Best Practices in Energy Efficiency

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Arapahoe County Government
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A little information about Arapahoe County:

- A large Metropolitan Denver County
- Population >550,000
- 12 miles N-S, 72 miles E-W
- Urban in West, rural plains in East
- >20 buildings owned or managed
- 3 Energy Star buildings for 2010

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Arapahoe County did $10million+ in Energy Performance Contract upgrades in 2006

- Upgraded lighting
- Replaced several boilers with high efficiency
- Laundry conservation system at Detention
- Numerous Variable Frequency Drives
- Replaced Chillers and Cooling tower, Admin I
- Water-side Economizer, Admin I
- Expanded Building Automation System
- Energy Management System
- Energy Program Manager

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The Performance Contract has been very successful:

Over $850,000 cost savings in each of first three years

~25% reduction in energy use

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EECBG provides funding to build on the success of the Performance Contract

1. Re-commissioning/Retro-commissioning
2. Chiller plant replacement
3. Thermal imaging/building envelope improvements
4. Expand Energy Management System
5. Expand teleconferencing system to two more locations

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Additional Energy Efficiency Projects (Non-EECBG)

1. Replace existing air-cooled chiller with new unit incorporating dry cooler (“free cooling”)
2. Replace existing Detention Center Direct/Indirect evaporative coolers with new, more efficient units
3. Replace old Data Center DX CRAC unit with new chiller incorporating dry cooler
4. Replace warehouse DX Rooftop Units with a mix of more efficient technologies (design phase)

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Curt's Concepts to Live By

- You can't manage what you don't measure
- The plural of Anecdote is NOT Data
- Data trumps assumptions
- Benchmark, Measure, Verify
- Don't take a CATNAP (Cheapest Available Technology Narrowly Avoiding Prosecution)

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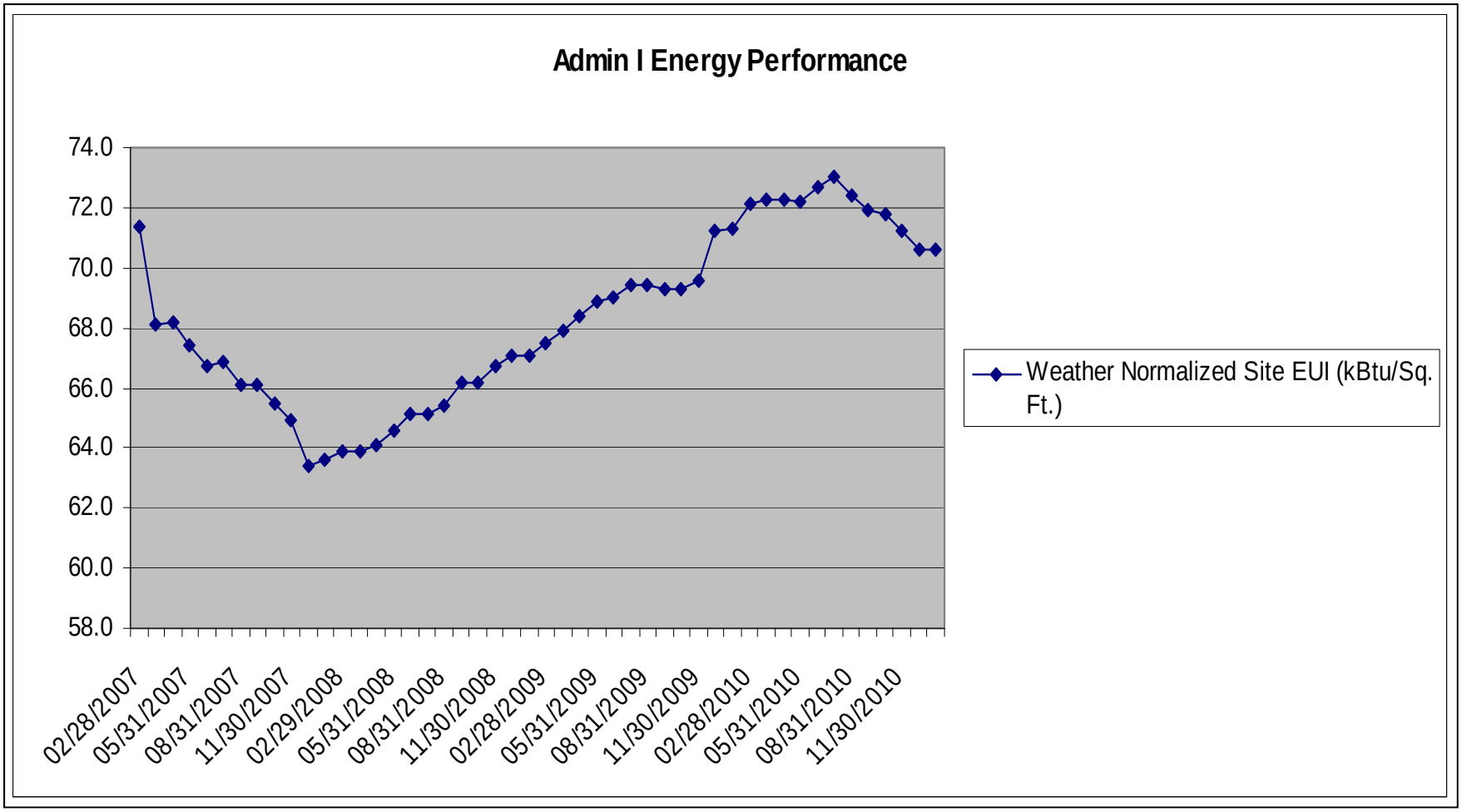

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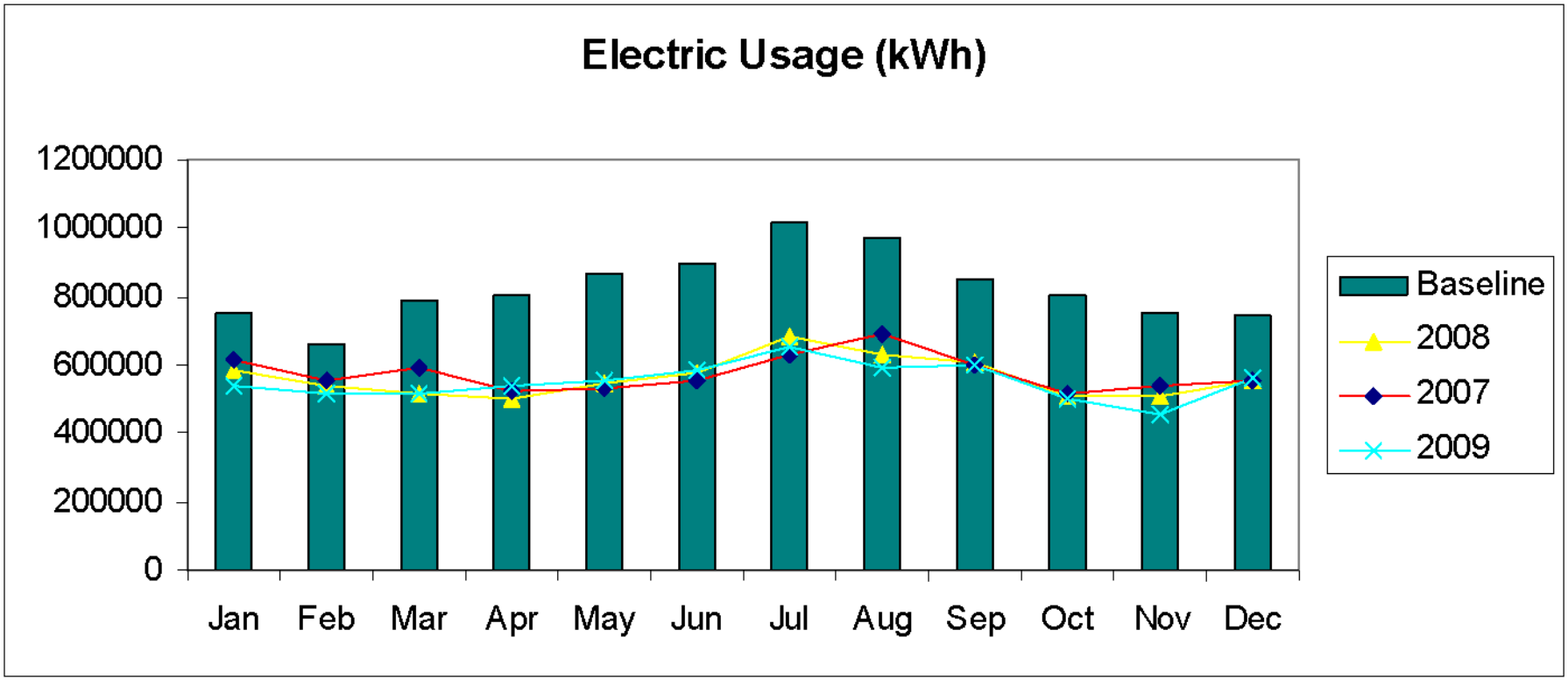

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- Questions?
- Comments?
- Thank You!

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Best Practices in Energy Efficiency

Dennis Lilley, CEM, PMP

EECBG and SEP South Central Region

Peer-to-Peer Exchange

March 15-16, 2011

Best Practices in Energy Efficiency

Austin Energy

- Municipally-owned electric utility
- Population 1 million
- Area > 437 square miles
- Generation = 3,000 MW
- > 400,000 electric customers

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AE Strategic Plan

Energy Efficiency is first priority

- 15% Demand-Side Management by 2020
- 35% renewable energy by 2020
- 200 MW of solar by 2020

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Our Energy Efficiency Strategies

- Residential programs
- Commercial programs
- Solar program
- Municipal program
- Climate Protection Plan

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Municipal Energy Policy

- Establish behavioral standards
- Develop purchasing guidelines
- Implement top-down accountability for staff
- Provide project funding mechanisms and responsibility

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Municipal Energy Policy - Continued

- Foster employee awareness (24-month cycle)
- Set maintenance expectations (preventive vs. reactive)
- Require new construction/renovation guidelines
- Define guidelines for cost-effectiveness

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Typical Opportunities

- Lighting (interior and exterior)
- Lighting controls (interior and exterior)
- HVAC
- Building envelope
- Data centers
- Water and wastewater treatment

(Typically 50% to 60% of municipal energy use)

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Non-Typical Opportunities

- Re-commissioning
- Wastewater treatment byproducts
- Landfill gas
- Vending machines
- Appliances
- Compact fluorescent giveaway
- Traffic and pedestrian crossing signals

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Re-Commissioning

- Large buildings
  - Repairs and deferred maintenance
  - Improved controls
- Small buildings
  - Programmable thermostats
  - HVAC tune-Ups
  - Weatherization

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Sludge Treatment Biogas

- 850 kW engine generator
- Runs on digester biogas
- Waste heat is used to heat the digestion process

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Vending Machines

- Shuts-off refrigerated drink vending machines based on need
- Cuts power costs by 1/3 (~$100/yr)
- Does not negatively affect product temperatures

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Refrigerator Replacement Program

- Turn key pick up and delivery
- 178 refrigerators 10 years old or older
- Energy Star refrigerators, 4 year payback
- Take-outs were recycled

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Useful Tools

- Look for the “no-brainer”
- Use low hanging fruit to help longer payback items
- Look at useful life vs. payback
- Focus on avoided cost, not savings
- How can we reduce the bureaucratic red tape?
- Where can we piggy-back?

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Lessons Learned

- The best conservation measure is off
- If it requires operator intelligence…it may not work
- If the occupants don't like it, it doesn't work
- If maintenance doesn't like it, it's broken
- It's impossible to make things truly fool proof, because fools are such ingenious people (But we try!)

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Lessons Learned - Continued

- Requires a commitment by management
- Employee education - get the word out
- Be creative – think outside the box
- The cutting edge is good, but try to avoid the bleeding edge

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Thank You

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