

Design & Implementation of Gas-Recovering Wastewater Treatment System for a Manufacturing Facility

The Project.

The facility in question is a manufacturing plant that produces yeast, alcohol, and carbon dioxide from molasses. Searching for ways to reduce its energy costs, the facility contracted Conversion Technology, Inc. (CTI) to examine facility processes for potential improvements in energy use, particularly through its waste streams. CTI designed and implemented a new closed-cycle system for the facility's wastewater stream, using the organic materials dissolved in the water as fuel for energy production at the plant.

The Analysis.

CTI performed a careful analysis of the overall energy requirements of the plant, as well as an evaluation of all facility waste streams as to proper disposal methods. CTI's analysis found:

- In a previous design project completed by CTI, the facility had modified its boiler (which provides steam energy to the plant's manufacturing processes) in order to use bio-gas as a fuel, in addition to the conventional fuel source of No. 6 fuel oil. This bio-gas was a waste product generated from the plant's processes.
- The facility's effluent wastewater contained a very high concentration of dissolved organic materials, requiring proper treatment before it could be disposed of.

The Solution.

Observing the need for proper treatment of the facility wastewater prior to disposal, CTI's engineers explored methods of treating the wastewater in a manner that could also aid with energy production at the plant. CTI's design solution included:

- Designing a system to treat the facility's wastewater through anaerobic digestion, in order to adequately purify the wastewater while generating bio-gas. The system was created using an Upflow Anaerobic Sludge Blanket (see Figure 1 below).
- The bio-gas produced from the wastewater treatment process was then used as fuel for the facility's steam boiler. This boiler produces energy for the plant processes (including the wastewater treatment system itself).

The Results.

CTI's innovative solution for the facility brought about improvements in waste disposal practices, energy production, and energy costs:

- The wastewater treatment system had an investment cost of \$2.68 million.
- Through the generation of bio-gas, which is used as fuel for the steam boiler and for the wastewater treatment system itself, the new system paid for itself within 7 years due to energy savings.

The Final Word.

The sustainable strategy designed and implemented by CTI serves as an illustration of the benefits of examining facility waste streams and alternative energy sources. This manufacturing plant solved its wastewater disposal problem while cutting energy costs, an ideal solution to the challenges facing the facility. CTI's engineers are dedicated to achieving energy conservation goals for unique facility circumstances, custom-building strategic methods of creating cost savings and reducing environmental impacts.

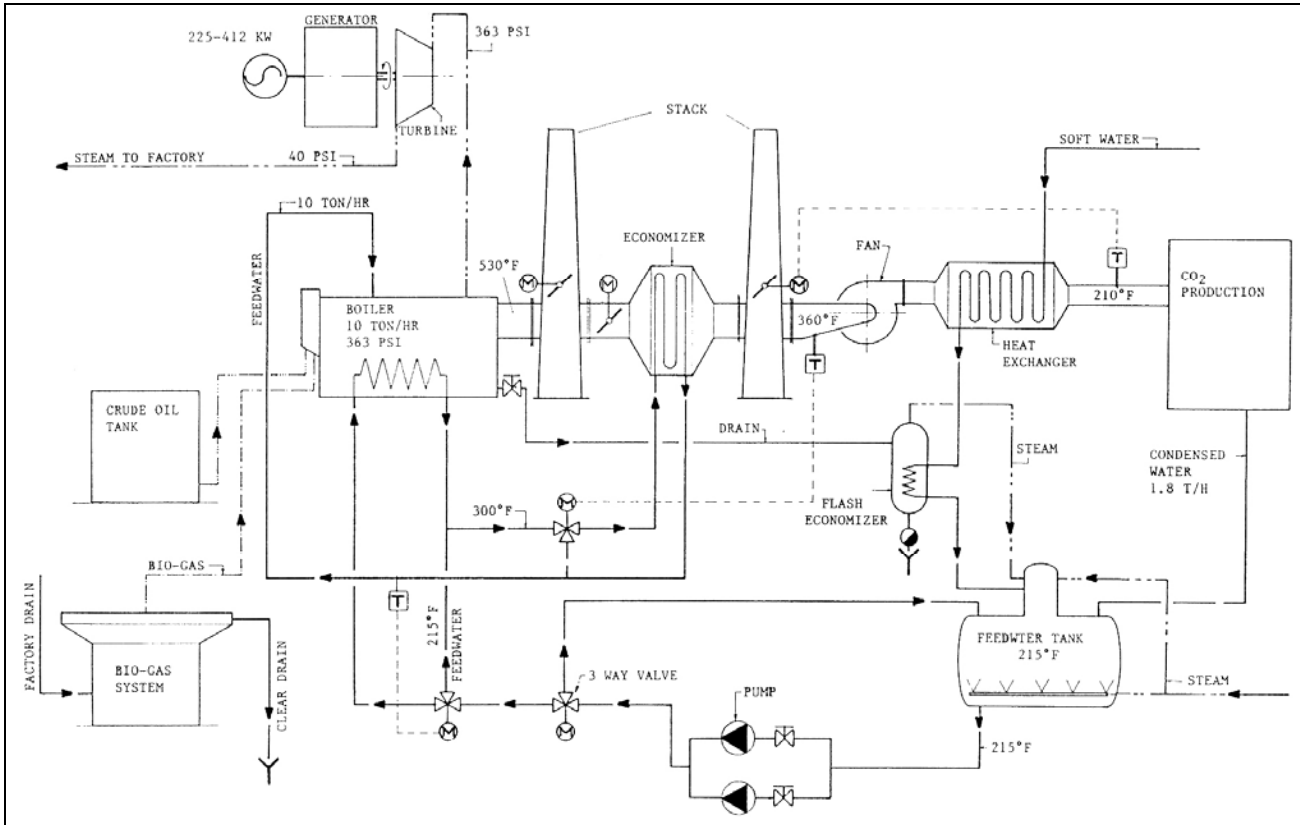


Figure 1: Gas-recovering wastewater treatment system, removing organic materials from the facility wastewater and converting them to bio-gas for energy production in the facility's steam boiler.