Executive Summary

Kishwaukee Water Reclamation District

THE ROAD TO ENERGY NEUTRALITY

U.S. Department of Energy
WATER RESOURCE RECOVERY PRIZE
PHASE I

Energy Neutrality Goal

The Kishwaukee Water Reclamation District (KWRD) is a regional sanitary district that provides sanitary sewer and wastewater treatment services to a population of 45,000 within the City of DeKalb, Northern Illinois University and unincorporated areas in DeKalb County. In FY 18/19 the District spent $398,500 on electricity at their main Wastewater Treatment Facility, the largest operational expense other than personnel payroll. In an effort to not only reduce operational expenses but to also be better environmental stewards to the DeKalb community, the District established the goal of being energy neutral by 2025.

Solutions

To reach the goal of being energy neutral, the District needs to produce an amount of energy equivalent to the remaining 52% of its daily electricity consumption. There are three main opportunities that the District is looking at. The first is to expand the HSW/FOG receiving program in order to produce enough biogas to fuel a second CHP unit. At this scope, the new Electrical Building built as part of the Phase 1B Improvements to house the first CHP unit was built with space and pipe size to allow for the installation of a 2nd CHP unit and the FOG station was built with additional space for future liquefaction of food scraps.

The second opportunity would be utilizing available space to install a solar field. With the construction of a new biological nutrient removal process as part of the Phase 1B Improvements project, the District's existing Trickling Filters will no longer be in service. The Trickling Filters encompass an area of approximately one acre. Installing photovoltaic in this area could provide up to an estimated 344,500 kWh per year, or approximately 1,000 kWh per day.

The third opportunity consists of installing a Micro-Hydro turbine at the outfall (effluent) location of the plant. Based on the drop of 6ft from the bottom of the flume and an average of 5 MGD flow, the turbine would be capable of generating 22,776 kWh/year.

Results:

Energy Generated Onsite with Proposed Solutions: 23,244 MMBtu

Percent Site Energy Neutrality: 71%

Total Project Cost: $1,061,305

Payback: 8.5 years

Net Present Value (30 years): 732,658

Greenhouse gas emission reduction: 3,436,651 lb of CO2