VA Energy Program

O&M Track – Session 6

Developing an Energy Management Program

Energy Management Program

- Required elements
  - Program Support
    - Management support at high levels
    - Management support at each facility
    - Support from Engineering staff at each facility
    - Secure maintenance staff “buy in”
  - Program Staff
    - Energy Managers
    - Energy Management Teams
  - Agency support through contracting, fiscal, and other related functions.

Program Support

- Management
  - Management at all levels need to support the program in order to succeed.
    - Energy Managers will be seeking ways to change how business is done.

      There will be resistance…
    - Energy Managers will be seeking to change policies and operating procedures.

      There will be resistance…
    - Energy Managers will be seeking funding to support new initiatives with both capital and operating dollars.

      There will be resistance…

Program Staff

- Energy Managers are hired and Energy Management Teams organized to facilitate the program.
  - Energy Managers are assigned to specific areas, typically at single or multiple facilities.
  - Next, they are organized by region with a regional team leader. For the VA, this is the Network Energy Manager.
  - Energy Management Teams
    - Organize by discipline and region. All Energy Managers within a region should work together as a team sharing ideas and experience

Energy Management Teams

- All Energy Managers within a region should work together as a team sharing ideas and experience led by the regional team leader or Network Energy Manager
- Nationally, Energy Managers should work in discipline specific teams to develop cost and Energy Savings projects and ideas.
  - Boiler Plant operations
  - Chiller Plant operations
  - New technology development
  - Specifications development
  - Building controls
  - Commissioning and Retro-commissioning

Energy Program Development

- Energy Plan
  - VISN or regional level planning
  - Facility level planning
- Energy Policy
  - Agency Policy
  - VISN policy
  - Facility Policy
- Goals/Objectives
  - Follow and exceed legislated goals
    - EPACT 2005
    - E.O. 13423
    - EISA 2007
    - E.O. 13514

Know your Energy Use

- Study your facility, know where to act.
  - For the VA's VISN 11 Energy break down:
    - Energy use (approximately)
      - 1/3 of Energy from electricity
      - 2/3 of Energy from natural gas or purchased steam
    - Energy cost (approximately)
      - 1/3 of Energy cost from natural gas or purchased steam
      - 2/3 of Energy cost from electricity
  - In the SW US, VISN 18, energy split between electric and natural gas varies widely by location

Energy Plan

- Key elements
  - Agency and VISN goals
  - Define the baseline for each VISN
  - Specify current energy and water use
- Define areas of focus by category
  - Renewable Energy
  - Commissioning and Retro-commissioning
  - Management of vacant space
  - Energy Management
  - Water management

Energy Plan

- Identify perceived hurdles to overcome in order to achieve your objectives.
- Define required actions in order to meet the stated objectives of your plan.
  - ECM list
    - Brief description
    - Implementation costs
    - Energy/Water savings
    - Simple Payback, Savings Investment Ratio
  - Impact of ECM's on the overall objectives
    - Rational for energy and cost savings shall be well defined and documented.

Energy Audits – In house

- Self performing your Energy Audits will yield multiple benefits such as:
  - Elevate the status of your program
  - Provide cross training for all Energy Managers within the Energy Management Team
  - Support training/education opportunities for maintenance foremen and staff
  - Enable greater understanding of facility operations
  - Identify wasteful practices and facilitate effective mitigation strategies
  - Enhance working relations between the Energy Managers and the Facilities Maintenance staff

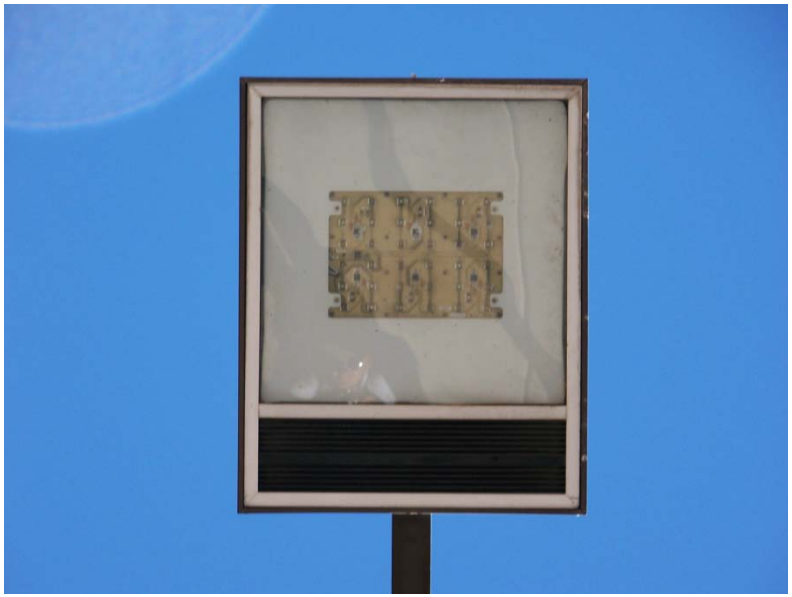
Examples of Policy changes

- Lighting
  - All exterior lighting shall be LED
  - All interior Fluorescent fixtures to use T8-F28/F25 (or better) lamps with Premium ballasts only.
  - Prohibit purchasing of T8-F32 lamps and ballasts.
  - Prohibit purchasing of all T12 lamps and ballasts.
  - Incorporate high performance lighting in all new construction and renovations.
  - Lowest material cost does not mean lowest life cycle or energy cost. (Follow the money)

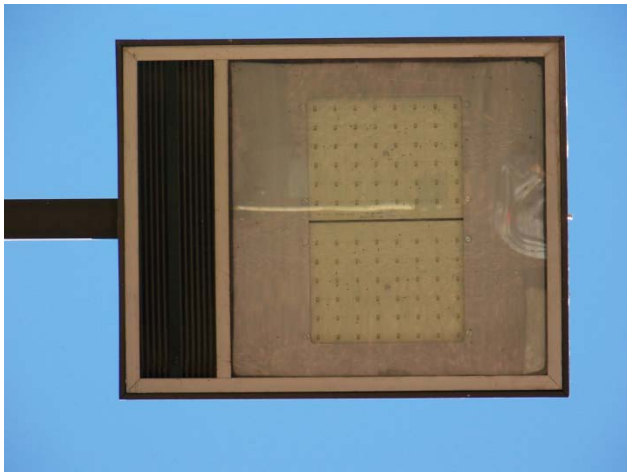
Project and Self Funded Initiatives

- Seeing the light – testing the LED market…

Like this retrofit



to this upgrade



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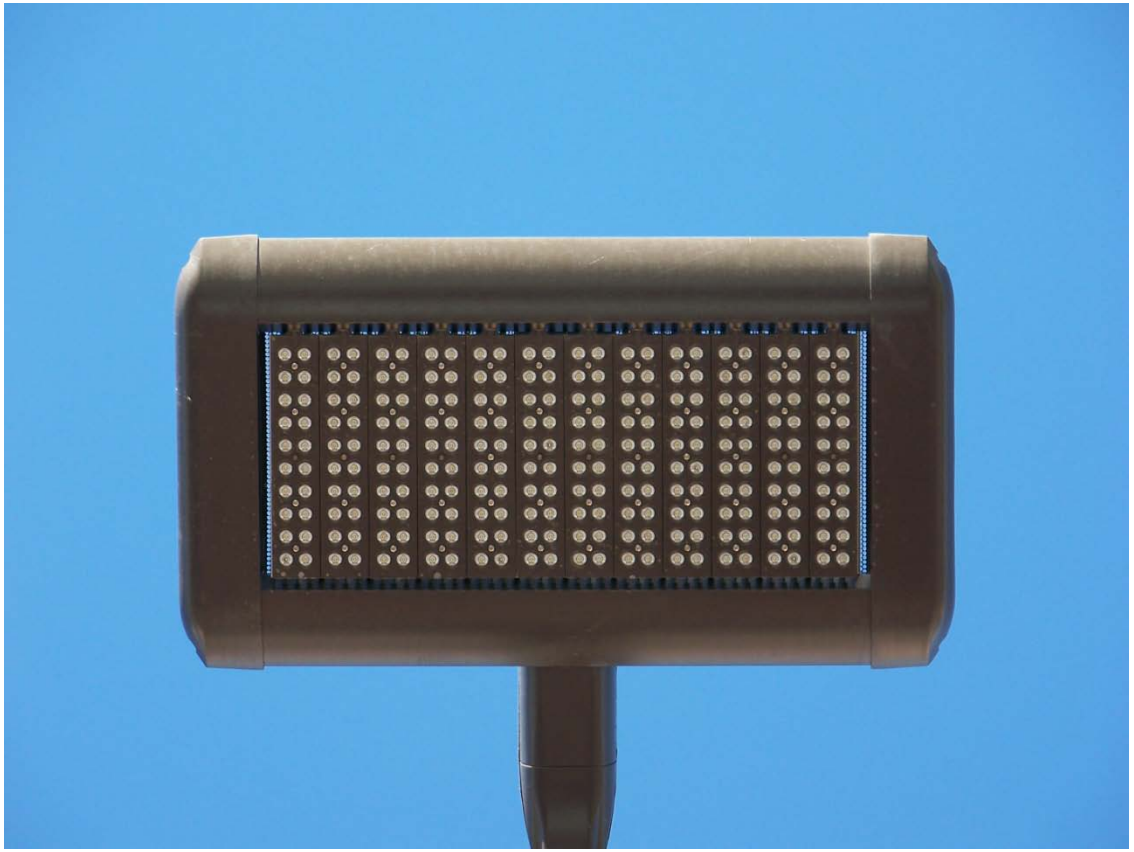
Project and Self Funded Initiatives



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Other Policy Change examples

- HVAC
  - Specify Minimum efficiency standards for Chillers
  - Specify Control sequences and control points for AHU's and HVAC systems.
  - Upgrade all automation controls to DDC

- M&R practices
  - Enforce setback schedules…

    There will be resistance…
  - Fix nuisance and recurring maintenance problems
  - Again, lowest material cost for maintenance and repairs does not mean lowest maintenance burden or lowest operational/energy cost.

Examples of M&R Improvements

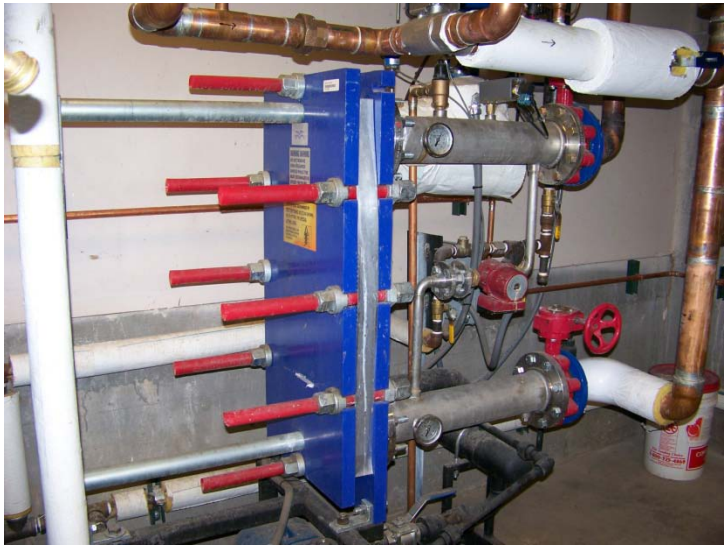
- HVAC Problems
  - Ask maintenance staff about their problem systems and equipment
    - Solve the problem
      - Correct flawed controls schemes.
        - Example – When our Air Handler loses power, the humidification does not shutdown and this trips the duct detectors.
          - Solution – modify programming such that when the Air handler fan motor is off the controls system closes all valves to the AHU. Chilled water, Steam or hot water heat, and steam humidification. This reduces false alarms for fires and avoids corrosions to HVAC equipment.
      - Replace older and failing equipment
        - Example – We get four or five trouble calls per week for this system and the unit constantly requires maintenance to maintain operations.
          - Solution – Develop a project to replace the system and ensure the new system meets all energy requirements and has the proper controls. Maintenance will drop considerably and you will save operational dollars.

M&R challenges–Seize opportunities

- Audit your facility and consider “multiple benefit” changes with an eye towards simplified maintenance and energy efficiency. For example, steam to hot water processing… change this

or better yet, this

to this



M&R challenges–Seize opportunities

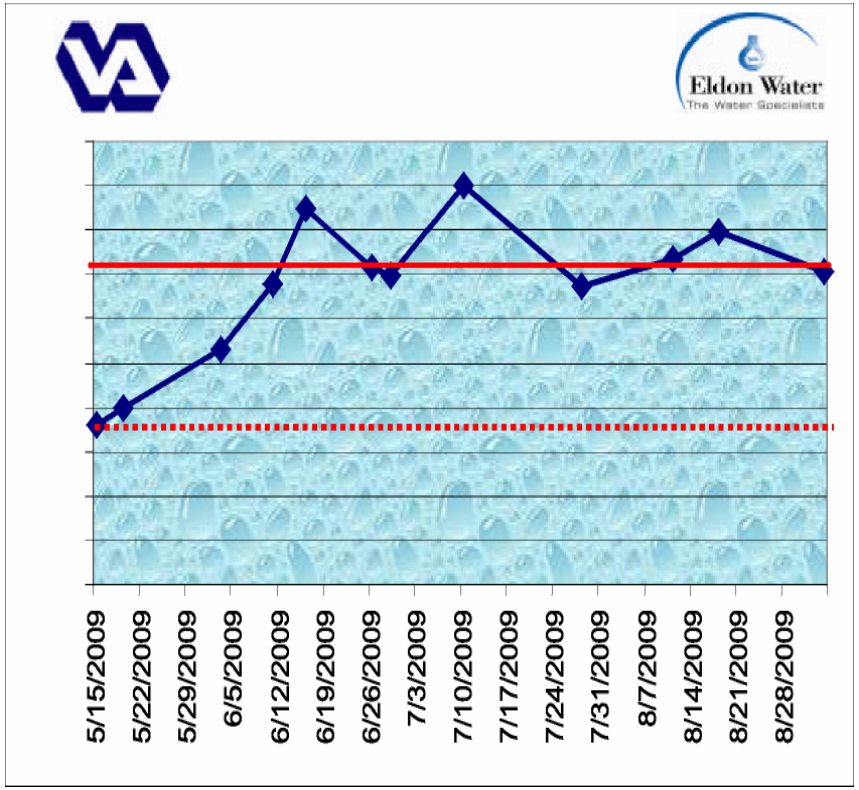
or better yet, this

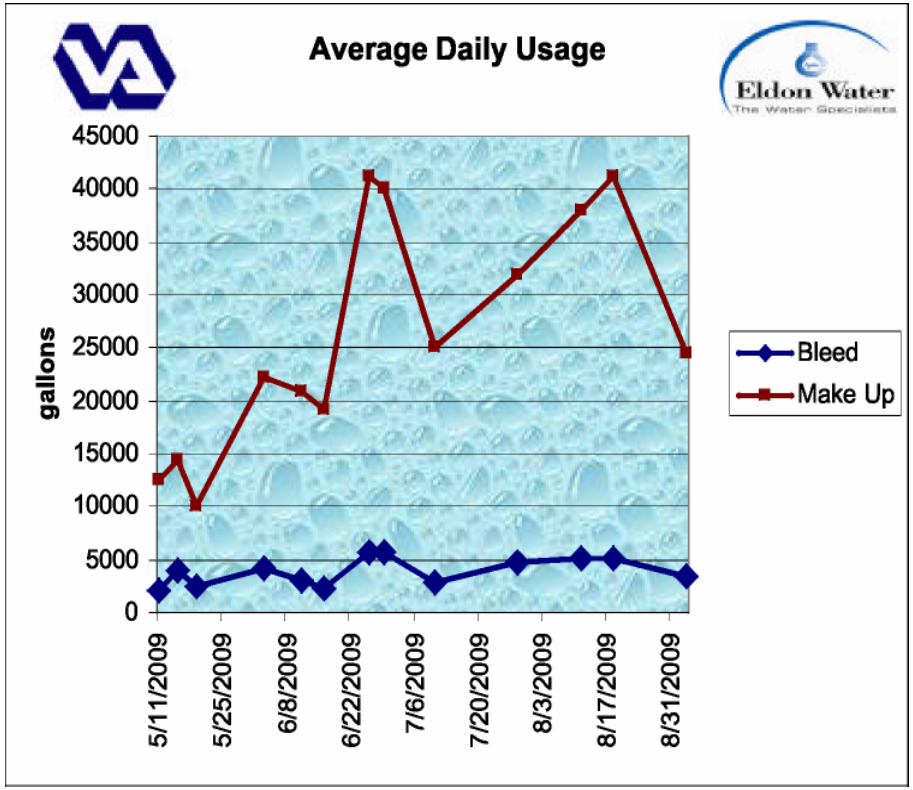
Share the knowledge

- Seek opportunities for improvement and incorporate changes as required by modifying O&M procedures
- Successful improvements at one facility can be implemented at other facilities.
  - Example
    - Operations Foreman of the Boiler Plant put the make up water for the central cooling towers on the Boiler Plant's water softeners.
      - This change was performed with very little cost by his staff and started saving over 585,000 gallons of water per year and reduced the need for chemicals while reducing maintenance requirements. An Excellent operational change that was pushed out to other VA's as an excellent example of utilizing existing equipment.

Cooling Tower – Fed with softened water

- Make-Up to Bleed Ratio





Project Conclusions

- Calculated water savings for summer 2009: 585,400 gallons of water (pro-rated to end of cooling season)
- Summer 2009 was a relatively cool summer. The evaporation rate was roughly 3.4M gals of water.
- Summer 2008 evaporation rate was roughly 4.3M gals. The softening project would have saved roughly 750,000 gals in summer 2008.
- Not every O&M situation requires a project, however this project required only a re-routing of tower make-up water through the existing water softeners, approx 30’ of pipe.

Proof of Concept Projects

- Consider smaller projects that can be mined for operations data and used to design and build larger capital projects…

This project has provided valuable data on the best use of chiller schedules, airside and waterside economization.

Renewable Energy!

- Mandated and counts double for onsite production and use

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