

# Welcome!

## Some Technical Tips Before We Get Started



### Training Being Recorded

### Attendee Phones on Mute

Lines will be opened up at the end of the presentation for Q&A

### Slides

If slides are not advancing please tell me immediately via the chat window

### Technical assistance

Call [1.866.229.3239](tel:1.866.229.3239) if you need help during the training



# Attendance





## Best Practices for Hotel Energy Management

Presented by:

**Andrew Schulte, ICF International**

**In collaboration with EPA Region 8**



Learn more at [energystar.gov](http://energystar.gov)



- 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](http://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](mailto:info@wattstowater.org)



[www.wattstowater.org](http://www.wattstowater.org)

## 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



- 5<sup>th</sup> 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 CO<sub>2</sub> 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:

	All Hotels	Limited Service	Full Service
Increasing ADR by	\$2.67	\$0.89	\$2.86
Increasing RevPAR by	\$1.91	\$0.60	\$2.02
Increasing occupancy points by	1.20	0.70	1.28



## 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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## Best Practices



Operations & Maintenance



Training & Communications



Lighting



ENERGY STAR Products

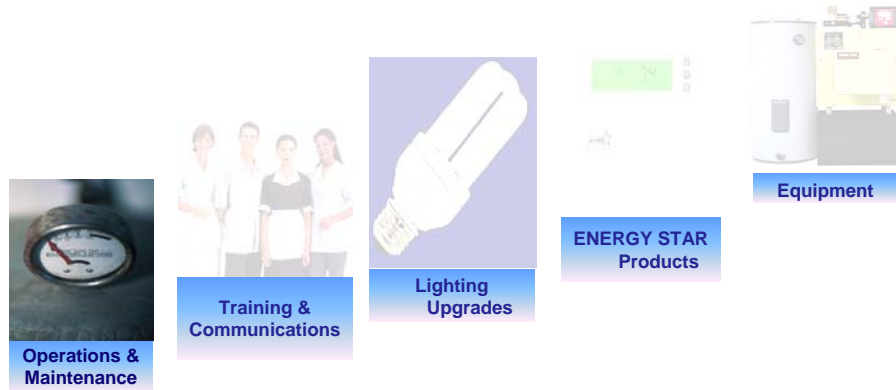


Equipment

**CONTINUOUS BENCHMARKING**



## Operations & Maintenance (O&M)



## Why Concentrate on Effective O&M?



Reduces need for *Unscheduled Maintenance*

<b><u>Increases</u></b>	<b><u>Decreases</u></b>
↑ Efficiency and useful life of systems	Equipment malfunctions and repair costs
↑ Equipment reliability	↓ Premature system failures
↑ Indoor air quality (IAQ)	↓ Unnecessary energy use
↑ Guest comfort & satisfaction	↓ Guest complaints
↑ Guest loyalty	



## 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



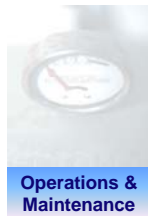
## Operations and Maintenance: Laundry



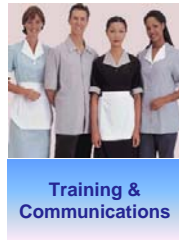
- Check steam traps for leakage
- Ensure proper insulation of hot water storage tanks, pipes, and steam lines
- Drain and clean hot water tanks to avoid buildup
- Follow manufacturer's recommended maintenance schedule for equipment
- Only run dryer with full loads



## Training & Communications



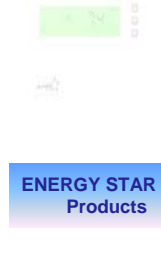
Operations & Maintenance



Training & Communications



Lighting Upgrades



ENERGY STAR Products



Equipment

**CONTINUOUS BENCHMARKING**



## 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

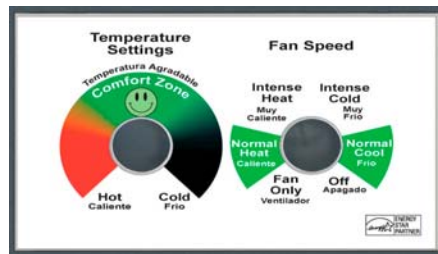


## Housekeeping



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



## Guestroom Lighting



- Replace standard incandescent bulbs with ENERGY STAR qualified compact florescent 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)



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

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](mailto:GJones@vailresorts.com)



## Keystone's Current Activities



- Reduce boiler temperatures from 180 deg F standard setting to 165 Deg F, *expected savings Gas .9 %*
- Maintain cover on main pool until guest make a request for the pool, *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, *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, *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



**CONTINUOUS BENCHMARKING** 



## 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



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

[www.energystar.gov/purchasing](http://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/>
  - ENERGY STAR Directory of Energy Efficiency Program Sponsors (DEEP) [http://www.energystar.gov/index.cfm?fuseaction=DEE PS.showSponsorSearch](http://www.energystar.gov/index.cfm?fuseaction=DEE_PS.showSponsorSearch)
  - 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

### Studies/Audits

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Xcel Energy funds a portion of a study – leads to identifying energy-saving opportunities

- ▶ Preapproval required
- ▶ Additional rebate opportunities can be realized by submitting a prescriptive or custom rebate application

Included programs:

- ▶ Data Center
- ▶ Recommissioning
- ▶ Refrigeration Recommissioning
- ▶ Energy Analysis
- ▶ Lighting Redesign

## Contact Information

Business Solutions Center 1-800-481-4700

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

Xcel Energy Account Managers



**Stacy Smith**  
Conservation Specialist, Denver Water  
303-628-6891  
[Stacy.Smith@denverwater.org](mailto:Stacy.Smith@denverwater.org)



## 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

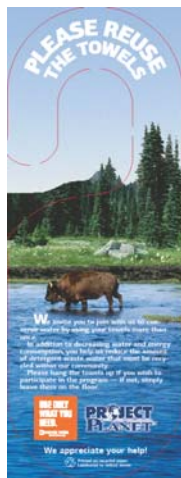
## Contd.



- 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/ft<sup>2</sup>
  - 30,200-39,500 gal/room



**...Use only what you need.**

**Conserve water & energy...**

**YOU CAN CHANGE THE WORLD**

## Restaurant Program



- Pre-Rinse Spray Valves
  - 15,600 gal/year savings after retrofit
- Ware washing equipment
- Water Upon Request Signs
- Benchmarks:
  - 170-210 gal/ft<sup>2</sup>
  - 10,600-14,300 gal/seat



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# Obtain an Energy Performance Rating Using Portfolio Manager



**PORTFOLIO MANAGER**

Home > My Portfolio > Sample Hotel in California

Facility Summary: **Sample Hotel in California**  
[How do I use this page?](#)

Building ID: 1221300  
 Level of Access: Building Data Administrator

[Generate a Statement of Energy Performance](#) for uses other than applying for the ENERGY STAR.

**General Information** [Edit](#)

Address: 123 Market Street  
 Anywhere, CA 92101

Year Built: 1987

Baseline Rating: 33      Current Rating: 56

Eligibility for the ENERGY STAR  
 Not Eligible: Rating must be 75 or above

**Facility Performance** [Get Baseline Period](#) | [Get Current Performance Target](#)

Select View: Performance: Environmental [Create View](#) | [Edit View](#)

12 Months Ending	Current Rating (1-100)	Current Source Energy Intensity (kBtu/Sq. Ft.)	Adjusted Percent Energy Reduction	CO2 Reduced (pounds)
January 2007 (Current)	56	172.6	20.2%	6,221,082.12
December 2004 (Baseline)	33	211.8	0.0%	0.00
<b>Change</b>	-23	39.2		-6,221,082.12

[REFRESH VIEW](#)

Space Name	Space Type	Floor Area (Sq. Ft.)	% Floor Area	Alerts

**General Facility Administration**  
[Track Energy Performance Improvements](#)  
[Delete this Facility from Portfolio Manager](#)  
[Contact us](#)



# Set Energy Performance Goals



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

Baseline Period (12 Months Ending): 03/31/2006					
Target	Baseline Rating (1-100)	Baseline Energy Use (kBtu/year)	Target Energy Use (kBtu/year)	Energy Cost Savings (\$/year)	Target Reduction (%)
<input type="text" value="57"/>	50	8,216,096	7,487,827	\$21,672	<input type="text" value="10"/>
Set Target Rating		Set Target Reduction			



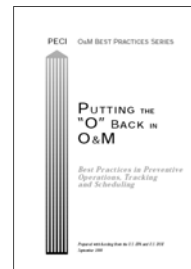
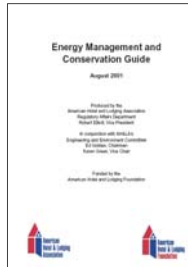
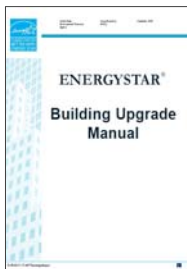
# Energy Management Assessment Matrix



ENERGY STAR® Energy Management Assessment Matrix				
	Little or no evidence	Some elements	Fully implemented	Next Steps
<b>Make Commitment to Continuous Improvement</b>				
<b>Energy Director</b>	No central or organizational resource. Decentralized management	Central or organizational resource not empowered	Empowered central or organizational leader with senior management support	
<b>Energy Team</b>	No company energy network	Informal organization	Active cross-functional team guiding energy program	
<b>Energy Policy</b>	No formal policy	Referenced in environmental or other policies	Formal stand-alone EE policy endorsed by senior management	
<b>Assess Performance and Opportunities</b>				
<b>Gather and Track Data</b>	Little metering/no tracking	Local or partial metering/tracking/reporting	All facilities report for central consolidation/analysis	
<b>Normalize</b>	Not addressed	Some unit measures or weather adjustments	All meaningful adjustments for organizational analysis	
<b>Establish baselines</b>	No baselines	Various facility-established	Standardized organizational base year and metric established	
<b>Benchmark</b>	Not addressed or only same site historical comparisons	Some internal comparisons among company sites	Regular internal & external comparisons & analysis	
<b>Analyze</b>	Not addressed	Some attempt to identify and correct spikes	Profiles identifying trends, peaks, valleys & causes	
<b>Technical assessments and audits</b>	Not conducted	Internal facility reviews	Reviews by multi-functional team of professionals	
<b>Set Performance Goals</b>				
<b>Determine scope</b>	No quantifiable goals	Short term facility goals or nominal corporate goals	Short & long term facility and corporate goals	



# Best Practices Guides



[http://www.energystar.gov/index.cfm?c=business.bus\\_upgrade\\_manual](http://www.energystar.gov/index.cfm?c=business.bus_upgrade_manual)



[http://www.energystar.gov/index.cfm?c=business.bus\\_om\\_reports](http://www.energystar.gov/index.cfm?c=business.bus_om_reports)



**Join us for this upcoming trainings:**

**Communications: August 18<sup>th</sup> 10–11:30am**



**Any Questions?**



Learn more at [energystar.gov](http://energystar.gov)



**Thank you for  
participating in this  
ENERGY STAR training**



Learn more at [energystar.gov](https://energystar.gov)