

CASE STUDY

Illinois EPA Public Water Infrastructure Program



Kishwaukee Water Reclamation District



The Kishwaukee Water Reclamation District (KWRD) has been pursuing energy efficiency and energy recovery opportunities for many years. In October 2022, they received national recognition as a Utility of the Future Today from the Water Environment Federation, honoring their accomplishments for transformational work in watershed stewardship, community engagement, energy efficiency and resource recovery. They were the only plant in Illinois to receive this prestigious recognition. With their aim of becoming energy neutral by 2025, they are leading the way for wastewater treatment efficiency and recovery in Illinois.

Deepening Efficiency

The Kishwaukee Water Reclamation District continues to make strides to increase efficiency of their treatment system. In 2022 through early 2023, they participated in the ComEd Energy Efficiency Program Strategic Energy Management (SEM) offering, identifying behavioral and operational changes that reduce electricity use and costs. Within the course of one year, they reduced over 300,000 kWh of electricity and saved the District about \$21,000 annually. Below, we highlight some of the projects that helped the district reduce energy use and increase operational efficiency:

Boiler Water Recirculation Pump Speed Reduction – After implementing operational and control changes to their digester boiler pumps, the pump speed was reduced from 275 GPM to 175 GPM, improving heat transfer and reducing maintenance needs of the digester boilers. Savings: 200,000 kWh/year

Reduce Runtime of Grit Pumps – Timers on the plant's grit pumps only allowed scheduling in 30-minute intervals. These controls were updated to allow flow detection and are programmed for 20 minutes on, 40 minutes off. The net 20-minute reduction in runtime each pumping cycle netted significant savings. Savings: 74,000 kWh/year

Reduce Runtime of Primary Sludge Pumps – After investigation, it was found that the plants' sludge fermenter could be eliminated and primary sludge could be pumped straight to the digesters. After operations and maintenance plans were implemented, unit efficiency was improved dramatically. Savings: 18,000 kWh/year





Other smaller savings opportunities focused on blower or motor runtime settings, temperature settings, or small changes such as raising wet well level setpoints slightly. Each of these projects helped the District reduce significant energy use and increased the overall efficiency of their system and operations.

Most recommendations were low hanging fruit that could be implemented immediately without major budgetary investments by the District. The ComEd SEM program helped their plant continue its energy efficiency journey and refine their operations for higher efficiency.

Energy Recovery Systems

The first step to energy neutrality at KWRD was to install combined heat and power (CHP) generators at the plant. CHP systems capture methane from anaerobic digestion of biological solids and turn it into electricity for the plant. Kishwaukee installed their first CHP generator in 2020 and recently added a 2nd generator to use additional methane gas that they were producing. CHP systems are not the simplest systems to operate and need significant attention to keep them running properly each day. However, the benefits of reducing utility costs of treatment by using gas that would have been flared off highly outweigh the challenges for their facility.

With the ability to produce up to 125% of the plant's electrical power through their CHP generators fueled by biogas, Kishwaukee is now reviewing other technologies to help them achieve energy neutrality. To use more power across the plant, they will be consolidating their electricity accounts to ensure generated electricity can travel throughout the plant where needed. They also have identified open areas on their property where KWRD could generate more than 4,000 kWh of electricity per day through solar panels. They are also considering the installation of a micro-turbine at the point where their treated water discharges into the Kishwaukee River, using the flow of effluent water to generate electricity through hydrokinetic power.



Kishwaukee also plans to continue engaging and educating both the industry and public on all the work they accomplish to achieve energy neutrality and serve as a model plant in Illinois. We look forward to continuing to work with the KWRD to uncover opportunities and help more wastewater professionals follow their lead.

Learn more about the program and apply now for your no-cost energy assessment now!
APPLY @ www.smartenergy.illinois.edu/water

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