



Step 4: Identify Energy Efficiency Opportunities



The energy management team should identify a broad array of energy efficiency opportunities



Energy Efficiency Opportunities

- Defined as any system change that helps to reach a stated energy management goal
- Identify a broad array of opportunities (in the next step we'll prioritize)
- Think about what you found during Step 3 – Evaluate the System and Collect the Data
- Ideas can come from reference materials, success stories, interviews with staff, energy providers, consultants



Categories for Energy Efficiency Opportunities

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



Tools and Resources

- NYSERDA's Water and Wastewater Energy Management Best Practices Handbook
- Utah's Drinking Water Energy (Cost) Savings Handbook
- EFC's Energy Efficiency Opportunities List
- Case Studies and Checklists



NYSERDA's Best Practices

Facility Energy Assessment*

Real Time Energy Monitoring*

Energy Education for Facility Personnel*

Comprehensive Planning Before Design*

Design Flexibility for Today and Tomorrow*

Electric Peak Reduction*

Manage Electric Rate Structure*

Idle or Turn off Equipment*

Electric Motors: Install High Efficiency Motors*

Electric Motors: Automate to Monitor and Control*

Supervisory Control and Data Acquisition (SCADA)

Electric Motors: Variable Frequency Drives Applications*

Electric Motors: Correctly Size Motors

Electric Motors: Properly Maintain Motors

Electric Motors: Improve Power Factor

Pumps: Optimize Pump System Efficiency*
Pumps: Reduce Pumping Flow

Pumps: Reduce Pumping Head

Pumps: Avoid Pump Discharge Throttling*

Filtration: Sequence Backwash Cycles

Ultraviolet (UV) Disinfection Options*

Renewable Energy Options*

Integrate System Demand and Power Demand*

Computer-Assisted Design and Operation*

System Leak Detection and Repair*

Manage Well Production and Draw-down*

Sequence Well Operation*

Optimize Storage Capacity

Promote Water Conservation*

Sprinkling Reduction Program*

Manage High Volume Users*



Utah's Savings Handbook

- Water Conservation
- Water Accountability
- System Inefficiencies
 - Looping
 - Leaping
 - Losing Head
 - Loading
- Supply Side
- Demand Side
- Pumping
- Storage
- Distribution
- Plant
- Technology
- Operational
- Behavioral
- Energy Supplier



EFC's Project List

- Raw and Finished Water Pumping
- Valve Throttling
- Rapid Mixing of Coagulant Chemicals
- Backwashing
- Load Shifting
- Wells
- Distribution Systems
- Other Considerations



Are these items on your list?

- Soft Starts
- Variable Frequency Drives
- Pump Replacement



Be informed

- When, where and why to use a soft start
 - Likely won't see much energy savings directly, but indirectly is possible
 - Excellent in some applications to protect equipment and prevent spills & clogs
 - Cheaper than Variable Frequency Drives, but less flexibility



Be informed

- When, where and why to use VFDs
 - VFDs can save a lot of energy in the right application
 - VFDs are sometimes utilized as a band-aid
 - Ensure equipment is right before VFD install
 - VFDs have been heavily marketed, but big savings only exist in specific applications
 - Use a soft start where appropriate
 - Utilizing VFDs in water pumping by replacing a throttling valve is almost always cost effective



Be informed

- Pumps
 - If your pump is not sized for the flow it pumps most often, you are most likely wasting energy
 - If your pump is several years old there is likely a more energy efficient version available today
 - Know how to read a pump curve – see handout
 - If you pump against a throttled valve, make sure you understand why and what you can do about it
 - Optimize storage fill and drain times to run pumps as efficiently as possible