Smart Management for Small Water Systems

Energy Management for Small Water Systems

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www.efcnetwork.org

EFCN environmental finance center network

Southwest Environmental Finance Center

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

About the Environmental Finance Center Network (EFCN)

The Environmental Finance Center Network (EFCN) is a university-based organization creating innovative solutions to the difficult how-to-pay issues of environmental protection and improvement. The EFCN works with the public and private sectors to promote sustainable environmental solutions while bolstering efforts to manage costs.

The Smart Management for Small Water Systems Program

This program is offered free of charge to all who are interested. The Program Team will conduct activities in every state, territory, and the Navajo Nation. All small drinking water systems are eligible to receive free training and technical assistance.

What We Offer

Individualized technical assistance, workshops, small group support, webinars, eLearning, online tools & resources, blogs

The Small Systems Program Team

- Environmental Finance Center at The University of North Carolina at Chapel Hill
- Environmental Finance Center at Wichita State University
- EFC West
- New England Environmental Finance Center at the University of Southern Maine
- Southwest Environmental Finance Center at the University of New Mexico
- Syracuse University Environmental Finance Center
- Environmental Finance Center at the University of Maryland
- American Water Works Association (AWWA)

UNC ENVIRONMENTAL FINANCE CENTER

WSU WICHITA STATE UNIVERSITY HUGO WALL SCHOOL OF PUBLIC AFFAIRS Environmental Finance Center

EFCWest Environmental Finance Center West

New England Environmental Finance Center

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Environmental Finance Center Syracuse University

ENVIRONMENTAL FINANCE CENTER

American Water Works Association

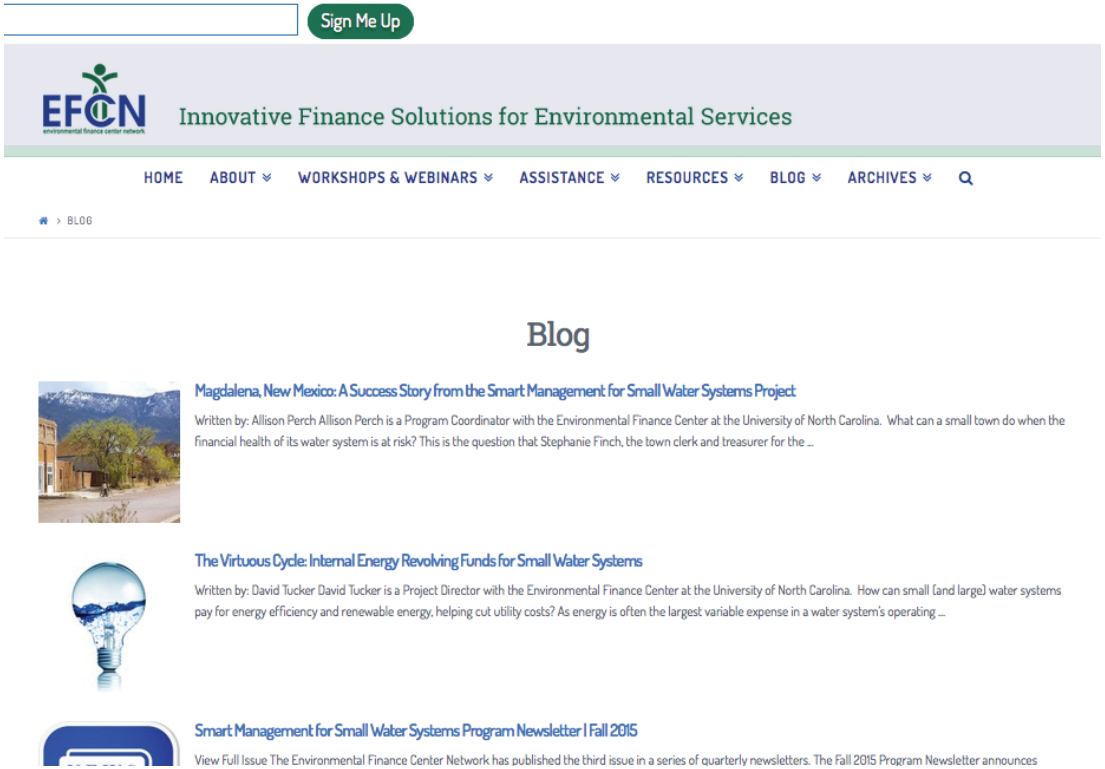
Areas of Expertise

- Asset Management
- Rate Setting and Fiscal Planning
- Leadership Through Decision-making and Communication
- Water Loss Reduction
- Energy Management Planning
- Accessing Infrastructure Financing Programs
- Workforce Development
- Water Conservation Finance and Management
- Collaborating with Other Water Systems
- Resiliency Planning
- Managing Drought

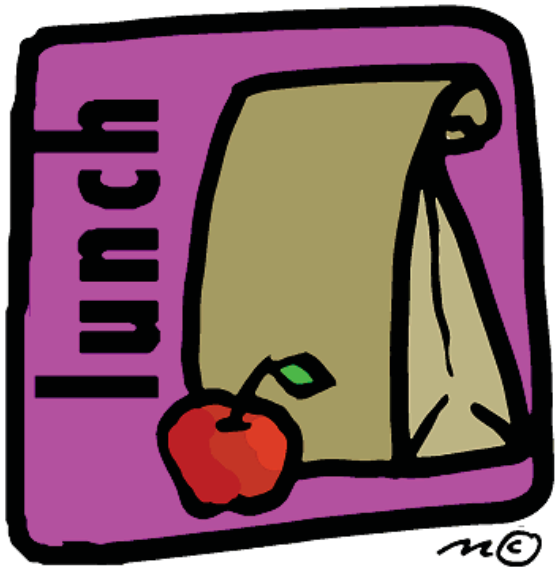
Small Systems Blog

Learn more about water finance and management through our Small Systems Blog! Blog posts feature lessons learned from our training and technical assistance, descriptions of available tools, and small systems “success stories.”

efcnetwork.org/small_systems_blog/



Housekeeping Items

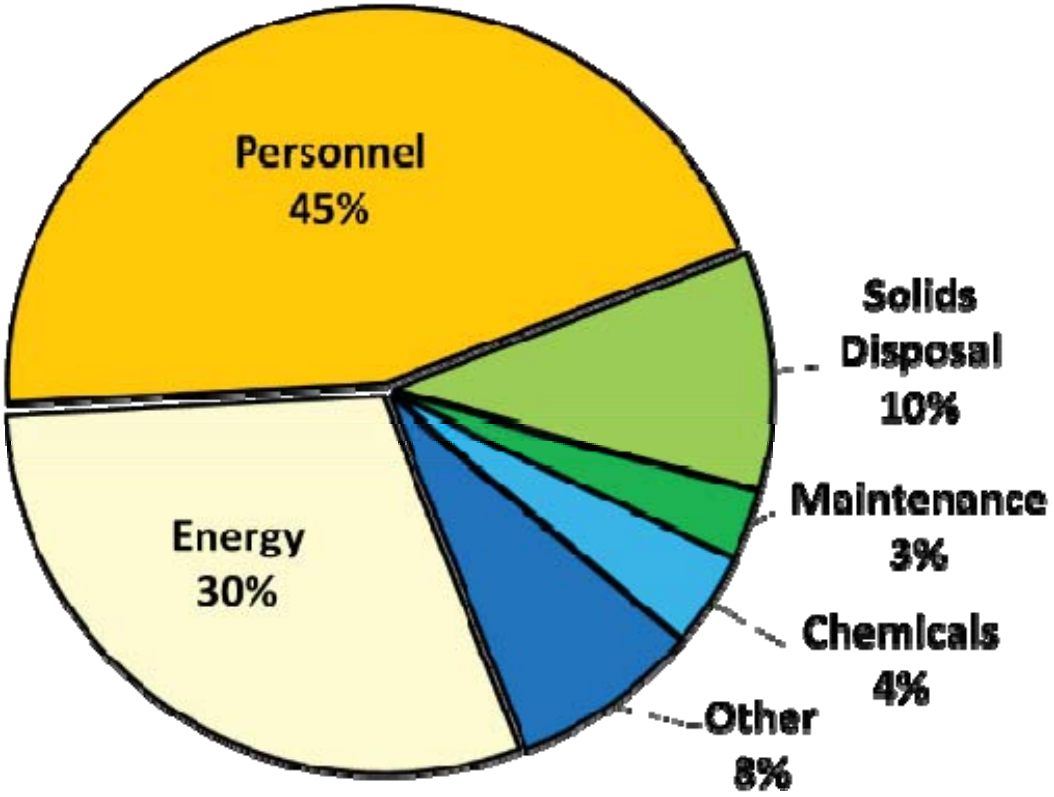


Who I am and how to contact me

- Dawn Nall
- Program Manager
- Southwest Environmental Finance Center
- dnall@unm.edu, (865) 210-5604
- southwestefc.unm.edu

Introductions

Why are we here today?



Should a small water utility care about energy?

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

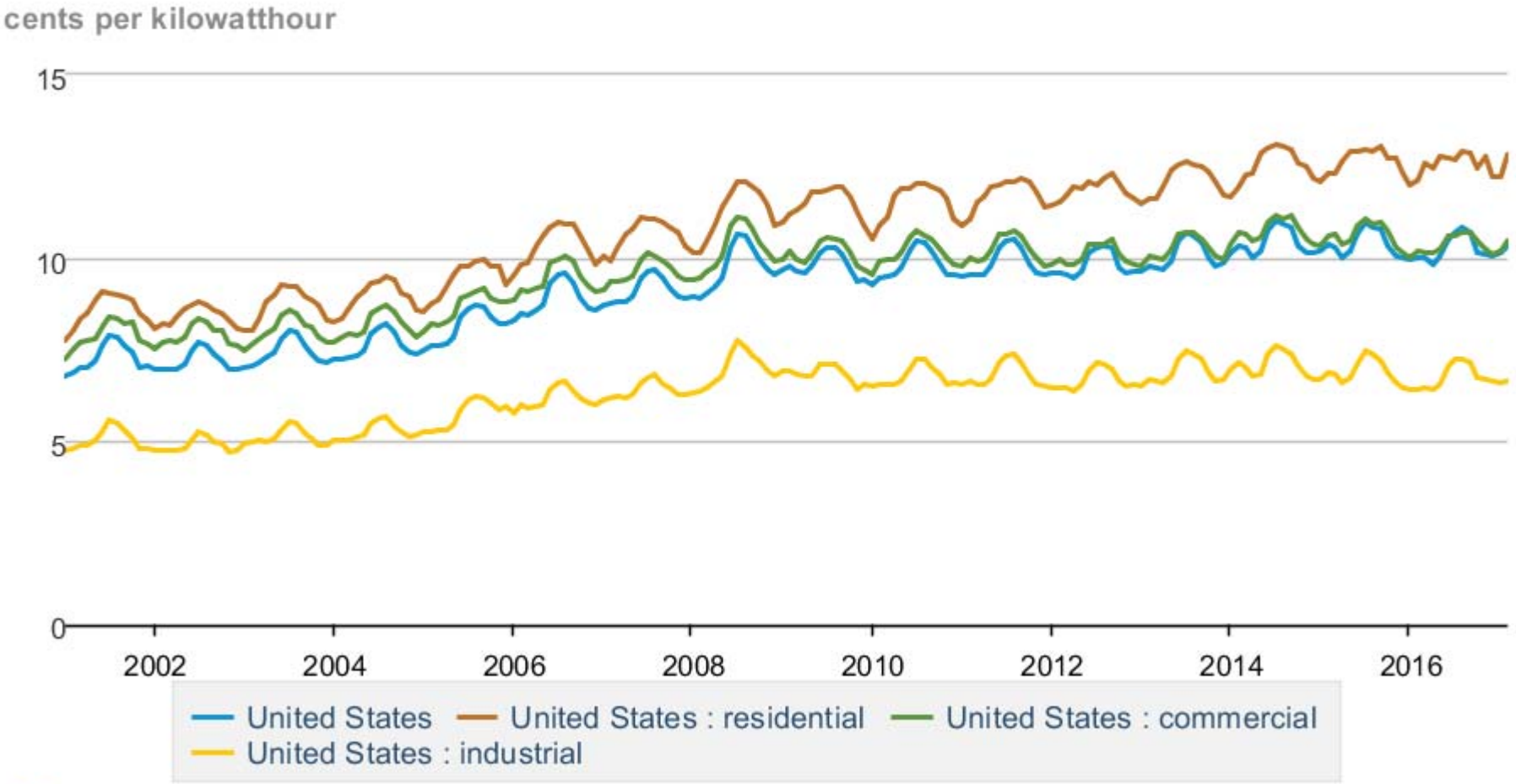
$1 billion: estimated electric power costs per year for these small systems.

$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.

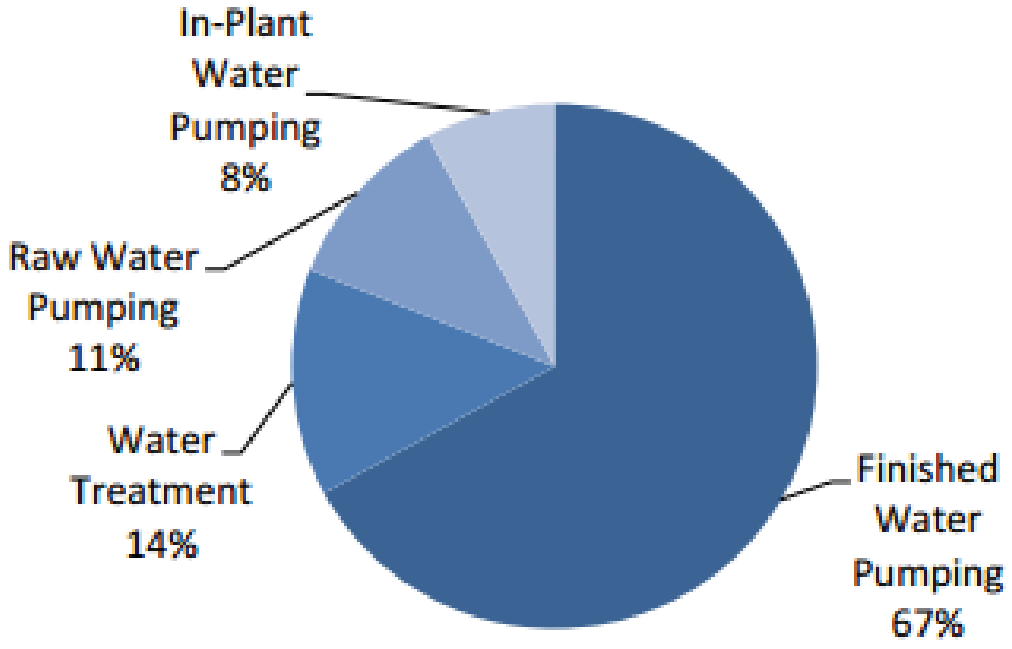
Source: Regnier and Winters, “Reducing electric power costs in small water systems,” Journal AWWA, April 2013, 67-72.

Average retail price of electricity, monthly



eia Source: U.S. Energy Information Administration

Typical Energy End-Uses in Public Surface Water Systems



Source: Keith Carns, EPRI Solutions, "Bringing Energy Efficiency to the Water & Wastewater Industry: How Do We Get There?," presented at *WEFTEC 2005*, Washington DC, November 2, 2005.


Letting a faucet run for
five minutes
uses as much energy as
leaving a
60-watt light bulb
on for
22 HOURS
EPA
epa.gov/watersense

Overview of NYSERDA's Energy Management Plan

Energy Management for Small Water Systems

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

Water System Goals

- Primary Goal – meet regulatory requirements to protect human health and environment
- Secondary Goal – provide services for reasonable and fair user fees or rates

Energy Management

- Goals of the Water System remain the same, however rising energy costs cause
  - Greater financial burden being placed on local governments
  - Public sentiment toward sustainability decreasing
- Therefore, improving energy management is paramount

Energy Management Goals

- Improve Energy Efficiency & Manage Total Energy Consumption
- Control Peak Demand for Energy
- Manage Energy Cost Volatility
- Improve Energy Reliability

These goals often overlap with other management practices (i.e. preventive maintenance program improves motor efficiency and improves reliability)

Improve Efficiency & Manage Total Consumption

- Cost of electricity is typically based on two main components:
  - Quantity of electricity used (kWh)
  - Demand for electricity (kW or kVa)
- 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 often 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

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

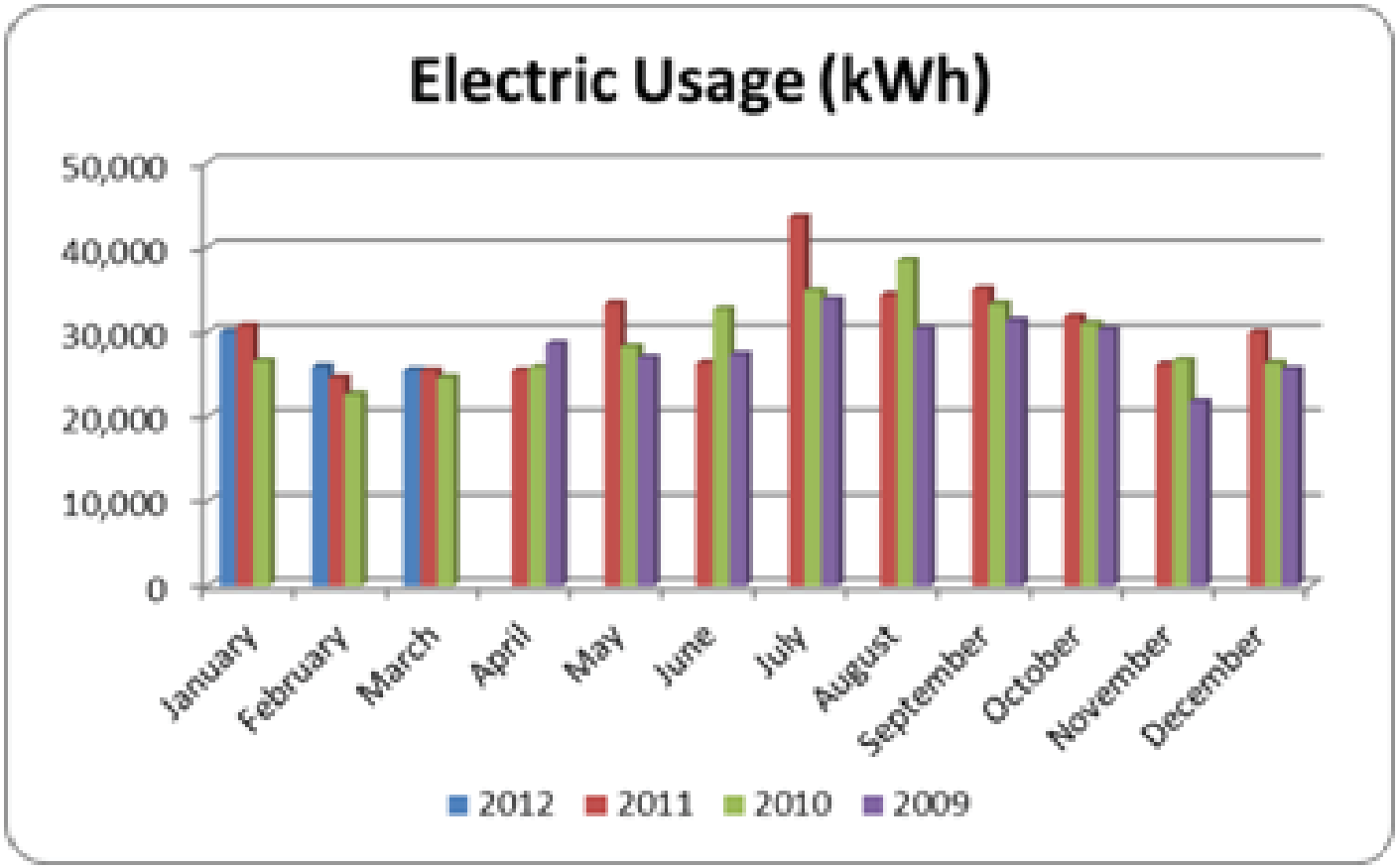
Step 1 – Establish Organizational Commitment

- 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: Develop a Baseline of Energy Use - Goals



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

Step 4: Identify Energy Efficiency Opportunities

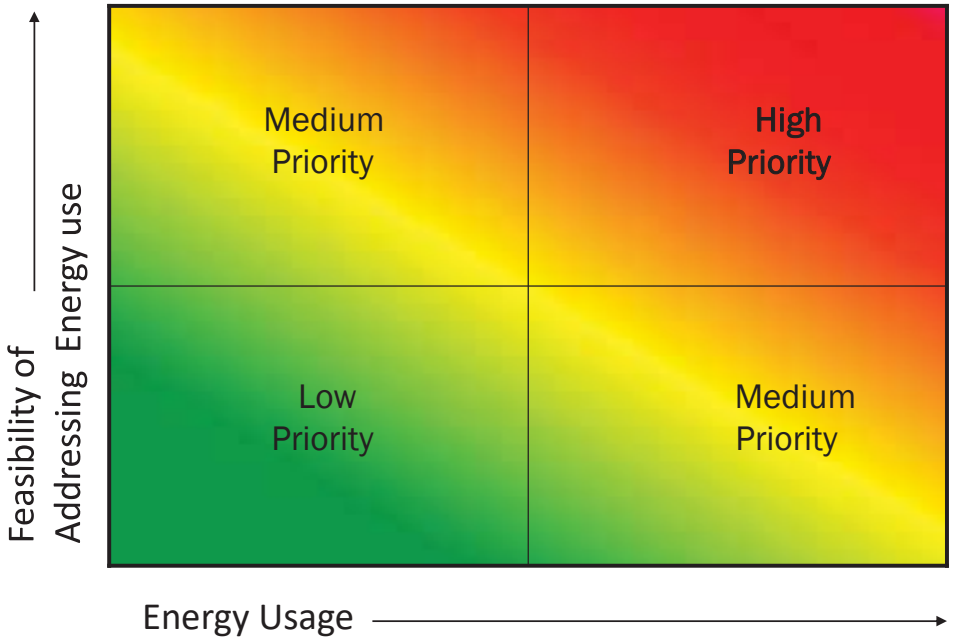
- The energy management team should identify a broad array of energy efficiency opportunities

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

Prioritization of Energy Use



Which category of assets will be the most important for energy efficiency?

Least important?

Step 6: Develop an Implementation Plan

Step 1
- Who
- What
- When

Step 2
- Who
- What
- When

Step 3
- Who
- What
- When

Step 7: Provide for Progress Tracking and Reporting