Solid Waste Generation and Root Cause Analysis at a Food Manufacturing Facility

Client

The client is a large food manufacturing company located in Western New York State. The company comprises of two industrial units, for two product groups. The primary sustainability goals identified by the facility are to reduce solid waste generated, reduce water consumption and reduce energy utilization.

Opportunity Areas

The company has been generating extensive quantities of solid waste from its food manufacturing process. The total annual solid waste disposal cost incurred by the entire facility was ~$500,000 in 2009. In addition, one product group (comprising of three different products which have similar manufacturing processes) has high material costs and the average cost of raw material lost per ton of waste generated is $1000. At present none of the organic waste is being utilized for alternative energy or heat generation which could potentially offset the high electricity usage and related costs.

Objectives

Evaluate waste generation data collected by the company to identify primary sources and/or root causes of solid waste generation from the manufacturing process and make recommendations to reduce waste generation. Conduct basic research to identify waste-to-energy technologies that could be installed to convert organic food waste into usable energy.

Work Performed

The data analysis revealed that the total annual cost of waste generation and disposal from one of the product groups (tipping fees + transportation costs + cost of lost raw material) is estimated to be at least ~$2.2 million. Waste only from one process step results in an annual estimated expense of ~$1.3 million (60% of the total as shown in Figure 1). A root-cause analysis of this process step showed that shutdowns in product packaging operations are the primary cause of waste generation from the investigated process step. Basic research was conducted to identify suitable waste-to-energy technologies.

Results

Short-term and long-term strategies have been recommended to reduce the solid waste generation. The short-term strategy is to increase the storage capacity (buffer capacity) of the product after the process step by purchasing storage containers or retrofitting the current storage system with additional capacity. Long-terms strategies include creating and maintaining a daily log and addressing problems/issues resulting in packaging shutdowns, and developing & delivering training programs to bring all packaging equipment operators (especially those involved in machine setup) to a consistent and higher level of proficiency. Conservatively assuming that 30% of the waste from the process step is reduced through the implementation of short- and long-term strategies, this would potentially result in estimated annual savings of ~$400,000.