Project Overview:

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Major: Chemical Engineering
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Company Background

The Nebraska Energy Office (NEO) is a government entity with a mission to promote the efficient, economic and environmentally responsible use of energy. The NEO's long standing missions include maximizing the efficient use of traditional energy sources, encouraging Nebraskans to adopt energy efficiency through low-cost financing, advising the executive and legislative branches of state government on energy policies and security, as well as encouraging the development and use of renewable energy resources.

Project Description

The NEO is working with the University of Nebraska-Lincoln to help reduce energy consumption and raise awareness on efficient energy use at treatment plants across Nebraska. This project is broken into multiple portions over the course of a few years. For the first portion of summer 2016, a detailed energy assessment for the wastewater treatment plant in Minden, NE was conducted. Additionally, energy use data from 109 mechanical wastewater treatment plants were collected for a graphical analysis. The second portion of summer 2016 included travelling to these wastewater treatment plants to conduct non-detailed assessments, as well as collect visual data on equipment and building performance. Lastly, all data collected was used to create a preliminary benchmarking model, which reflected each facility's energy intensity and the overall average energy intensity for wastewater treatment plants in Nebraska. Rough calculations were carried out to determine the cost savings and greenhouse gas reductions if wastewater treatment plants with high energy intensities were lowered to the calculated average.

Pollution Prevention Benefits

Implementation of pollution prevention opportunities can directly benefit wastewater treatment plants in terms of energy usage, cost savings, and equipment replacement. The intangible benefits associated with energy reduction include the reduction of greenhouse gas emissions, as well as improved public image and operator awareness. A summary presenting the benefits associated with the implementation of recommendations for the Minden wastewater treatment facility and if 8 out of the 19 personally visited wastewater treatment plants bearing high energy intensities were lowered to the calculated average are portrayed in table 1.1. All numerical values stated are on an estimate basis.

Table 1.1: Summary of Recommendation Benefits

Facility	Annual Energy Savings	Annual Cost Savings	Annual Greenhouse Gas Reduction
Minden WWTF	~10,000 kWh/yr	~$500/yr	~11 MT CO_2E/yr
8 of 19 Visited WWTF	~870,000 kWh/yr	~$80,000/yr	~940 MT CO_2E/yr
Total	880,000 kWh/yr	$80,500/yr	951 MT CO_2E/yr