hudson Valley Community College (HVCC) is located in Troy, NY. The college occupies 17 buildings on a 90 acre campus and serves about 11,500 students. Annual electric costs had previously exceeded \$1.5 million.

The college is located less than a mile from the former City of Troy landfill. Though closed, the landfill produces sufficient methane to run an 825 kW engine-generator set. Four other natural gas fueled generators provide enough additional capacity for the college to operate independent of the utility grid. A large diesel generator set is used as a source of backup power.

The Application

Anaerobic decomposition of the organic material in landfills produces a low BTU gas consisting primarily of methane and carbon dioxide. Although closed, gas was still being collected and flared at the City of Troy's landfill. As much as 360,000 ft³ of gas per day is expected to be produced over the next 10 to 15 years.

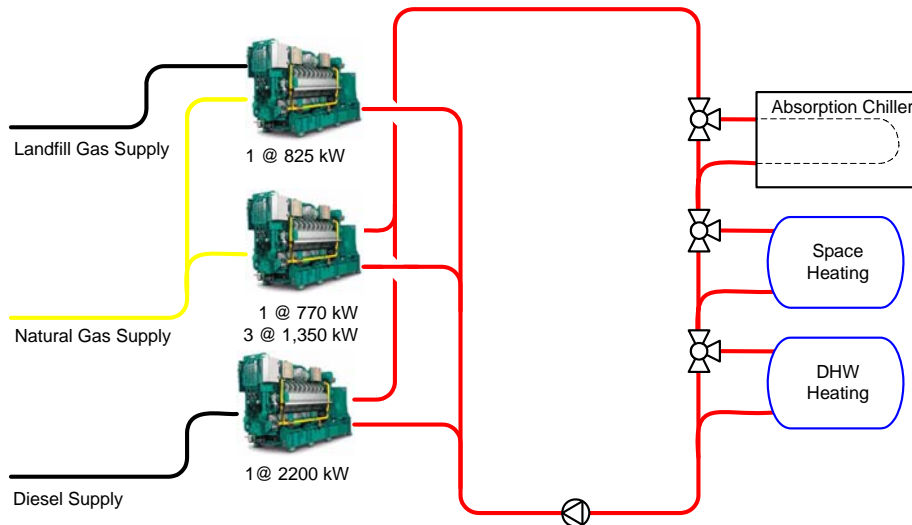
The city, HVCC and Siemens Building Technologies, Inc., developed a CHP project using the gas to provide electricity to the college. This was done through an energy services performance contract that guaranteed a minimum monetary savings. The resultant plant was configured on multiple engine-generator sets having a combined capacity of 7.9 MW. The generator fueled on the landfill gas is base loaded, the remaining generators provide backup and swing service. Heat recovered from the engines provides HVAC for the college's field house.



Landfill Gas Fueled Engine-Generator Sets

CHP System and Equipment

The CHP system is housed in a dedicated building that includes a classroom suitable to HVCC's educational interests. Six engine-generator sets produce electricity independent of the local utility grid. The lead generator uses the landfill gas to provide about 20% of the total electricity consumption. The balance of the power requirements (~3 MW) is met using a combination of four other natural gas fueled generators operating on a schedule designed to optimize the plant's overall performance. Waste heat recovered from the engines is captured as hot water that is circulated to the college's field house for space heating or to operate an absorption chiller that provides air conditioning. Excess heat can be rejected to the atmosphere through a set of external radiators.



Economics and Environmental Benefits

The installed cost of the project was \$8.4 million. HVCC is guaranteed savings of \$1.3 million over the life of the Siemens contract (15 years). However, greater savings are anticipated since the college was paying more than \$1.8 million annually for all of its purchased utilities. A substantial reduction in carbon dioxide emissions should be realized due to the greater efficiency of the CHP system compared to the use of conventional systems. Fugitive landfill gas emissions should also be reduced. Monitored data have been collected from the site and are available in an hourly format on NYSERDA's DG/CHP website from April 2004 through November 2006.



Heat Recovery Components



McDonough Sports Complex uses Waste Heat

Summary of Benefits

- Renewable fuel source used to provide electricity and reduce greenhouse gases
- Waste heat used year round for building HVAC
- Savings guaranteed to college by project developer

“This project makes good environmental, economic and educational sense. We're proud to be using a cutting edge technology that is cost effective and environmentally sound.”

- Dr. Marco Silvestri,
President, HVCC

Web Links and Further Information:

Siemens Building
Technologies –
ESCO

www.siemens.com

Engine Manufacturer

www.cat.com

Other DG/CHP Resources

chp.nyserda.org

www.hvcc.edu

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