BASE Energy, Inc.

WEP

Agriculture and Food Wastewater Energy Program

WEP Case Study: Bell-Carter Foods

Introduction

Bell Carter Foods, located in Corning, California, has a dedicated wastewater treatment plant that captures wastewater influent from its olive canning operation. The wastewater treatment plant consists of 7 aeration ponds and 65 aeration units. In 2010 the wastewater treatment plant processed over 241 million gallons. The existing aeration system was manually controlled which presented a great opportunity for energy efficiency improvement through optimized automatic aeration controls.

BASE Energy, Inc. was chosen to recommend energy savings opportunities, to estimate the annual energy savings potential, the cost savings, and the one-time financial incentive through BASE's Wastewater Energy Program (WEP). WEP is an incentive program administered by BASE under the auspices of Pacific Gas and Electric Company. BASE worked with Bell-Carter in choosing which potential projects were most important to Bell-Carter and in gathering the necessary data to perform the estimated savings calculations.

Project Implementation

Bell-Carter implemented the project by hiring outside contractors as well as utilizing in-house personnel. The facility has broken down the wastewater treatment upgrade projects into phases, with Phase I scope including ponds 1, 2 and 3 control upgrades. Subsequent phases will include automatic controls on the remaining ponds as well as replacing existing aeration units with more energy efficient units. The two control upgrades that have been implemented as part of Phase I include:

Automatic Dissolved Oxygen (DO) Control

Typically aeration systems are manually controlled (turned on and off) by facility operators, which may result in over-aerating the wastewater. The facility installed an automatic dissolved oxygen control system to automatically turn on/off aerator units based on the dissolved oxygen level in the wastewater.

Aerator Optimum Sequencing

The aeration units used at the wastewater treatment plant are of different vintages (some old and some new). From experience, aeration efficiencies tend to deteriorate with time. Recognizing that some aeration units may be more energy efficient, the optimum sequencing controller will ensure that the most energy efficient units come online first, which will maximize their run time.

Verified Project Results

After the work was completed, BASE verified the savings by monitoring the electrical usage after installation and comparing it to the electrical usage prior to implementation of the project. The verified savings include:

- 2,743,404 kWh/yr energy savings
- 316 kW peak demand reduction
- $322,899/yr energy cost savings*
- $114,475 financial incentives (capped at 50% of project cost)
- $228,949 project cost
- About 4 months simple payback period
- 716 metric tons of CO_2 reduction in the carbon foot print

*Assuming average cost of electricity of $0.1177/kWh

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WEP

Agriculture and Food
Wastewater Energy Program

Energy Efficiency in Food Processing
& Agricultural Wastewater Treatment

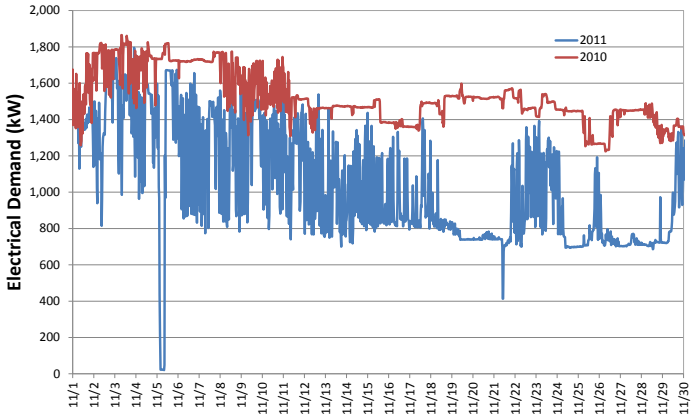

Figure 1

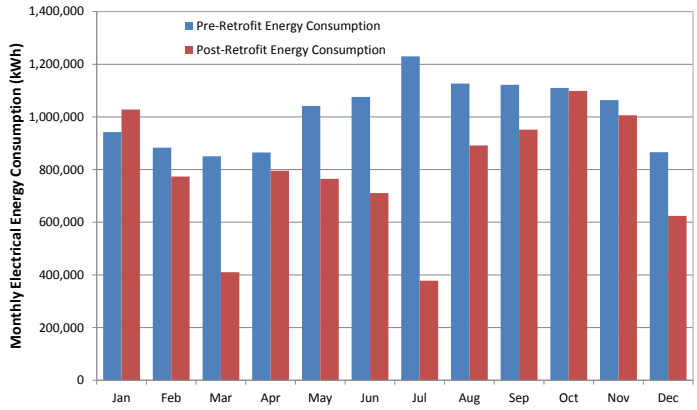

Figure 2

Phase I Energy Savings Verification

Utility demand interval data for November 2010 was used to establish a baseline energy consumption of the wastewater treatment plant prior to the upgrades. After the upgrades were implemented (mid 2011), the demand interval data for November 2011 was used to determine the energy consumption of the wastewater treatment plant. Both sets of data were then normalized with respect to the amount of wastewater treated for those two particular months. Based on the performance improvement for the month of November 2011 relative to November 2010, the energy savings was extrapolated for a full year with consideration to the monthly wastewater profile. Figure 1 compares the energy consumption for November 2010 and November 2011. Figure 2 shows the monthly baseline energy consumption and the expected energy consumption after project implementation given 2010 wastewater flow rates.

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