Smart Management for Small Water Systems

Identifying Potential Energy Management Projects at Your Small Drinking Water System

This program is made possible under a cooperative agreement with EPA.

EFCN environmental finance center network

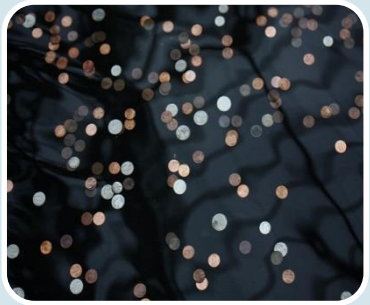
American Water Works Association

UNC ENVIRONMENTAL FINANCE CENTER

Environmental Finance Center Syracuse University

Review from Workshop One

Should a small water utility care about energy?



2 trillion gallons of H_2O: estimated amount pumped each year by small systems.

$1 billion: estimated electric power costs per year for these small systems.

$10 million: annual electric bill savings from a 1% reduction in electric costs.

$100 million: annual electric bill savings from a 10% reduction in electric costs.

Source: Regnier and Winters, "Reducing electric power costs in small water systems," Journal AWWA, April 2013, 67-72.

Can your utility reduce energy costs?

PUMPS

- All pumps
  - Variable speed?
  - Premium efficiency motors?
- High Lift Pumps
  - Operate during off-peak hours?
  - Utilize in system storage to minimize peak hour pumping?

FLOCCULATION/COAGULATION

- Are mixers 2 speed or VFDs
- Do mixers have premium efficiency motors?

FILTRATION

- Backwash based on water quality or pressure?
- Do you have elevated backwash water storage tanks?
- Do pumps, blowers, compressors have premium efficiency motors?

NYSERDA Focus SMALL WATER TREATMENT PLANT CHECKLIST

http://www.nyserda.ny.gov/-/media/Files/EERP/Commercial/Sector/Municipalities/water-treatment-plant-check-list.pdf

Do any of these ideas sound promising for your system?

Can your utility reduce energy costs?

DISINFECTION

- UV System
  - utilize low-pressure, high-output lamps?
  - is system operated via flow-pacing and/or dosing setpoint?
- use ozone as a disinfectant?

RESIDUAL MANAGEMENT

- haul residuals to another location for processing?
- residuals currently used as part of a beneficial reuse program?
- utilize centrifuges for dewatering residuals?

OTHER

- energy improvement projects in last 5 years?
  - involved more efficient lighting?
  - involved load shedding and/or off-peak load shifting?
  - involved installation of new or improved HVAC equipment?
- capacity expansion and/or other upgrade projects in next 2 years?
  - are energy conservation measures included within the improvements?

NYSERDA Focus SMALL WATER TREATMENT PLANT CHECKLIST

http://www.nyserda.ny.gov/-/media/Files/EERP/Commercial/Sector/Municipalities/water-treatment-plant-check-list.pdf

Do any of these ideas sound promising for your system?

Why does the EPA want you here?

- Energy represents the largest controllable costs of providing water to the public
- Help water systems meet regulatory requirements to protect public health and the environment

Energy Management Goals

- Improve energy efficiency & manage total energy consumption
- Control peak demand for energy
- Manage energy cost volatility
- Improve energy reliability

Do any of these goals lead you to ideas for energy projects for your small water system?

Improve Efficiency & Manage Total Consumption

- Cost of electricity is based on two main components
  - Quantity of electricity used (kWh)
  - Demand for electricity
- On-peak vs. off-peak consumption affects rates
- Understanding the electric utility's pricing policies (rate structures) is critically important

Control Peak Demand for Energy

- Electric utilities typically include a “demand charge” in their rate structure
- Lower variability in electric demand over time (flattened demand curve)
  - Minimize changes in peak demand throughout the course of a billing period
  - Shifting loads from peak periods, typically during daylight hours, to off-peak periods
- Potential for significant cost savings by minimizing demand charges

Manage Energy Cost Volatility

- Energy costs fluctuate
- Dramatic changes stress budgets
- Protect against volatility as much as possible
  - Reducing need for energy
  - Long-term procurement of energy
  - Provisions for alternative energy sources
  - On-site generation of energy

Improve Energy Reliability

- Water utilities should be able to provide critical systems with adequate backup power
- Energy planning process should identify opportunities to improve energy reliability
  - Protection against complete loss
  - Identify changes in power quality that can damage equipment and/or
  - Institute operating procedures to address changes in overall power availability