MN Drinking Water Utilities

Tiffany Schindler
Physics
University of Minnesota Twin Cities

Project Background

MnTAP hired a student researcher in September 2019 to assist in a market study on energy efficiency at drinking water utilities in the state of Minnesota. Drinking water utilities in Minnesota are estimated to use 379 million kilowatt hours (kWh) per year. Funded by a CARD Grant from the Minnesota Department of Commerce, this ongoing project aims to find best practices for energy management in water treatment plants (WTP) and relay this information to electric utilities that can create rebate programs to incentivize changes.

"This internship gave me the opportunity to use what I had been taught in a classroom in a real setting. I was able to gain experience and confidence in analysis, communication, and time management while working to make an impact in one of the most universal industries. I don't think I'll ever see water the same again." ~ TS

Why Drinking Water Utilities?

Drinking water utilities are one of the most widespread industries across the nation, yet most research is focused on utilities that serve over 100,000 people. In Minnesota, this only includes four cities out of the 655 cities that have municipal water permits. Smaller utilities have fewer resources to investigate efficiency opportunities and lack the time and capital to optimize their current system. Best-practices and rebate programs can allow utilities to increase their efficiency despite a lack of resources.

Project Goal

The main goal is to help electric utilities create rebate programs in order to incentivize energy efficiency upgrades in drinking water utilities. Specific goals include:

- Gaining an understanding of drinking water utility operations by interviewing a state-wide representative sample.
- Analyzing energy costs of WTPs to find where energy is used and identify efficiency opportunities.
- Conducting assessments for specific opportunities.
- Estimating energy savings for identified opportunities.
- Reporting best-practices to energy utilities.

Key Research Findings

Energy footprints were calculated for each site that provided energy data. These footprints were calculated for each plant overall and for acquisition, treatment, and distribution. These footprints indicate that treatment is typically the least energy intensive operation and that acquisition and distribution use a similar amount of energy. These findings will help identify potential energy efficiency upgrades for this industry and help electric utilities develop rebates for common upgrades.

Size	Acquisition (MG/kWh)	Treatment (MG/kWh)	Distribution (MG/kWh)
Small	1,100	400	1,000
Medium	700	300	600
Large	900	450	900
Overall	900	350	900

MnTAP Advisor: Brent Vizanko, Associate Engineer