# Village of Akron Water District

# Energy Assessment

# June 2020

*Figure 1: Murder Creek Reservoir*

**Energy Efficiency Program Overview:**

During June 2020, the New York Rural Water Association conducted an energy assessment for the Village of Akron Water Treatment System. The assessment was provided free of charge to your system thanks to funding provided by the United States Department of Agriculture (USDA), Rural Development. The purpose of the assessment is to determine if there are operational and / or equipment changes that will result in less energy consumption, and cost savings for the Village of Akron. John Asmus, Chief Operator, provided our staff with copies of all the necessary utility bills and operational reports, as well as detailed information regarding the operation of the water system. We conducted an onsite tour of the system and documented pump and motor information, as well as lighting and HVAC requirements. John Asmus was polite and professional throughout the process, and it was a pleasure to work with him during this assessment.

**Executive Summary of Potential Energy / Money savings:**

The executive Summary Table below illustrates the potential energy and financial savings we identified during our assessment. It also provides you with an estimated cost for each upgrade and the payback period necessary to achieve these improvements

| Project Item | Energy Conservation Measure Description | Annual Energy Savings ($) | Estimated Cost of Improvement ($) | Rebate Total ($) | Pay Back (Years) | Annual kWh Savings |
|---|---|---|---|---|---|---|
| 1 | Install VFD | $306 | $770 | $0 | 2.5 | 15,582 |
| | | | | | | |

**Project Item #1**: This project line item refers to the installation of a variable frequency drive on the Service Water Pump. The project has an estimated cost of $770 and could lead to annual energy savings of 15,582 kW/h. This would lead to annual cost savings of $306 and would have a return on investment of 2.5 years.

**Project Overview:**

The Akron Water District services a population of approximately 3085 people through 1178 service connections. The Village's first municipal water system was installed at the turn of the 20$^{th}$ century, but outbreaks of Typhoid in the 1910's led the Village to seek a clean and sustainable water source. A 400-acre valley was purchased 15 miles South of Akron in the town of Bennington, NY. In 1925 the creek running through the parcel was dammed to create a 90-acre reservoir.

**How is treatment accomplished?** The Village is supplied water by the Murder Creek Reservoir. The treatment plant is located adjacent to the reservoir in the town of Darien Center, NY. Water enters the plant by gravity. A flocculant is added to cause small particles to clump together before the water is filtered through two large package filters. The floc is pulled out of the water as it passes through the filter beds. After filtration, Chlorine is added to the water for bacterial disinfection. Carbon and Caustic are also added to adjust taste, odor, and PH. Although the treatment facility is located 15 miles from the Village of Akron, the facility is 300ft higher in elevation than the Village and is able to utilize gravity to feed clean water to the Village.

*Figure 2: Backwash Pumps*

**From January – December**: Your system treated 159,498,000 gallons of water. The average treated flow per month was 13,292,000 gallons, meaning the average daily treated water flow was roughly 443,000 gallons. Your water treatment system is operated exceptionally well by the staff.

**Energy Efficiency Observations/ Opportunities:**

The Akron Water District is provided both the electric delivery and the supply portions by provided by National Grid. Currently, National Grid is charging $0.005045 per kilowatt hour for delivery, and $0.0240 per kilowatt hour for supply. The New York State average is $0.04 kW/h: your supply charge is $0.016 below the state average. Your combined electric charge is $0.029045 per kilowatt hour.

However, being a commercial electric user, and based on your local load factor created when your equipment “starts up”, there is another charge identified as demand charge. Demand is the rate at which electric energy is used at any instant or averaged over any designated period of time and is measure in kilowatts (kW). The demand kW is measured by the electric meter as the highest average demand in any 15-minute period during the month. This is the amount of electric load required by the customer’s electric equipment operating at any given time. Your current rate is $11.60, which is $1.29 higher than the state average of $10.31/kW.

**From January – December**: Your system consumed 91,670 kWh of electricity at a total cost of $2,198. Given this information, it cost your system an average of $0.01 in electric fees to treat each 1,000 gallons of drinking water.

| | |
|---|---|
| **Plant Annual Water Treatment Flow (TGAL/Year)** | **159,498** |
| **Plant Average Water Treatment Flow (TGAL/Month)** | **13,292** |
| **Plant Average Energy Cost Per Thousand Gallons Water Treated ($/TGAL)** | **$0.01** |

**Electric Usage:**

This section will provide a breakdown and description of your water systems major energy consuming devices.

**Pumps:** The treatment facility uses 10 pumps to move water through the treatment and distribution process. Eight of the ten pumps are listed below with suggested recommendations.

| Major Process/Top Energy Use Systems | Motor Efficiency (%) | Efficiency Rating | Electric Energy Use (%) | Electric Energy Use (kWh) | Electric Energy Cost ($) |
|---|---|---|---|---|---|
| Chemical Mix and Feed | | | | | |
| Mixer - Chemical Mixer | 87.5 | Medium | 0.76% | 700 | $16.79 |
| Pump - Chemical Feed Pump | 94 | High | 1.42% | 1,304 | $31.26 |
| Internal Plant Pumping | | | | | |
| Pump - Backwash Pump 1 | 90 | Medium | 0.73% | 668 | $16.03 |
| Pump - Backwash Pump 2 | 90 | Medium | 0.73% | 668 | $16.03 |
| Pump - Low Level Pump 1 | 90 | Medium | 0.00% | 3 | $0.07 |
| Pump - Low Level Pump 2 | 90 | Medium | 0.00% | 3 | $0.07 |
| Pump - Service Water Pump | 86.5 | Medium | 30.91% | 28,331 | $679.44 |
| Pump - WW Return Pump 1 | 87 | Medium | 0.29% | 264 | $6.34 |
| Pump - WW Return Pump 2 | 87 | Medium | 0.29% | 264 | $6.34 |

1) Recommendations: None of these pumps are currently utilizing a Variable Frequency Device. Nine of the ten pumps are not good candidates for VFD's due to their infrequent usage, but the service water pump is prime candidate for a VFD. We recommend installing a variable frequency drive on the service water pump. Also, as pumps reach the end of their service life more efficient pumps should be considered as their replacement.

**HVAC / Lighting:** The second largest electric consumption is from the: HVAC, lighting, controls, and miscellaneous equipment. These functions are essential to the operation of the facility and are operated efficiently. We make no recommended changes to these processes.

As part of the assessment, we review the general system operation with your staff and personnel. We want to note that there are no recommended changes to your operations schedule. Your operations specialists do and excellent job operating and maintaining the drinking water system.

**Note**: Everyone involved with the management and operation of the water treatment plant should be commended. As mentioned, it costs your system $0.01 in electrical fees to treat 1,000 gallons of water. The average cost we see in our assessments is approximately $ 0.10 /1,000 gallons. Your system is operated effectively and has a very efficient design.

**Data Collection and Maintenance:**

The database used to input your billing and flow data was used to generate the charts and information provided. It will track your data over a 5-year period, allowing for an accurate accounting of trends when considering electric costs and water flow. We will provide your personnel with a copy of the database created, and encourage them to input future utility system billing and flow data to help you track any inefficacies in your system and to promote a much more sustainable system for the future.

**Energy Efficiency recommendation:**

a. **Installation of a Variable Frequency Drive on the Service Water Pump:** Installing a VFD on this 5 hp pump could lead to annual savings of $306.00. The savings would be a result of reducing the pump's electric usage by 15,582 kW/h annually. The cost of this improvement would be $770.00 and have a return on investment of 2.5 years.

**Sources of Funding:**

- **DSIRE**- www.dsireusa.org is the most comprehensive source of information on incentives and policies that support renewables and energy efficiency in the unites states. It is funded by the Department of Energy
- **USDA** (Unites States Department of Agriculture), Rural Development – Provides financing for Water, Waste Water, Solid Waste, and Storm Water facilities for a number of purposes including, but not limited to, energy efficiency improvements.
- **National Rural Water Association** (NRWA) – has a Rural Water Loan Fund specifically designed to meet the needs of small water and waste water systems. The have established a new emphasis on energy efficiency projects that improve water and/or waste water sustainability through lower energy costs. There are no administrative or processing fees involved with this loan program.
    - Key Points
        - Low interest rate (currently 3%)
        - $100,000 maximum or 75% of project cost, whichever is less
        - Maximum 10-year term
        - Quick turnaround (generally only a few days from application to funds

    www.nrwa.org/initiatives/revolving-loan-fund/ for more information

- **NYSERDA** (New York State Energy Research and Development Authority- Provide various incentives and initiatives for energy efficiency projects. Further information can be found at www.nyserda.ny.gov

**Closing**:

The New York Rural Water Association would like to thank you for the opportunity to provide this Energy Efficiency Assessment Report. Your personnel have been very kind and courteous, and it was a please working with them. Should you have and questions or concerns, please contact our assessor, Jacob Gardner, at 518-751-6242 or by email at gardner@nyruralwater.org