

CASE STUDY

Illinois EPA Public Water Infrastructure Program

Village of Heyworth WWTP Case Study

In 2022, the Village of Heyworth wastewater treatment plant, a 1.0 MGD lagoon system, faced an electric supply hike of nearly 78%. This hike increased their overall electric bill by about 40% and drove annual operating costs up over \$12,000 per year. The Village Engineer, David Shafer, had already been implementing energy conservation measures at the plant to address rising energy costs. Installing LEDs in their plant office and lift stations lowered their overall energy use, as did installing a flow-paced aeration system for the primary lagoon, but more would need to be done to keep operational costs under control. To identify deeper opportunities for energy savings, David reached out to the Smart Energy Design Assistance Center (SEDAC) for an energy assessment of their plant.



Identifying Energy-Savings through Assessment

SEDAC had already completed an assessment of the Heyworth Water Treatment Plant in December 2020, so David knew what the assessment process would entail. “The assessment process is fairly painless,” he said. “For a minimal investment of time to pull together some bills and records, I would get significantly greater benefits. It’s a nominal investment to obtain an actionable report.”

In February 2022, SEDAC performed an assessment of the Heyworth Wastewater Treatment Plant, plus the two lift stations serving the plant. In combination with documentation supplied by David, our report identified 6,000 kWh of potential energy savings for the plant with paybacks within 7 years, as well as an additional 40,000 kWh of savings for lift station improvements. Recommendations for lift stations, however, were beyond a 7-year payback period.



Measure	Electric Savings (kWh)	Cost Savings	Estimated Cost with Incentives	Estimated Payback Period
Install TLED Lights	500	\$60	\$470	7.4
Install Wall Pack Photocell	1,000	\$120	\$420	3.5
Install Wall Pack Motion Sensors	700	\$90	\$390	4.4
Repair Filter Pump Seals	3,700	\$450	\$1,800	4.0
Install Lift Station Variable Frequency Drives (VFDs) (North)	33,700	\$4,100	\$30,900	7.6
Install Lift Station VFDs (SW)	7,000	\$840	\$28,400	34

Table 1. Village of Heyworth WWTP Report Recommendations

David remarked, “The report was shared with our Village Budget Committee and provides focus and perspective on energy consumption, which allows energy to be a component of the decision-making process. The report helps shift the Committee’s focus from only costs to long term investment considerations.” Rather than focusing solely on minimizing upfront costs for projects, the report is helping the Village to target long-term benefits such as reduced energy consumption, improved resilience, and plant reliability that will yield greater cost savings over time.

Taking Action to Achieve Energy Efficiency

Not long after receiving their energy assessment report for the plant, the sand filter dosing pumps failed. SEDAC’s report had noted that both pumps may not be properly sized for their current application; therefore, SEDAC recommended that the plant reduce energy use through proper sizing when replacements were needed. As a result of that recommendation, when the dosing pumps failed, the pump contractor worked with the village to right-size the pumps rather than just replacing existing pumps with similar models.

The original two dosing pumps were about 27 HP (pulling 31-34 amps) and pump efficiency was only at 45%. In May 2022, the two dosing pumps were tested for performance before replacement and found to be oversized for the plant’s needs. Village engineers replaced the units with two new 74% efficient 15 HP pumps resulting in energy savings of about 40% of the original pump energy, and 6% of total plant energy. Incentives from the Ameren Illinois Energy Efficiency

Program provided incentives that covered 15% of the equipment cost of the pumps, resulting in a total project payback of about 13 years, and monthly energy savings of about \$200 per month.

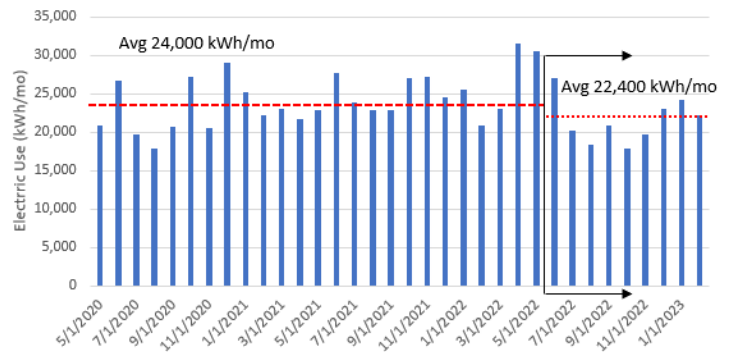


Figure 2. Sand filter dosing pump electrical savings.

This graph shows the impact of the sand filter dosing pump replacement. Note the 6% energy savings after the installation of the new pumps in May of 2022.

Planning for the Future

The Village of Heyworth has not completed its energy resilience journey. They recently received \$1.6M in federal funding for infrastructure improvement projects, which will be used to line and grout the plant’s collection system throughout the community. Once these projects are completed, their next priority is to improve lift station performance. David plans to take another look at the plant’s lift stations to evaluate whether VFDs would be a good application for pumps or whether they should be replaced with more efficient models based on SEDAC’s report recommendations and reduced flows from the lining projects.

Additionally, the village has been approached by a floating solar vendor to lease area on two of the plant’s lagoons to install a 3 MW community solar system. The Village of Heyworth is exploring a potential lease agreement, which could provide funding for future plant

upgrades, or a Power Purchase Agreement (PPA) option that would allow the village to reduce and stabilize their energy prices. We look forward to working with the Village of Heyworth as they continue their journey towards energy efficiency and exploration of energy resilience for their system.



Learn more about the program and apply now for your no-cost energy assessment now!

APPLY @ www.smartenergy.illinois.edu/water

Funding provided in whole or in part by the Illinois EPA Office of Energy. This program is in partnership with the U.S. Dept. of Energy Sustainable Wastewater Infrastructure of the Future (SWIFt) Accelerator for energy efficiency in wastewater and water treatment.
Illinois EPA: epa.illinois.gov/topics/energy/eewwtp.html



Energy Efficiency & Renewable Energy

