

Industry: Municipal Waste Water Treatment

Project: North Plant Waste Heat to Power

Owner: Albany County Sewer District

Engineer: CDM Smith

Customer: Albany County Sewer District

Location: Menands, NY

Waste Heat Source: 1,000 to 1,250°F exhaust gas from sludge incinerators

Capacity: 925 kW

Average Capacity Factor: ~67%

Annual Energy Output: 3.3 million kWh's per year, enough to power 3,000 households

Use of Electrical Energy: Onsite consumption

Equipment: Turboden 10HR ORC unit

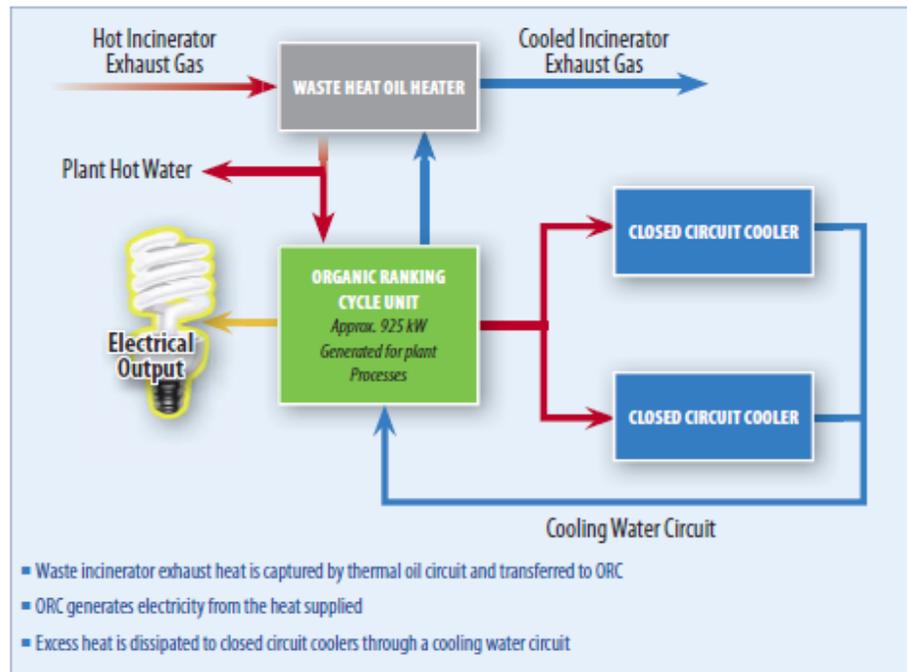
Commercial Operation: March 2012

Cost: Over 90% financed through NYSERDA and ARRA grants

Savings: est. \$480,000 per year

Payback: est. 12.6 years

Unique Aspects: First municipally owned ORC system in North America in the water/wastewater sector



The Heat is Power Association is the trade association of the Waste Heat to Power (WHP) industry. The not-for-profit organization is committed to educating decision makers and the public about the characteristics of waste heat to power as a source for emission-free electricity and an economic driver for global competitiveness. The Heat is Power Association promotes the efficient, industrial use of emission-free electricity generated through WHP processes. To learn more, visit www.heatispower.org.

Project Description

The Albany County Sewage District's (ACSD) North Plant uses multiple-hearth incineration as the ultimate disposal method for sewage-sludge produced in their 35 million gallon per day waste water treatment plant. The flue-gas exhausted from the incinerators is ducted to a waste heat to power system where it is used to make electricity which is used onsite. This system is not intended to export power to the utility, neither is it intended to stand alone and be off the grid. It was built to use the available waste heat from the existing incinerators to generate a portion of the plant's electrical and space heating needs.

During the wastewater treatment process, the plant incinerators run 112 hours/week on average. During this time, the heat recovery system ducts the 1,000 to 1,250°F gas flow to the Turboden 10HR organic rankine cycle (ORC) system where it boils an organic, high molecular mass fluid to create a high pressure vapor. This vapor from the ORC runs a turbine that generates electricity and the vapor is condensed back to a liquid in the closed loop system. During cold weather months, lower temperature waste heat exiting the waste heat to power system is used for space heating, turning the waste heat to power system into a combined heat and power system for that period of time. Total annual electricity production of 3.3 million kWh's per year is enough to power 3,000 households, while reducing the District's natural gas consumption by 100,000 therms per year, and reducing GHG emissions by 1,445 tons/yr.

Operational Benefits

- Uses an onsite waste heat that had been vented
- System is easy to use and requires no operators beyond those already at the plant

Economic Benefits

- The plant saves about \$475,000 per year in electric and natural gas costs
- Construction and maintenance of waste heat to power facility created new jobs

Environmental Benefits

- Produces emission free power - The innovative ORC system generates about 3,300,000 kWh emission-free electricity through a closed internal process
- Reduces natural gas consumption - The use of waste heat to power avoids the burning of 100,000 Therms of Natural Gas per year

Awards

- 2013 ACEC Diamond Award For Excellence in the Category of Energy
- New York Water Environment Association 2013 Sustainability Award



The Heat is Power Association is the trade association of the Waste Heat to Power (WHP) industry. The not-for-profit organization is committed to educating decision makers and the public about the characteristics of waste heat to power as a source for emission-free electricity and an economic driver for global competitiveness. The Heat is Power Association promotes the efficient, industrial use of emission-free electricity generated through WHP processes. To learn more, visit www.heatispower.org.