



Smart Management for  
Small Water Systems

# Managing Energy at Your Small Drinking Water System – A Workshop Series for New Hampshire Utilities

Workshop 1 – 07/19/16  
Ashland Fire Station, Ashland, NH

Facilitator – Stacey Isaac Berahzer

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



UNC  
ENVIRONMENTAL  
FINANCE CENTER



Environmental  
Finance  
Center  

---

Syracuse University

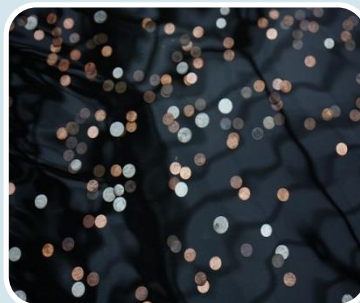


# Why are we here?





## Should a small water utility care about energy?



2 trillion  
gallons of  
H<sub>2</sub>O:  
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.nyserdera.ny.gov/-/media/Files/EERP/Commercial/Sector/Municipalities/water-treatment-plant-check-list.pdf>





# 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>



# 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



# 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



# Process: Energy Management Workshop Series



Who: Dawn Nall, Southwest Environmental Finance Center

What: On-Site Level 1 Energy Assessment

Where: Your Water System



# Energy Audit – Asset Inventory

Energy Use Inventory

ID Number	Asset Name	Type of Energy Used	Nameplate HP	Variable Speed Y/N	Measured Power Consumption (units)	Hours of Operation per Year	Total kWh per Year	Peak Energy Demand	Average Run Time	Operating Status	Design Specs.	Avg. Cost cents/kWh	Total Cost





# Energy Management Workshop Series



Who: Stacey Isaac Berahzer, Environmental Finance Center at UNC, Luis Adorno, NHDES; Paul Hausmann, Eversource Energy

What: One Day Workshop Covering:

- Overview of Energy Management Planning
- Review of Energy Assessments
- Understanding Energy Bill

When: July 19<sup>th</sup>, 2016

Where: Ashland, NH



# Energy Management Workshop Series



Who: David Tucker, Environmental Finance Center at UNC;  
Various speakers on financing options and VFDs?

What: One Day Workshop Covering:

- Approaches to Project Prioritization
- Traditional Financing Mechanisms
- Special Financing Mechanisms
- Etc.

When: August 24<sup>th</sup>, 2016

Where: TBD



# Energy Management Workshop Series



Who: David Tucker, Environmental Finance Center at UNC,  
Special Topic Speakers, TBD

What: One Day Workshop Covering:

- Maintaining Momentum
- Communication Strategies
- Special Energy Topics (Renewables?)

When: September 28<sup>th</sup>, 2016 (*tentative*)

Where: TBD

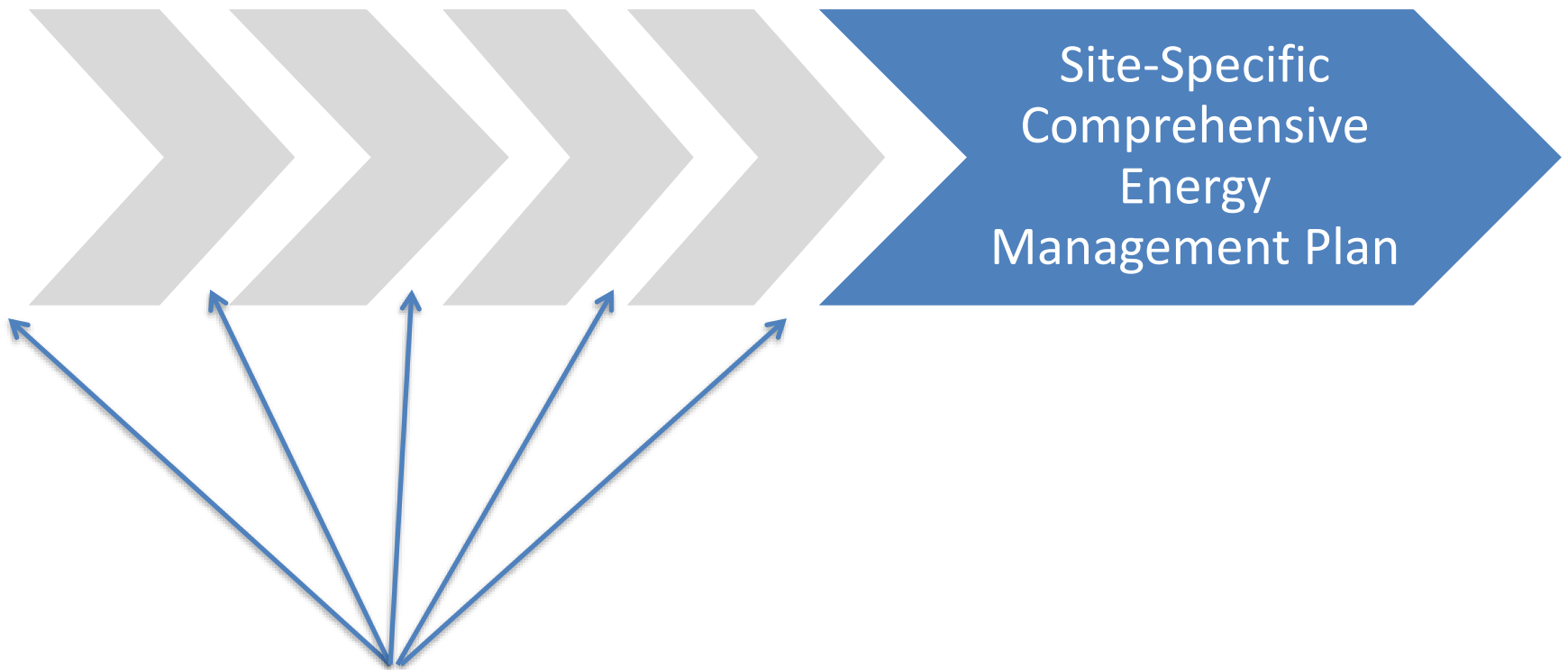


# Energy Management Workshop Series





# Energy Management Workshop Series



😊 Homework 😊