

**Cities of Gloversville-Johnstown
Joint Wastewater Treatment Facility
Biogas-Fired Engine Electricity Generation and Heat Recovery**

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**Utilizing
Biogas to
Meet
Total
Electricity
Needs
On-Site**

Project Overview

The Cities of Gloversville and Johnstown, New York operate a Joint Wastewater Treatment Facility to treat up to 13.8 mg of domestic sanitary sewage daily. The Gloversville-Johnstown Joint Sewer Board (GJJSB) manages the facility located 35 miles west of Albany, NY and also treats a large, variable industrial wastewater discharge from food manufacturers, leather tanning and finishing, metal finishing, textile and other major industries.

The Cities have developed a strategy to use CHP technologies integrated with advanced activated sludge systems to achieve energy independence in the facility by 2010. Because CHP systems are so flexible in design and operation, use of the technologies has enabled this approach since GJJSB must be able to treat up to 30 MGD (peak) due to the variable industrial wastewater input to the treatment facility from industries in the area.

This strategy is built on previous CHP applications and operational experience. The construction improvements now underway will more than double capacity for on-site electric power generation and boost production of digester biogas to fuel an expanded CHP system and lead to the goal of generating all facility electricity needs on-site by early 2010.

Quick Facts

- ◆ **Location:**
Gloversville-Johnstown, New York
- ◆ **Wastewater Treatment:**
13 MGD Wastewater-Design
30 MGD Peak (Industrial)
- ◆ **Biogas Usage:**
71 Million cubic feet – 2008
(47% increase from 2007)
- ◆ **Project Equipment:**
2003 Plant Modification – Two 150kW Engine Generators
2008 Design Change to Generate All Plant Electricity–
Two New 350kW Engine Generators
- ◆ **Thermal Heat Recovered:**
Used to Heat Digesters & Facility Buildings
- ◆ **Equipment Cost:**
Plant Modifications through 2006
Total Cost = \$3,500,000
- ◆ **Annual Savings:**
Electricity = \$438,000
- ◆ **2008 Design Change; Generate All Plant Electricity**
Construction Cost Estimate = \$7,000,000
Annual Savings Expected:
Electricity & Natural Gas – = \$450,000



GJJWTF Existing Engine Generator System

CHP Strategy

A 2005 evaluation sponsored by NYSERDA provided the GJJSB with options for reducing electricity costs. The evaluation and its recommendations were timely since local and regional economic

development efforts had begun to bring industrial companies back to the area requiring quality, reliable wastewater treatment processes.



Dual-Membrane Gasholder

The strategy to generate all facility electricity on-site has three parts with CHP being the critical element that leverages the other two. One project will pre-treat industrial wastewater to reduce loadings to the aeration tanks,

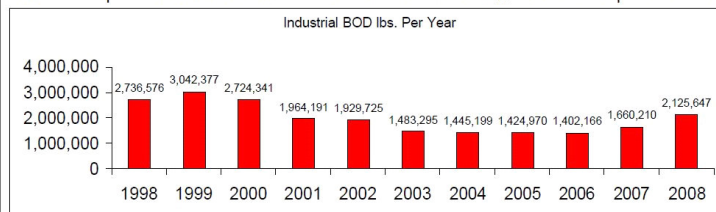
and one will build on previous efforts to increase anaerobic digestion to produce more biogas.

Ten percent of the biogas from the digesters was routinely flared in 2007, but by midyear 2008 50 percent of the valuable digester byproduct fuel was flared even with the two existing engine-generators running at full capacity. The new strategy uses a design and has allocated funds to replace the two existing 150kW engine generators and purchase two new 350-kW units to handle the peak electric load of 700 kW. Waste heat recovery components from the engines will continue to recover engine heat for supply to the digesters. The new process and CHP systems will allow the plant to produce all the electricity needed for on-site facility power. The facility will still purchase some natural gas, but only to heat the administration and garage facilities.

Increased Industrial Loadings Drive CHP Strategy

Industrial plant loadings began to increase in 2007, but as shown in the graph below significant increases in 2008 gave the GJJSB the impetus needed to implement an aggressive strategy to improve the facility so that all electricity needed to treat the combined municipal and industrial waste streams could be generated on-site.

Laboratory data compiled to determine the quantity of Biochemical Oxygen Demand (BOD) that arrived in the plant influent from industrial sources resulted in a 28% increase compared to 2007.



“If you can take wastewater nobody wants, effectively treat it, discharge it in a non-polluting way – and do it with no increase in purchased electricity – that’s a pretty neat goal.”

George Bevington
Plant Manager
GJJWTF

Contributions Made by:

- Cities of Gloversville and Johnstown, New York
- Gloversville-Johnstown Joint Sewer Board; operations and project management
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 - Energy Evaluation
 - Project Grant Funding
- Malcolm Pirnie, Inc.; NYSERDA Contractor for Energy Evaluation Study



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