DALY CITY WASTE WATER TREATMENT

Assessment Date:

December 3rd, 2015

Benefits:

- A $78,168 implementation investment will produce an estimated 615,800 kWh/yr in energy savings, with $68,680/yr in cost savings, and decrease in GHG emission of 227,850 lb/yr
- Identified potential for a 600 kW cogeneration application

Relevance:

The IAC/SFSU assessment team identified several opportunities for decreasing energy use, GHG emissions, and cost of operation. These included rescheduling of selected operations, and improving efficiency of major energy consuming equipment. The results of this audit can serve as a valuable guide to similar WWT plants for improving their wastewater treatment processes.

A strong energy portfolio for a strong America: efficient use, coupled with clean renewable energy means a stronger economy, a cleaner environment, and greater energy independence.

Summary of Results

Potential energy savings of 662,600 kWh/yr, producing cost savings of approximately $ 72,600/yr were identified by the Industrial Assessment Center of San Francisco State University (IAC/SFSU) at the Daly City Waste Water Treatment Plant in the San Francisco Bay Area. Implementation cost of these measures, after rebates, was estimated to be $ 80,171, yielding an overall simple payback period of 1.1 year. With one exception, Plant's Management decided to implement all the proposed measures for a net implementation cost of $78,168, realizing an estimated energy savings of 615,800 kWh/yr, a cost savings of $68,680/yr, as well as decrease GHG emissions by 227,850 lb/yr, and an overall simple payback period of 1.14 years,
Additionally, an RGO (Renewable Energy Generation) application for a 600 kW cogeneration system, using digester's gas, was submitted for consideration: if implemented, it would save $324,000 per year, with an annual GHG reduction of 227,850 lb/yr, and a simple payback period of 3.4 years.

Plant's background

The Daly City Waste Water Treatment Plant, located in the municipality of Daly City in Northern California, performs primary, secondary, and tertiary treatment of wastewater generated by the surrounding area. The sludge extracted in the process is anaerobically digested, producing methane gas, and then dewatered into a sludge cake. The tertiary effluent water is distributed to a local golf course and park for irrigation. The facility has 75 employees and a maximum treatment capacity up to 8 million gallons per day; on average, 2.9 billion gallons of raw sewage are treated annually.

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Assessment approach

The IAC/SFSU team performed a comprehensive assessment of the Plant's energy use in December 2015. The team consisted of eight engineering students, led by Professor Ahmad Ganji, Director of the Center at San Francisco State University. After an introductory meeting, the team toured the Plant, conducted a detailed inspection of equipment and processes, identified various potential opportunities for energy conservation, and gathered the data necessary for quantification of potential savings and estimation of the implementation costs.

Plant's energy conservation awareness

The team observed that Plant's Management is aware of the importance of conservation and its impact on cost to the community. At the time of the audit they had already implemented several energy efficiency measures including operation controls on various pumps, lighting controls and high efficiency LEDs in several areas, power demand shift, and partial use of digesters' gas to fuel boilers.

Proposed energy conservation measures

The proposed energy conservation opportunities, identified, quantified, and estimated for implementation, included:

(1) Run centrifuges during off-peak hours;
(2) Turn off half of the fans in Equalization Basin when not in use;
(3) Install VFDs on the Digester's sludge circulating pumps;
(4) Return air compressor's heat exchanger cooling water to the Secondary Clarifier;
(5) Install lighting control in various areas;
(6) Install high efficiency lighting indoor and outdoor areas;

Plant's Management decided to implement all the proposed measures, except #4, which was considered not feasible given the layout of the plant.

Additionally, the proposed implementation of 600 kW cogeneration RGO using digester's gas will likely be considered for future investments.