Tackling WaterSense

• WaterSense and ENERGY STAR are hosting a joint webinar series throughout 2016 to help you tackle your facility’s water use
• It’s easy to include water in your existing energy management efforts to achieve great returns

Tackling WaterSense – Outdoor Water Use
Tackling WaterSense – Mechanical Systems
Let’s Go on an Energy and Water Treasure Hunt
Tacking WaterSense – Commercial Kitchens

March 30th
May 10th
July 12th
September 20th
Agenda

• Introduction to WaterSense
• Restroom water use and savings opportunities
• Laundry equipment and water-efficient practices
• Case study
• WaterSense resources
Introduction to WaterSense

• WaterSense is a voluntary program launched by EPA in 2006 that provides a simple way to identify water-efficient:
  – Products
  – Homes
  – Programs
  – Practices

• All products are independently certified to meet water efficiency and performance standards
WaterSense Labeled Products

- Flushing Urinals
- Lavatory Faucets
- Irrigation Controllers
- Tank-Type Toilets
- Showerheads
- Pre-Rinse Spray Valves
- More than 16,000 product models have earned the WaterSense label
- New! Flushometer-Valve Toilets
Just add water!

- Include water in existing energy management efforts
- Track water usage in Portfolio Manager
- Measure water use with properly installed meters and sub-meters
- Conduct a facility water audit and include leak detection in regular assessments
Evaluating water and energy efficiency together provides the greatest resource and cost savings for any project.

Eight percent of the energy used in commercial buildings is used to heat water so significant savings can be found wherever hot water is used.

Incorporate water efficiency into Standard Operating Procedures, procurement language, and policies just like ENERGY STAR.

Many water and energy utilities also provide rebates to reduce the cost of water-efficient fixture replacements and other efficient projects.
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Water Use Profiles of Commercial Facilities

![Bar chart showing water use profiles for different facilities]

Created by analyzing data from: New Mexico Office of the State Engineer, American Water Works Association (AWWA), AWWA Research Foundation, and East Bay Municipal Utility District.
Water Savings in Restrooms

- Restrooms can account for up to 40% of water use
- Older fixtures installed before 1994 use 3-5 times more water than newer efficient models
- Water savings depend on user behavior just like energy
- Educate users on proper use to achieve greatest savings
  - Signage at point-of-use can prompt correct use
  - Newer technology like dual-flush fixtures should be installed with signs with simple instructions
  - Add maintenance contact information for users to report problems and leaks
Water Use in Commercial Building Restrooms

• Public and employee restrooms
  – Toilets (flushometer-valve or tank-type)
  – Urinals
  – Faucets
  – Showerheads

• Private and guestroom bathrooms
  – Likely tank-type toilets
  – Showerheads
  – Faucets
Toilet Efficiencies

3.5 to 7.0 gallons per flush (gpf)
*Models installed before 1994*

1.6 gpf
*EPAct 1992 requirement*

≤ 1.28 gpf
*WaterSense labeled models*
- Flush at 1.28 gpf or less
- Meet waste removal/flush performance requirements
Tank-Type Toilets: Retrofits and Replacements

- Periodically check tank-type toilet fill valves and tank water levels
- Use dye tablets to test toilet flappers for leaks
- Avoid using retrofit devices on existing tank-type toilets:
  - Could negatively affect performance
- Replace 1.6-gpf-or-higher tank-type toilets with WaterSense labeled models
Flushometer-Valve Toilets

• Contain two main components: toilet bowl and flushometer-valve
• Often use automatic- or sensor-flushing devices that require regular calibration to work properly
• Replace inefficient toilets with WaterSense labeled models which flush between 1.28 gpf and 1.0 gpf
• Dual-flush retrofit kits can be used to reduce water in-lieu-of replacements
• Prioritize retrofits and replacements in women’s restrooms for greatest savings

Post instructions for proper dual-flush usage
Calibrate sensors regularly to prevent phantom or double flushes.

If replacing flush valves, confirm that flush valve inserts are compatible with the fixture.

Replace older, inefficient urinals with WaterSense labeled models:
- Flush at 0.5 gpf or less
- Meet waste removal/flush performance requirements

1.5 to 3.0 gpf
*Models installed before 1994*

1.0 gpf
*EPA Act 1992 requirement*

≤ 0.5 gpf
*WaterSense labeled models*
Private-Use Faucets

2.5+ gpm
Models installed before 1994

2.2 gpm
Current National Standard

≤ 1.5 gpm
WaterSense labeled models

- Retrofit with WaterSense labeled aerators or
- Replace with WaterSense labeled faucets:
  - Max. of 1.5 gpm at 60 psi
  - Min. of 0.8 gpm at 20 psi to ensure performance
Public-Use Faucets

- Most common in commercial facilities
- Primarily used for hand-washing so have lower maximum flow rate
- Often use automatic sensors

2.5+ gpm
*Models installed before 1994*

2.2 gpm
*Current National Standard*

0.5 gpm
*ASME/CSA standard, IPC, and UPC*
Public-Use Faucets: Retrofits and Replacements

• Retrofit with faucet aerators or laminar flow devices flowing at 0.5 gpm or less
• Replace with:
  – Faucets flowing at 0.5 gpm or less
  – Metered faucets delivering no more than 0.25 gallons per cycle (gpc)
• Periodically check and adjust automatic sensors
Showerheads

Showers are found in some commercial facilities:

- dormitories
- locker rooms
- fitness centers

3.5 to 5.0 gallons per minute (gpm)

Models installed before 1994

2.5 gpm

EPAAct 1992 requirement

≤ 2.0 gpm

WaterSense labeled models
Showerhead Efficiencies

• Replacing a showerhead is more economical and practical than retrofitting

• Replace 2.5-gpm-or-higher with WaterSense labeled models:
  – Flow at 2.0 gpm or less
  – Meets spray coverage and spray force requirements

• Inspect showerheads often and remove any scale build-up from hard water
## Water-Efficient Sanitary Fixtures

<table>
<thead>
<tr>
<th></th>
<th>Private Restrooms or Guest Rooms</th>
<th>Public Restrooms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Toilets</strong></td>
<td>Tank-type ≤ 1.28 gpf</td>
<td>Flushometer-valve or Tank-type ≤ 1.28 gpf</td>
</tr>
<tr>
<td><strong>Urinals</strong></td>
<td></td>
<td>Flushing urinals ≤ 0.5 gpf</td>
</tr>
<tr>
<td><strong>Faucets</strong></td>
<td>≤ 1.5 gpm</td>
<td>0.5-gpm Aerators; 0.25-gpc Metered faucets</td>
</tr>
<tr>
<td><strong>Showerheads</strong></td>
<td></td>
<td>≤ 2.0 gpm</td>
</tr>
</tbody>
</table>
Restroom Maintenance

• Implementing water-efficient O&M practices can save water with little capital cost required

• Test the water pressure serving each floor to achieve expected fixture performance – optimal pressure is between 20 and 80 psi

• Ensure proper toilet, faucet, and urinal operation
  – Annually inspect valves and replace worn parts
  – Adjust automatic sensors on fixtures to avoid double or phantom flushes and faucets running longer than necessary

• Regularly inspect for and remove scale build-up on all fixtures especially faucets and showerheads
Fix Leaks!

- Leaks can be the greatest source of water waste within a facility – especially in restrooms.
- Leaking or continuously running water provides no added value:
  - Facilities pay for water twice - water supplied and water discharged to the sewer.
  - Unlike energy products, plumbing products leak when they fail.
- A dripping faucet (one drip per second) can waste nearly 3,200 gallons of water per year.
Fix Leaks!

- Train cleaning and maintenance staff to identify and report leaky or continuously flushing fixtures
- Respond quickly to all reports of leaky or continuously flushing fixtures
- Place signage in restrooms with instructions for reporting leaks so employees, visitors, and guests can help
Savings Considerations

- Occupancy data is vital to accurate savings calculations because water consumption for restrooms is based on usage, not the number of fixtures.
- The male-female ratio is key when calculating toilet savings:
  - Women’s restrooms have a high potential for water savings when replacing flushometer-valve toilets so they could be prioritized in phased projects.
  - A combination of toilet and urinal replacement may yield greater savings in male restrooms.
By replacing old, inefficient flushometer-valve toilets with WaterSense labeled models, a 10-story office building with 1,000 occupants could save nearly 1.2 million gallons of water and nearly $10,000 per year.

Each of these toilets that is replaced with a WaterSense-labeled model could save a business nearly 5,500 gallons of water per year and nearly $1,000 over the lifetime of the toilet.
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• Case study
• WaterSense resources
Multi-family buildings and dormitories laundries use:
• Commercial coin- or card-operated washers
• No-pay commercial washers

Professional laundries, hospitals and hotels use larger equipment:
• Multi-load washers
• Washer extractors
• Tunnel washers
Coin- or Card-Operated & No-Pay Commercial Washers

**Top-Loading Washers**
- 8.5 gallons/ft³
- **EPAAct 1992 requirement**
- **4.5 gallons/ft³**
  - **ENERGY STAR certified**

**Front-Loading Washers**
- 5.5 gallons/ft³
- **EPAAct 1992 requirement**
- **4.5 gallons/ft³**
  - **ENERGY STAR certified**

- Replace with ENERGY STAR certified commercial washers
  - 37 percent more efficient than standard models
  - Save water, energy and detergent
Linen Laundry

Multi-Load Washers
~80+ lbs/load
≤ 8 gallons/cycle/ft³

Washer Extractors
30 to 800 lbs/load
2-4 gallons of water/lb fabric

Tunnel Washers
2,000 lbs/hour
≤2 gallons of water/lb fabric
Laundry Efficiencies

- Program washers to use least wash and rinse cycles for each load
  - Multi-load washers should use 8.0 gallons/cycle/ft$^3$ or less
- Water reuse/recycling systems:
  - Simple systems reuse water from final rinse for first wash can save 10 to 35 percent of water
  - Complex systems treat reclaimed water from wash and rinse cycles:
    - Can be used in all cycles of the next load
    - Can save up to 85 percent of water
- Ozone injection systems:
  - Allow machines to run at reduced temperatures, which saves energy
  - Wash cycles require less detergent and chemicals, so less rinsing water is required
  - Can save 10 to 25 percent of water
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Nor'wood Development & Colorado Springs Utilities

- Colorado Springs, CO
- Large locally owned developer
- 1.8M sqft retail, office, commercial
- Master planned communities
- Art, Land, Community, Innovation

- Municipally owned 4 service utility
- Serves ~500,000 customers
- WaterSense & ENERGY STAR Partner
- Collaboration, Innovation, Trust
- Water Efficiency Plan → Conservation
- Incentives for WaterSense plumbing fixture upgrades
Nor'wood Development
Plaza of the Rockies

- Amber Hicks, Senior Building Engr.
- Class A Office Building, built 1983
- Showcase property, downtown
- Important tenants; federal, etc.
- Renovations for Green Leases
- Undertaking LEED EB: O&M
- Utilizing ENERGY STAR Portfolio Manager
- Water Efficiency Economic Assessment Policy – evaluate performance and savings
- 516 FTE, 50/50 Female/Male
- 50% reduction target with O&M
North Tower assessment/replacement
• LEED 2009 WE Prerequisite 1.1
  – 20% minimum baseline reduction
• 39 water closets: 3.5 → 1.28 gpf
• 17 urinals 1.0 → 0.125 gpf
• Installed 0.5 gpm faucet aerators
• Installed 1.5 gpm showerheads
• Corporate social responsibility via resource stewardship
• CSU Business rebate of $125/fixture
• WaterSense or HET/HEU required
• Water efficiency → WaterSense
• Water management → Partnerships
• Systemic water savings for all parties
Nor'wood Development
Plaza of the Rockies

- North Tower fixtures replaced 2014
- Kohler flushometer-valve toilets & urinals
- MaP-Testing.com used for performance and qualifications
- CSU rebate of $7,000 (56 @ $125)
- LEED Water Reduction from 1,295 to 763 Kgal/year → 41.1% savings
- CSU recycles all porcelain into road base aggregate → zero waste project
- Green Leases satisfied through LEED
- Tenant retention, improved facility
- CSU gains important customer participation
- Durable water savings
Nor'wood Development
Plaza of the Rockies

• Lessons Learned
  – Inform customers of changes
  – Learning curve for new products
  – Maintenance is important
  – Educate tenants to participate in water savings; use, leaks, etc.
  – Work with utility for best results
  – Utilities often have incentives

• Ongoing efforts
  – Tracking water usage with ENERGY STAR Portfolio Manager
  – Isolating water savings is hard
  – Implemented same upgrades in other properties, recreate success
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WaterSense Resources

- Water use information by facility type
- Water-saving tips
- Best Management Practices
- Assessment tools
- Worksheets and checklists
- Live and recorded training webinars
- Case studies and more!
Water Efficiency Best Management Practices

- *WaterSense at Work* is an online guide facilities can use to manage water use:
  - Water management planning
  - Water use monitoring and education
  - Sanitary fixtures and equipment
  - Commercial kitchen equipment
  - Outdoor water use
  - Mechanical systems
  - Laboratory and medical equipment
  - Onsite alternative sources of water

[www.epa.gov/watersense/commercial](http://www.epa.gov/watersense/commercial)
WaterSense at Work

36 best management practices

• Overview of technology
• O&M and user education tips
• Retrofit and replacement options
• Calculations for potential water energy and dollar savings and payback
• 15+ case studies from all types of facilities using BMPs
What You Can Do Right Now

• Start tracking water use in Portfolio Manager
• Incorporate restrooms into facility walk-throughs to check plumbing fixtures for leaks
• Post signage in restrooms and laundry rooms to tell users how to save water and report leaks
• Install 0.5-gpm faucet aerators in public restrooms and WaterSense labeled faucet aerators in private-use bathrooms
• Check and adjust automatic sensors on all toilets and faucets regularly
• Encourage laundry staff to weigh laundry so that washers are filled to capacity
Upcoming Webinars

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www.epa.gov/watersense/commercial/webinars.html
Questions?

ENERGY STAR
For technical questions related to Portfolio Manager® or the ENERGY STAR program, please visit:
www.energystar.gov/buildingshelp

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