

Ten Cost-Effective O&M Energy Efficiency Changes: Low-to-No Cost Solutions

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- Going to focus on the “O” of O&M
- Discuss 10 potential energy efficient operational changes to save energy, resources, and money
- Present an example of implementing these changes

- Usually inefficiencies are not detectable by typical O&M practices
- A new approach is needed to continually achieve energy efficiency operations
- Need someone experienced with implementing energy efficiency procedures to facilitate the process

- Gather information and data
- Turn off what you can
- If you can't turn it off, determine if you can reduce it
- Set-up a mechanism to facilitate communication
- Don't walk away - Set-up a mechanism to continually apply energy efficiency measure

- Even when control systems are in place, they are often not used
- Often equipment is still not turned off at night or weekends
- Controls are often too centralized
- Often few know how to operate or maintain controls
 - HVAC - Often heating and cooling are still competing
 - Lighting - Often sufficient zoning are not in-place

- Energy Management:
 - Should be redefined from typical O&M perceptions
 - Really is a management task (data/communication/implementation/tracking)
 - Is an art
- Energy Management should include operational efficiency and energy efficiency

2003 Energy #2 Determine Data and Information Available

- Metered Data
 - Sub-metering
 - Data bases
 - Reporting tools
- Utility Bills
- Equipment Energy Efficiency/Performance
- Direct Digital Control/Energy Management Systems
- Operation Manuals
- Building Energy Performance

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2003 Energy #3 Determine and Involve the Right People

- Communicate with management/supervisor staff
- Operations staff are critical
- Facilities and Maintenance staff need to be involved
- Evaluate lines of communication
- Evaluate available staff resources, capabilities, required training
- Be sensitive about outside help

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2003 Energy #4 Identify Energy Efficiency Operations

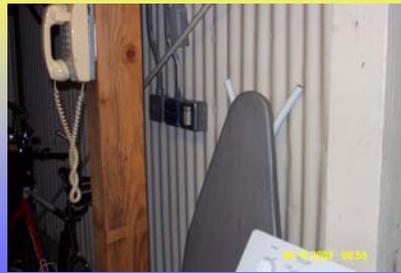
- Involve Operators and Maintenance
 - Solicit their ideas, they know their systems best and already often have good energy efficiency ideas
 - Walk the building/facility
- Determine what would be required to implement an electrical efficiency measure
 - Determine low-to-no cost options
 - Estimate information about capital improvements
 - Evaluate ability to not sacrifice comfort or productivity while implementing an energy efficiency measure
- Identify how to make an energy efficiency measure institutionalize/continuous Commissioning

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2003 Energy Blocked Sensor



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2003 Energy Any Masking Tape?



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2003 Energy Barriers to Energy Efficiency Operation

- Operational written procedures and energy efficiency operations are not always available or documented
- Often hard to overcome or change current management, accounting, and institutional procedures
- Focus is on new projects to implement energy efficiency measures, instead of implementing operational changes
- Maintenance procedures do not always address energy efficiency
- Tools are not in place to determine/document energy savings from operational changes

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#5 Prioritize Improvements to Evaluate

- HVAC control
- EMCS or DDC
- Lighting control
- Process systems
- Chillers and boilers
- Other large energy users that are left on

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#6 Building Energy Management Team

- Potential team members include energy, utilities, facilities, O&M, and end-user stakeholders
- Make sure that everyone on the team knows how they are doing
 - Best incentive is to show them they are making a difference
- Establish overall improvement goals
- Justify and verify value of efforts

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Operations and Facility Involvement

- Important to involve operations and facility staff on the team
- Understand their perspective
 - Make it clear that suggested improvements are not a reflection of their current performance
 - Address concerns that changes will result in more “trouble calls”
 - Show them the potential and actual results of the proposed change
 - Determine what training or information they need
 - Be sensitive that this may add more work for them

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#7 Evaluate Energy Demand

- Measure or estimate how much energy is being used by different equipment
 - Need meters and measurement instruments
- Determine or estimated as best as possible the operational procedures
 - Need to determine if manuals are available or if operational knowledge has been institutionalized
- Evaluate energy efficiency performance of facilities
 - Need energy use data per gross floor area or other means to establish a rating/comparison
- Careful of simulation data or engineering calculations when you don't know the assumptions

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#8 Implement Energy Efficiency Ideas

- Implement the energy efficiency operational ideas
 - Start with the low-to-no cost ideas
- Maintain communication among people involved
- Measure performance of the operational change
- Export/repeat what works

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#9 Energy Measurement

- Measure where needed to determine savings from operational changes
- If you already have meters and sufficient measurement tools, determine if the data is being evaluated
 - Implement data management tools and procedures for someone to use the data
 - Develop reporting systems to track progress
- Continually evaluate energy data and energy efficiency operational changes
 - Document successes and savings
 - Set goals

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2003 Energy #10 Institutionalize Energy Efficiency Operations

- Operational changes need to be continually implemented
- Operation knowledge needs to be documented and retained
- Need to implement plan to track key energy efficiency operational changes
- Maintain communication between Energy Manager, operators, maintenance, and management
- Document savings to justify energy efficiency program

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2003 Energy Example

- In Early 2003 Tetra Tech identified the requirement to cut the \$6 million utility bill for Building 1482 at Naval Air Station, North Island
- On-site Tetra Tech Resource Efficiency Manager (REM) helped form a team to identify low- and no-cost ways to achieve immediate cost savings
 - Team included On-site REM, Tetra Tech team REMs, utilities, facilities, and end-user stakeholders

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2003 Energy Example - continued

- Energy Efficiency measures identified and implemented included:
 - Steam and electricity rate reductions
 - Taking redundant and unneeded absorption chiller and its associated pumps off-line
 - Turning off un-needed lights and equipment
 - Restoring/resetting VFD controls on chilled water systems
 - Properly balancing air conditioning in computer server rooms

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2003 Energy Example - continued

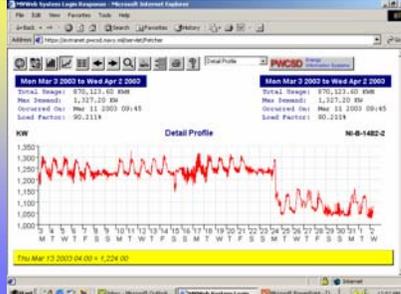
- Demand was cut in the building by 150 kw (12 percent)
- Building's critical air conditioning needs were still met
 - Worked directly with the stakeholders to ensure all concerns were addressed
- The low- and no-cost measures will result in more than \$3.5 million in annual cost savings (a 58 percent reduction)

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2003 Energy Example Data Results



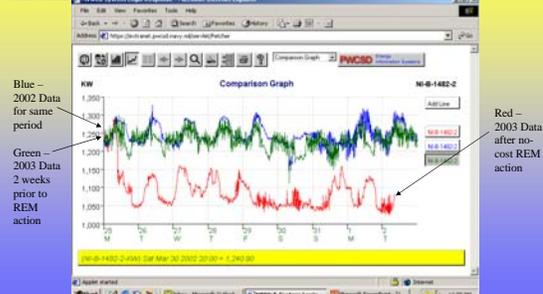
150 kw demand reduction *at no cost*

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2003 Energy Example Data Results



Blue – 2002 Data for same period
Green – 2003 Data 2 weeks prior to REM action

Red – 2003 Data after no-cost REM action

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Conclusions

- Redefine Energy Management
 - Potentially find a way to add additional experienced resource energy managers
- Set goals
- Communicate success/results to everyone that helped implement an energy efficiency measure
 - Make sure management knows the successes
- Continually evaluate performance
 - If possible set up automatic notifications when goals are not being met
- Justify and verify value of efforts
 - Often easy to save 10 to 20 percent with no-to-low cost measures



Any Questions?

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