



Smart Management for
Small Water Systems

Managing Energy at Your Small Drinking Water System – A Workshop Series for North Carolina Utilities

Workshop 1 – Tuesday, 11/29/16

Land-of-Sky Regional Council,
Asheville, NC

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Introduction to Water System Energy Management Steps (NYSERDA model)



Who is NYSERDA?

- New York State Energy Research & Development Authority
- Public benefit corporation created in 1975
- Mission:
 - Use innovation and technology to solve some of New York's most difficult energy and environmental problems in ways that improve the state's economy
- Municipal water and wastewater sectors are a target to strategically reduce energy consumption in New York



Energy Management Program - Basic Steps

- Step 1. Establish Organizational Commitment
- Step 2. Develop a Baseline of Energy Use
- Step 3. Evaluate the System and Collect Data
- Step 4. Identify Energy Efficiency Opportunities
- Step 5. Prioritize Opportunities for Implementation
- Step 6. Develop an Implementation Plan
- Step 7. Provide for Progress Tracking and Reporting

Source: NYSERDA



Step 1 – Establish Organizational Commitment

- Is your team defined? Is your team diverse?
- Does it represent various interests and responsibilities within the facility? (Owner, operators, users?)
- Team responsibilities include: develop the plan, establish goals, define the resources needed, provide information to others (i.e. CIP team)



Why Bother?

- Without the commitment of several individuals at varying levels within your utility, successful implementation of an energy management plan will be difficult
- Think of The Avengers – no one individual could have saved the city; it took all of them working towards a common goal to be successful!





Step 2 - Developing An Energy Baseline – What Should You Do?

- Gather basic information
 - One year of data minimum
 - Examples: utility billing records, O&M records, equipment or motor lists (horsepower & load)
- Organize treatment processes by functional area
- Evaluate energy bills and understand the energy rate structure



Developing An Energy Baseline – What Else Should You Do?

- Review facility use data and compare it to energy use
 - Identify wet weather, seasonal patterns.
- Build a basic ‘model’ to organize data, and capture energy use patterns.
- Create basic graphics and reports to communicate initial findings.



Why Bother?



- Energy efficiency gains = \$\$ saved
 - The process of investigating energy use, and improving awareness among staff, can provide measurable energy efficiency gains on the order of 3-5%.
- Value shown before resources committed
 - Successfully developing a basic understanding of energy use can be a good ‘early victory,’ allowing the team to demonstrate some value even before any significant resources are committed to the program.



Step 3- Evaluate the System and Collect Data

- This step goes beyond the baseline development (historical records). It involves data collection in the field
 - System walk-through (note operational information, motor sizes, etc.)
 - Staff interviews (operational practices, maintenance practices/history, take suggestions)
 - Energy performance data (field data from direct measurements, average equipment run time, sub-metering, etc.)



Step 4: Identify Energy Efficiency Opportunities

- Energy efficiency opportunities can be defined as any system change that helps to reach a stated energy management goal.
- At this stage the energy management team should identify a broad array of energy efficiency opportunities



Categories for Energy Efficiency Opportunities

- Capital program or equipment replacement
- Process change
- Operational change
- Automation or controls
- Maintenance improvements
- Business measures



Step 5: Prioritize Opportunities for Implementation

- The final product of this step is a short list of energy efficiency opportunities that have been selected and carefully evaluated out of the list of opportunities generated in the previous step
- Identify a consistent method to compare and rank opportunities (consider both the monetary and non-monetary)



Keys to Success

- Convert all energy efficiency opportunities characteristics to monetary terms whenever possible.
- Evaluate all energy management, including ancillary benefits when possible.
- Test the sensitivity of results to determine the impact of important assumptions (e.g. time horizons).
- Make sure that the final results make sense in terms of the utility's capabilities.



Step 6: Develop an Implementation Plan

- How to Do It – Business Plan
- Actions required in this step include the following:
 - List the projects chosen for implementation and describe the goals and objectives of the program
 - Explain the resources needed, including a budget and financing plan
 - Develop any specifications needed, including design criteria and procurement related documents



Step 6: Develop an Implementation Plan

- Actions required (cont.):
 - Provide any changes in standard operating procedures, and/or process control strategies
 - Set the schedule for implementation, including milestones and gaining the necessary regulatory approvals (if applicable)
 - Set realistic expectations for the project in terms of resources required, schedule, procurement time frame, and expected results



Step 7: Provide for Progress Tracking and Reporting

- The success of a project should be measured as it is being implemented.
- The specific actions required in this step include the following:
 - Assign the responsibility for tracking the progress of a project and reporting on that progress. Allocate the resources necessary to fulfill the responsibilities.



Step 7: Provide for Progress Tracking and Reporting

- The specific actions required (cont.):
 - Set the performance metrics that will be used.
 - Create a communication plan.
 - Identify who needs to be included in progress reports (examples: elected officials, public, etc.), when reports should be made, and any actions that need to occur in response to reports.



Constraints on Implementing an Energy Program

- Organizational constraints
- Capital costs
- Process reliability
- Regulatory requirements and limits
- O&M capabilities, and non-energy O&M costs
- Engineering constraints
- Space availability



Tools: NYSERDA Water & Wastewater Energy Management Best Practices Handbook

Download from:

[https://www.nyserda.ny.gov/-
/media/Files/EERP/Commercial/Sector/Municipalities/water-
wastewater-energy-management.pdf](https://www.nyserda.ny.gov/-/media/Files/EERP/Commercial/Sector/Municipalities/water-wastewater-energy-management.pdf)

Also from NYSERDA : Checklist, Benchmarking, Payback Analysis tools

Best Practices in One-page Format:

- General
- Water
- Wastewater
- Buildings



EXERCISE: Assessing Energy Management Systems for Best Practices

(adapted from ENERGY STAR)

- Fill out the handout by circling which column applies to each category (row) for your water system at present.
- Share with a partner / the group.
- We'll repeat this exercise at the end of Workshop Three to see how you have progressed! 😊