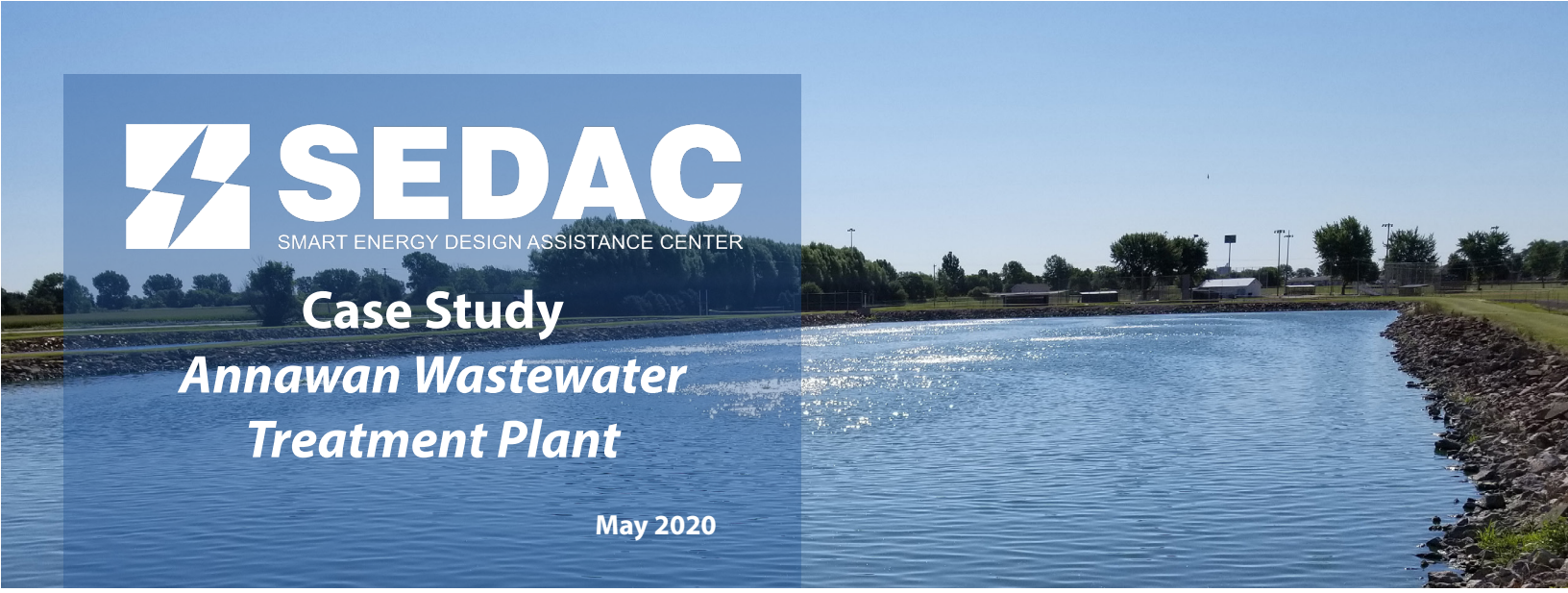


SEDAC
SMART ENERGY DESIGN ASSISTANCE CENTER

Case Study
Annawan Wastewater Treatment Plant

May 2020

Most energy assessments identify energy efficiency measures to save facilities between 10% and 30% on annual energy costs. Sometimes the savings opportunities are much more significant.

In 2018, Village of Annawan Wastewater Treatment Plant Operator Mark Crosby reached out to SEDAC to participate in the Illinois EPA Wastewater Treatment Plant Assessment Program. The goal was to find ways to save money on energy bills for this village of just under 1,000 residents. SEDAC identified measures that would reduce electricity use by **66%, an energy savings of $9,600 per year** for the Village of Annawan.

Mr. Crosby applied for funding from the Illinois EPA to implement SEDAC's recommended measures. In the fall of 2019, they received a $130,000 grant to cover most of the project costs, and they implemented the measures in December.

Significant Energy Savings

SEDAC completed a site visit and utility bill analysis for the Annawan Wastewater Treatment Plant. After evaluation, SEDAC recommended a package of two energy-saving measures: fine bubble aeration with blower controls, and downsizing blowers.

The original plant was oversized in anticipation of growth that has not happened. The oversized motors consumed more energy than necessary to process the amount of flow Annawan currently sees. Resizing the plant's motors and modernizing the facility's aeration equipment will greatly increase efficiency resulting in a significant reduction in energy costs.

Table 1. Energy Cost Reduction Measure Analysis

Measure	Electricity Savings (kWh)	Energy Cost Savings
Fine Bubble Aeration with Blower Controls	73,000	$6,900
Downsizing Blowers	28,000	$2,700
Total	**101,000**	**$9,600**

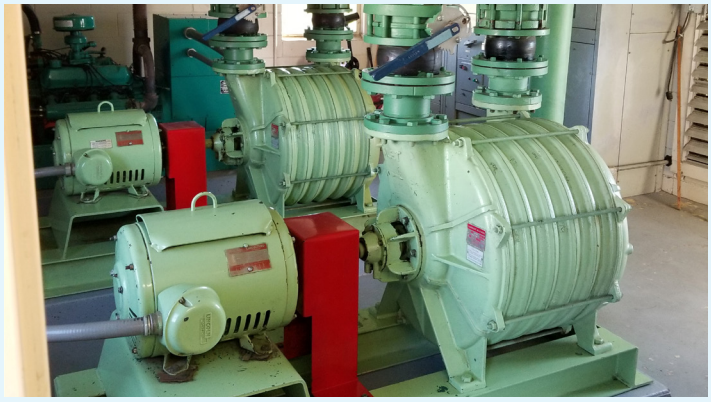
Current Operation	Proposed Operation
$14,500	$9,600 in savings
	$4,900

Implementation and Funding

Fine bubble aeration

The lagoons at Annawan Wastewater Treatment Plant had a course bubble aeration system which provides oxygen to feed the biological processes. Fine bubble aeration has roughly double the oxygen transfer efficiency of course bubble aeration, which can cut energy consumption by half.

Replacing the aeration heads with fine bubble diffusers will increase the efficiency of oxygen transfer into the water and allow the dissolved oxygen levels to be met while reducing the energy usage of a blower.



Downsizing blowers

The Annawan Wastewater Treatment Plant was oversized for the watewater it manages. The blowers were throttled down to prevent over-aeration, causing unnecessary waste by providing more energy than necessary.

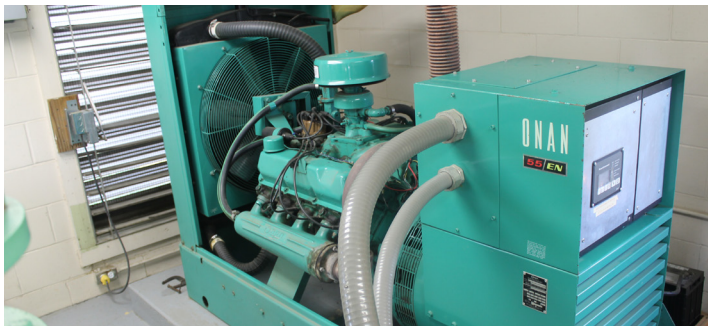
Downsizing the aeration system would save money and energy over the system's lifespan. SEDAC recommended downsizing and modernizing the system. Combined with fine bubble aeration, system efficiency will increase as much as 50%, allowing a smaller design to treat the same amount of water with less energy.

To cover project costs, Mr. Crosby applied for an energy efficiency grant through the Illinois EPA Office of Energy. He received $130,000, enough to cover the majority of the project costs.

While implementing SEDAC's recommended measures, the Village of Annawan also replaced lighting, windows, and doors. Underground piping was also replaced.

As is sometimes the case, the project ended up costing more than anticipated, but with an estimated energy savings of almost $10,000 per year, the energy savings are projected to exceed the project cost in about 4 years.

"I would highly recommend working with SEDAC for an energy assessment. SEDAC engineers were really good to work with and very nice. Working with Illinois EPA through the grant process was also great."
--Mark Crosby



Learn more

No-cost energy assessments are available to all municipal or county wastewater treatment plants in Illinois. Funding provided in whole or in part by the Illinois EPA Office of Energy.

Learn more at **sedac.org/wastewater**

Who we are

The Smart Energy Design Assistance Center assists buildings and communities in achieving energy efficiency, saving money, and becoming more sustainable. SEDAC is an applied research program at the University of Illinois at Urbana-Champaign working in collaboration with 360 Energy Group. SEDAC services to save energy and money include:

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