Welcome!
Some Technical Tips Before We Get Started

<table>
<thead>
<tr>
<th>Training Being Recorded</th>
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<tbody>
<tr>
<td><strong>Attendee Phones on Mute</strong></td>
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<tr>
<td>Lines will be opened up at the end of the presentation for Q&amp;A</td>
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<tr>
<td><strong>Slides</strong></td>
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<td>If slides are not advancing please tell me immediately via the chat window</td>
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<tr>
<td><strong>Technical assistance</strong></td>
</tr>
<tr>
<td>Call 1.866.229.3239 if you need help during the training</td>
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## Attendance

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Best Practices for Hotel Energy Management

Presented by:
Andrew Schulte, ICF International
In collaboration with EPA Region 8

- A recognition program focused on energy and water efficiency of commercial office buildings and hotels.
- Participants are from the 7 county Denver Metro area.
- Use of Portfolio Manager to track energy and water data is required.

www.wattstowater.org
• There are three award categories (one hotel winner in each category):
  – Greatest Improvement in Efficiency,
  – Most Efficient Building
  – Super Saver

  *For more information please contact*
  Susan Essex
  Watts to Water Program Coordinator
  info@wattstowater.org

www.wattstowater.org

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**Training Objectives**

• Understand why energy management is important, both financially and in terms of your impact on climate change

• Identify opportunities to improve energy performance in your hotel(s)

• Set performance goals for your facility
Agenda

• Energy Management in the Hospitality Industry

• Best Practices
  – Operations and Maintenance
  – Training and Communications
  – Lighting Upgrades
  – ENERGY STAR Products
  – System and Equipment Upgrades

• Measuring Performance, Setting Goals, and Next Steps

Why Does Energy Efficiency Matter?

• Leading businesses use 35 percent less energy
• Energy: largest impact on building carbon footprint
• Energy consumption: single largest controllable cost
• Financial Returns: for future “green” investments
### Energy and the Lodging Industry

- 5th largest commercial energy consumer
- Spend $7.5 billion per year on energy
- Utility costs rose 3.6% in 2008
- Lighting, space conditioning, & water heating account for 75% of energy costs

### Industry Environmental Impact

- Equivalent to 53 million metric tons of CO₂ per year
- 10% reduction in lodging industry energy consumption would be equivalent to
  - Taking 1 million cars off the road for a year
  - Offsetting annual electricity consumption of more than 730,000 homes
Energy Efficiency Can Improve Your Bottom Line!

10% reduction in energy costs equivalent to:

<table>
<thead>
<tr>
<th></th>
<th>All Hotels</th>
<th>Limited Service</th>
<th>Full Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing ADR by</td>
<td>$2.67</td>
<td>$0.89</td>
<td>$2.86</td>
</tr>
<tr>
<td>Increasing RevPAR by</td>
<td>$1.91</td>
<td>$0.60</td>
<td>$2.02</td>
</tr>
<tr>
<td>Increasing occupancy points by</td>
<td>1.20</td>
<td>0.70</td>
<td>1.28</td>
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</table>

Energy Decisions are Business Decisions

Enhanced energy performance leads to reduced operating expenses and...

- Better equipment operation and extended life
- Potential labor cost savings
- Greater comfort and satisfaction for tenants/guests
- Enhanced image by emphasizing climate stewardship
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  – ENERGY STAR Products
  – System and Equipment Upgrades

• Measuring Performance, Setting Goals, and Next Steps
Why Concentrate on Effective O&M?

Reduces need for *Unscheduled Maintenance*

<table>
<thead>
<tr>
<th>Increases</th>
<th>Decreases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency and useful life of systems</td>
<td>Equipment malfunctions and repair costs</td>
</tr>
<tr>
<td>Equipment reliability</td>
<td>Premature system failures</td>
</tr>
<tr>
<td>Indoor air quality (IAQ)</td>
<td>Unnecessary energy use</td>
</tr>
<tr>
<td>Guest comfort &amp; satisfaction</td>
<td>Guest complaints</td>
</tr>
<tr>
<td>Guest loyalty</td>
<td></td>
</tr>
</tbody>
</table>
Operations and Maintenance: Lighting

- Review common area lighting schedules
- Create seasonal settings for timers
- Institute a lighting maintenance program (including cleaning of fixtures)
- Calibrate lighting controls
- Take advantage of daylight where possible
- Remove unnecessary fixtures ("delamping")

Operations and Maintenance: HVAC

- Calibrate thermostats
- Review heating/cooling schedules
- Adjust thermostat setpoints by season
- Change filters regularly
- Treat water to avoid scaling and fouling on chillers, condensers, and boilers
- Check air intake or delivery grills to prevent blockage
- Check and adjust dampers; use outside air for cooling when possible
- Replace worn weather stripping and seals (windows, doors, PTAC cut-outs, etc.)
## Operations and Maintenance: HVAC (cont’d.)

- Ensure adequate insulation of all equipment, ducts, pipes, etc.
- Adjust drives and motors to proper tension
- Check and maintain steam traps
- Clean coils and heat exchange surfaces
- Check air ducts and water pipes for leaks
- Limit hot water temperatures in guest rooms to 120 degrees

## Operations and Maintenance: Laundry

- Check steam traps for leakage
- Ensure proper insulation of hot water storage tanks, pipes, and steam lines
- Drain and clean hot water tanks to avoid buildup
- Follow manufacturer’s recommended maintenance schedule for equipment
- Only run dryer with full loads
Create an Energy Team

- Download the ENERGY STAR guide “Teaming Up to Save Energy”
- Meet with hotel executives to outline plan and ensure support
- Identify a champion to lead the effort
- Include all departments and staff levels
- Develop a communications plan and training tools
- Reward effort, not just success
Guest Rooms and Meeting Space

- Assign guest rooms by floors during low occupancy periods
- Reduce lighting and space conditioning for unoccupied floors and guest rooms
- Share meeting room schedules to ensure room lighting and temperatures are reduced until needed
- Set and maintain occupied and unoccupied temperature set-points for all space types
- Establish lighting use standards when preparing or cleaning meeting rooms

Housekeeping

Train housekeeping staff about the value of energy management including:

- Turn off lights, radio and TV when leaving the room
- For vacant rooms, return HVAC settings to the established seasonal standard
- Dust all lamps, mini bar condensers and vents
- Close drapes during summer, leave open in winter
Towel and Linen Reuse Program

- Educate staff and guests on program features and how to participate

- Consider designing program to be “opt-out” rather than “opt-in”

- Help guests understand the impact of their participation

Educate Guests

- Promote your participation in ENERGY STAR and other environmental programs
- Use energy and water conservation reminder cards/door hangers
- Train your staff to help educate guests
- Establish procedures to notify staff of equipment malfunctions
- Publicize environmental management efforts to build guest loyalty
Lighting Upgrades

- Replace standard incandescent bulbs with ENERGY STAR qualified compact fluorescent lightbulbs (CFLs)
- Convert bathroom wraparound fixtures from T12 to T8
- Consider cost-effectiveness of LED lighting options
- Use motion and occupancy sensors
- Consider partial re-lamping as valuable option!
Compact Fluorescent Lightbulbs (CFLs)

- CFLs use 75% less electricity than incandescent bulbs
- CFLs produce 75% less heat than incandescents, which can reduce the HVAC load
- Extended life lasts 10 times longer, significant reduction in labor costs
- Potential for significant savings!

Guest Room Lighting Retrofit: Washington, DC Hotel (800+ rooms)

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 room lamps @ 100 W</td>
<td>4 CFLs @ 27 W</td>
</tr>
<tr>
<td>1 foyer light @ 75 W</td>
<td>1 CFL @ 23 W</td>
</tr>
<tr>
<td>3 vanity bulbs @ 40 W</td>
<td>3 CFLs @ 13 W</td>
</tr>
<tr>
<td>Bathroom fixture @ 120 W</td>
<td>2 T-8s @ 32 W</td>
</tr>
<tr>
<td>715 W total per room</td>
<td>234 W total per room</td>
</tr>
</tbody>
</table>

Assuming 74% average annual occupancy, 6 occupied hours per day, and $.11/kWh, this translates into almost $70,000 per year in lighting-related energy savings!
Motion Sensor Nightlights for Bathrooms

- On average 1/3 of hotel guests leave bathroom lights on overnight
- Use a motion sensor nightlight instead!
- Significant potential for savings – as much as 400 Wh (50 W per bathroom over 8 hours) per occupied room night

Public Space Lighting

- Replace T-12 lamps to T-8
- Convert incandescent bulbs to CFLs
- Use occupancy sensors for back-room offices/storage spaces
- Install photocell controls or timers on exterior lights
- Use ENERGY STAR qualified fixtures
- Consider LED applications
Keystone Lodge & Spa

Geoff Jones
Area Director of Engineering
GJones@vailresorts.com

Keystone’s Current Activities

- Reduce boiler temperatures from 180 deg F standard setting to 165 Deg F, \textit{expected savings Gas .9\%}
- Maintain cover on main pool until guest make a request for the pool, \textit{expected savings Gas 1.0\%}
- Retrofit AHU and control valves for main ballroom at Lodge to improve guest comfort heating/cooling efficiencies and reduction in electrical and gas energy, \textit{savings depending on usage: Gas .4\%}
- All lamps where possible are CFL low wattage. A new survey is planned for Keystone to determine the costs to modify electrical, fittings and lamp to carry CFL, \textit{electrical savings .4\%}
Keystone’s Current Activities Contd.

- Continuous employee awareness: visit department monthly meeting to share successes and opportunities for energy conservation
- Improve irrigation system for all properties: New control valves, timers, and upgraded sprinkler heads, savings to be determined
- 2 energy efficient landscaping trucks
- Installed new windows at Lodge with low U factor estimated savings Gas 15%

Keystone’s Future Plans

- Retrofit or replace boilers at the Lodge for better efficiency and control. Capital project investment, estimated savings 25% for gas
- Upgrade the conference center air handler units (AHU) to Building Automated System (BAS) and tie into the Conference scheduler to better control the AHU based on business needs. Estimated energy savings 30%. Rebate of $80,000 approved by Xcel Energy, project planned for June 2011
- Replace 30 halogen 100W with CFL 27W in conference center corridors. Rebate approved by Xcel Energy, in progress savings 70% energy
ENERGY STAR Qualified Products

ENERGY STAR Qualified Products: Guest Room

- Televisions
- DVD Players
- Ceiling and Ventilation Fans
- Mini refrigerators
- CFLs
- Cordless Phones
- Combination Units (TV + DVD, etc)
- Home audio
ENERGY STAR Qualified Products: Business Center

- Desktop Computers/Monitors
- Laptops
- Copiers
- Fax Machines
- Mailing Machines
- Printers
- Scanners

ENERGY STAR Qualified Products: Common Areas

- Refrigerated Beverage Vending Machines
- Ice Machines
ENERGY STAR Qualified Products: Kitchens & Restaurants

• Commercial Dishwashers
• Commercial Fryers
• Commercial Griddles
• Commercial Hot Food Holding Cabinets
• Commercial Ovens
• Commercial Ice Machines
• Commercial Refrigerators & Freezers
• Commercial Steam Cookers

Tools for Product Purchasing/Procurement

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Solutions</th>
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</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Fact Sheets</td>
</tr>
<tr>
<td></td>
<td>Key Product Criteria</td>
</tr>
<tr>
<td>Availability</td>
<td>Qualified Products (QP) lists</td>
</tr>
<tr>
<td>Cost</td>
<td>Product Savings Calculators</td>
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<tr>
<td></td>
<td>Utility Incentives/Rebates</td>
</tr>
<tr>
<td>Complexity</td>
<td>Direct Support</td>
</tr>
<tr>
<td></td>
<td>ENERGY STAR as liaison</td>
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<tr>
<td></td>
<td>Sample Procurement Language</td>
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</table>

www.energystar.gov/purchasing
Next Steps: ENERGY STAR Products

- Talk to Purchasing/Procurement, Energy, Engineering staff
- Determine renovation schedule
- Conduct product audit
- Communicate with vendors
- Contact ENERGY STAR for assistance

System and Equipment Upgrades

CONTINUOUS BENCHMARKING
System Equipment and Upgrades

- HVAC: Central Plant
- HVAC: Distribution and Terminal Units
- Controls
- Other Major Energy-Consuming Systems

HVAC: Central Plant Systems

**Consider:**
- Proper sizing of equipment
- Combustion efficiency (boilers), kW/ton (chillers)
- Free cooling
- Heat recovery
- Variable speed drives and energy-efficient motors
HVAC: Distribution and Terminal Units

- Variable air volume (VAV) air handling systems and variable flow pumping systems
- Variable frequency drives and energy-efficient motors
- Look for higher energy efficiency ratings (EER) on Packaged Terminal Air Conditioning Units (PTACs) and Vertical Packaged Terminal Air Conditioning Units (VTACs)
- Heat pumps versus electric heating for PTACs

Controls

- No need to condition rooms 24/7; guests generally in room for portion of the day
- Various strategies:
  - Stand-alone thermostats with programmed setbacks
  - Networked in-room energy management systems (EMS)
- Significant savings on air conditioning and heating
- Opportunities for integration with power management systems (PMS) & security systems: gives front desk control of energy management for vacant rooms
Other Major Energy-Consuming Systems

- Laundry
  - Ozone systems
- Guest room hot water
  - Instantaneous/tankless water heaters
- Kitchen
  - Variable-flow exhaust controls on hoods
- Other
  - Retro-commissioning
  - Demand control ventilation
  - Building envelope

Rebates and Incentives

- Incentives may be available to help buy down the first cost of energy efficiency measures
- Some resources to consider:
  - Database of State Incentives for Utility Rebates (DSIRE) [http://www.dsireusa.org/](http://www.dsireusa.org/)
  - Your local utility Web site
Xcel Energy’s Energy Efficiency Programs

Derek Shockley
Trade Relations Manager
Commercial and Industrial

Xcel Energy Offers Three Types of Programs

- Prescriptive programs
- Non-prescriptive (custom) programs
- Studies/Audits
**Xcel Energy Prescriptive Programs**

**Prescriptive programs**
- Predetermined rebate amounts and related savings for various energy-saving technologies
- No preapproval required
- Qualifying technologies are listed on the rebate applications

**Included programs:**
- Lighting
- Cooling
- Motors and variable frequency drives

**Xcel Energy Non-prescriptive Programs**

**Non-prescriptive rebates**
- For equipment and conservation efforts not covered with the prescriptive programs
- Preapproval required
- Rebate amounts and energy savings may vary greatly by project

**Included programs:**
- Custom Efficiency
- Energy Management Systems
- Energy Design Assistance
# Xcel Energy Studies/Audits

| Xcel Energy funds a portion of a study – leads to identifying energy-saving opportunities | Included programs: |
| Preapproval required |  |
| Additional rebate opportunities can be realized by submitting a prescriptive or custom rebate application |  |

### Contact Information

Business Solutions Center 1-800-481-4700

Rebate info: [xcelenergy.com/rebates](http://xcelenergy.com/rebates)

Xcel Energy Account Managers
Denver Water Rebates & Incentives
Help You Save Water and $$

• Free audit of both indoor and outdoor water use at property

• 16 rebates for high-efficiency fixtures and appliances.
Denver Water Rebates & Incentives

Contd.

- Incentive contracts paying $21.50/kgal with minimum annual savings of 100,000 gallons.

- Types of projects that qualify include elimination of single-pass cooling, cooling tower modifications, industrial laundry equipment upgrades, re-use applications or installation of water efficient equipment, and many more.

Hotel – Project Planet Program

- Benchmarks:
  - 79-165 gal/ft²
  - 30,200-39,500 gal/room
Restaurant Program

- Pre-Rinse Spray Valves
  - 15,600 gal/year savings after retrofit
- Ware washing equipment
- Water Upon Request Signs
- Benchmarks:
  - 170-210 gal/ft²
  - 10,600-14,300 gal/seat

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Obtain an Energy Performance Rating Using Portfolio Manager

Set Energy Performance Goals

Set an Energy Performance Target Rating or a Target Energy Reduction Goal in Portfolio Manager

<table>
<thead>
<tr>
<th>Baseline Period (12 Months Ending): 03/31/2006</th>
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<tbody>
<tr>
<td>Target</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>57</td>
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</table>

Set Target Rating

Set Target Reduction
Energy Management Assessment Matrix

<table>
<thead>
<tr>
<th></th>
<th>Little or no evidence</th>
<th>Some elements</th>
<th>Fully implemented</th>
<th>Next Steps</th>
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<tbody>
<tr>
<td><strong>State Commitment to Continuous Improvement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy Director</td>
<td>No central or co-ordinated resources, no implementation</td>
<td>Central or co-ordinated resources implemented</td>
<td>Improved central or co-ordinated resources implemented with senior leadership support</td>
<td></td>
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<tr>
<td>Energy Team</td>
<td>No energy strategy/plan</td>
<td>Internal organization</td>
<td>Action plan; Consider hiring an energy specialist</td>
<td></td>
</tr>
<tr>
<td>Energy Policy</td>
<td>No plan or policy</td>
<td>Performance is fragmented or other obstacles</td>
<td>Pave way next AE policy must be implemented by fiscal year</td>
<td></td>
</tr>
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**Key Performance Indicators**

- **Energy Focus**
- **Process and Results**
- **Information and Knowledge**
- **Audits**
- **Energy Management and Leadership**
- **Health and Safety**
- **Emergency Preparedness**
- **Performance Monitoring**
- **Energy Management and Leadership**
- **Health and Safety**
- **Emergency Preparedness**
- **Performance Monitoring**

**Best Practices Guides**

- **Energy Management and Conservation Guide**
- **Fifteen O&M Best Practices**
- **Putting the "O" Back in O&M**

Join us for this upcoming training:

Communications: August 18th 10–11:30am

Any Questions?
Thank you for participating in this ENERGY STAR training