WaterSense®

H₂Otel Challenge
What’s Cooking:
Commercial Kitchen Savings

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Presenters

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Welcome!

Housekeeping

• The moderator is going to mute all attendees at the beginning of the webinar to minimize background noise.

• Please type questions into the chat box on the upper right-hand side of your screen. We will have a dedicated time for Q&A.

• A recording of this presentation and a transcript will be posted on the WaterSense website after the call.
Agenda

• What Is WaterSense?
• Saving Water in Hotels
• Improving Water and Energy Efficiency of Commercial Kitchen Equipment Used for:
  – Food Preservation
  – Food Preparation
  – Cleaning and Washing
• Lair Marketplace at Loyola Marymount University Case Study
• Webinar Review
WaterSense is a voluntary program launched by EPA in 2006 that provides a simple way to identify water-efficient:

- Products
- Homes
- Programs
- Practices

To date, more than 11,000 different models have earned the label

- Independently certified for water efficiency and performance
WaterSense Focus: 3 Ps

Facility-level water savings with best management practices

Specific fixtures and technologies save water

Partners reach users to change behavior
WaterSense Labeled Products

- **Flushing Urinals** (≤0.5 gpf)
- **Tank-Type Toilets** (≤1.28 gpf)
- **Lavatory Faucets** (≤1.5 gpf)
- **Showerheads** (≤ 2.0 gpm)
- **Irrigation Controllers**
- **NEW: Pre-Rinse Spray Valves** (≤ 1.28 gpm)

More than 11,000 product models have earned the label.

Water factors are also included in many ENERGY STAR® qualified products.
• *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
The WaterSense H₂Otel Challenge

• Encourages hotels to “ACT”:
  – **Assess** water use and savings opportunities
  – **Change** products or processes to incorporate best management practices
  – **Track** water savings progress

• EPA provides technical guidance:
  – Training webinar series
  – Water assessment worksheets for conducting a facility walk-through
  – Water Use and Savings Evaluation (WaterUSE) Tool
Why Save Water in Hotels?

- Save operational costs
  - Water and sewer rates have risen well above inflation
  - Saving water saves energy costs for heating and treating water
  - Improving plumbing fixtures can reduce maintenance calls
- Save water while enhancing your guests’ experience
- Competitive edge in the green travel marketplace
  - More companies are making water conservation a priority
- Build on successes of towel/linen reuse programs
  - Best management practices have even greater savings potential
- Show sustainability leadership in the community
  - Recognition for participating in H₂Otel Challenge
Maximize Savings with Water and Energy Together

- Evaluate water and energy efficiency together for the best results
  - Can reduce payback periods and improve ROI
  - Combining water, sewer, and energy costs makes savings estimates more accurate

- Local water and energy utilities can provide rebates and incentives for efficient technologies
ENERGY STAR qualifies several types of water-using commercial kitchen equipment:
- Commercial dishwashers
- Commercial ice machines
- Combi ovens
- Steam cookers

They also offer tools and resources to help facilities better manage commercial kitchen water use and identify ways to save energy, water, and money:
- Guide for Cafes, Restaurants, and Institutional Kitchens
- Equipment Savings Fact Sheet
- Commercial Kitchen Equipment Savings Calculator
- [www.energystar.gov/cfs](http://www.energystar.gov/cfs)
Questions?
Where Do Hotels Use Water?

- Domestic/Restroom: 30%
- Laundry: 16%
- Landscaping: 16%
- Kitchen/Dishwashing: 14%
- Cooling and Heating: 14%
- Other: 16%
- Pools: 12%
Fixtures that use water in hotel kitchens fall into three main categories:

- Food preservation
  - Commercial ice machines

- Food preparation
  - Combination ovens, steam cookers, steam kettles, and wok stoves

- Cleaning and washing
  - Pre-rinse spray valves, food disposals, commercial dishwashers, wash-down sprayers, and dipper wells
Commercial Ice Machines

- Ice machine water use depends on the type of ice produced, quality of incoming water, and whether water is used to cool the ice making unit
  - Water-cooled machines: Between 100 and 300 gallons of water per 100 lbs of ice produced
  - Air-cooled machines: Less than 50 gallons of water per 100 lbs of ice produced, but may require more energy
  - ENERGY STAR qualified models: At least 15 percent more energy-efficient and 10 percent more water-efficient than standard, air-cooled models
Commercial Ice Machines: O&M

- Periodically clean the machine to remove lime and scale build-up
- Keep the ice machine’s coils clean to ensure the heat exchange process is running efficiently
- Keep the lid closed to maintain the appropriate temperature
- Work with manufacturer to ensure rinse cycles are set at the lowest frequency necessary
- Train hotel staff to identify and report leaking or otherwise improperly operating ice machines
Commercial Ice Machines: Retrofits & Replacements

- Retrofit Options:
  - Modify single-pass cooling systems to re-circulate the cooling water through a cooling tower or heat exchanger
  - Reuse cooling water for another application

- Replacement Options:
  - Select an appropriately sized machine
  - Purchase an ENERGY STAR qualified model
  - Consider purchasing continuous (flake or nugget) ice machines, which use less water and energy than batch (cubed) ice machines
Combination Ovens

• Combine three modes of cooking into one unit: steam mode, circulated hot air (i.e., dry heat), and a combination of both

• Amount of water used dictated by steam source
  • Boiler-based units are connected to a central boiler system that provides a constant supply of steam
  • Connectionless units have a self-contained water reservoir and heat source

• Traditional boiler-based units use 30 to 40 gallons of water per hour
• Connectionless models use 15 gallons of water per hour or less
Combination Ovens: O&M

- Use steam mode or combination mode sparingly, as they require more water and energy use
- Turn the oven off or down during slow times or when not in use
- Keep oven doors completely closed
- Maximize efficiency by ensuring oven is loaded to full capacity
- Ensure that doors stay aligned to provide a good seal and retain heat/steam
  - Replace gaskets when necessary
  - Keep door hinges tight
Combination Ovens: Replacements

- There are no known retrofit options for combination ovens

- Replacement options
  - Look for ENERGY STAR qualified models that use no more than 15 gallons of water per hour or 3.5 gallons per pan per hour
  - Select an appropriately-sized oven for your facility’s cooking needs
Steam Cookers

• Used to prepare foods in a sealed vessel that limits escape of air or liquids below a preset pressure
• There are two varieties that differ in water and energy use
  • Boiler-based cookers receive a constant supply of steam from a central boiler
  • Connectionless cookers have a water reservoir that is drained and refilled as needed
• Traditional boiler-based models use an average of 40 gallons of water per hour
• ENERGY STAR models use an average of 3 gallons of water per hour (90 percent less water)
Steam Cookers: O&M

- Prepare food in batches to avoid unnecessary opening and closing of the steam cooker
- Fill the steam cooker to capacity, rather than cooking one pan at a time
- Keep the doors closed while the steamer is operating
- Use only as many steamer compartments as needed
- Set a timer to ensure that the steamer returns to standby mode following use; turn it off during long periods of non-use
- Repair any leaks and remove deposit buildup from the boiler (boiler-based models only)
Steam Cookers: Replacements

- There are no known retrofit options for steam cookers

- Replacement options
  - Look for models that are ENERGY STAR qualified
  - Choose an appropriately-sized cooker for the application
Steam Kettles

- Steam kettles use circulating steam inside a kettle jacket to cook food (function as a stock pot)
- Boiler-based steam kettle
  - Connected to a central boiler
  - Require blowdown and can consume 100,000 gallons per year
- Self-contained steam kettle
  - Have an internal heating element
  - Require regular dumping and cleaning
Steam Kettles: O&M

• Regularly monitor self-contained steam kettle water levels and maintain temperature control components
• Turn the steam kettle down or off between uses
• Ensure steam kettle lid is secure to reduce steam/energy required for cooking.
• Prevent buildup of minerals in self-contained units by dumping water daily
Steam Kettles: Retrofits & Replacements

- **Retrofit Options**
  - For boiler-based steam kettles, install a condensate return system that directs condensate back into the central boiler system for reuse
  - Insulate condensate return lines for additional energy savings

- **Replacement Options**
  - Purchase a steam kettle that is properly sized for the cooking needs
  - Consider purchasing a self-contained steam kettle
  - If daily operations require a boiler-based steam kettle, purchase a model with a condensate return system
Pre-Rinse Spray Valves

- Commercial pre-rinse spray valves are used to remove food residue from dishes prior to dishwashing

- Standard pre-rinse spray valves use 1.6 gpm
  - Models older than 2005 may use 3.0 to 4.5 gpm

- WaterSense labeled pre-rinse spray valves use less than 1.28 gpm
  - 20 percent more efficient than standard models
Pre-Rinse Spray Valves: O&M

- Scrape as much food waste as possible from dishes or pre-soak heavily soiled dishes before using pre-rinse spray valves
- Train users how to properly use the always-on clamp, if available
- Periodically inspect for scale buildup to ensure flow is not being restricted
- Periodically inspect for leaks and broken parts
Pre-Rinse Spray Valves: Replacements

- Replace older pre-rinse spray valves instead of retrofitting
- Look for WaterSense labeled models
  - Flow at 1.28 gpm or less
  - Meet performance requirements for spray force and lifecycle testing
Food Disposals

- Commercial kitchens often dispose of food scraps using a garbage disposal with a food grinder, running water to prevent damage to the grinder blades.

- Some use a sluice trough to feed the garbage disposal; water is applied continuously at rates of 2.0 to 15.0 gpm.

- Pulpers and food strainers are water-efficient alternatives.
Food Disposals: O&M

- Turn off the water to the food disposal system during idle periods
- Scrape larger food items into a trash receptacle rather than into the food disposal
- Only run cold water through the food disposal system
- Avoid putting both hard objects and oil/grease into the disposal, as this can dull blades, clog pipes, and make the overall system less efficient
- Periodically inspect the food disposal system to make sure blades remain sharp and debris is not lodged
Food Disposals: Retrofits & Replacements

- **Retrofit Options**
  - Install a device that adjusts water flow based on the disposal’s motor load
    - Can reduce the flow during idle periods to 1.0 gpm

- **Replacement Options**
  - Purchase a garbage disposal with a load sensor
  - Install a food pulper, which can recycle 75 percent of the water used for the food disposal process
  - Replace mechanical food disposal systems with food strainers, which use little to no water
Commercial Dishwashers

- Commercial dishwashers are one of the largest water users in commercial kitchens

- Many different types, depending on facility throughput:
  - Undercounter
  - Stationary door- or hood-type
  - Conveyor-type
  - Flight-type

- ENERGY STAR qualified models can reduce both energy and water use by 25 percent
Commercial Dishwashers: O&M

- Only run dishwashers when they are full
- Educate staff to scrape dishes prior to loading the dishwasher
- Operate the dishwasher at the minimum flow rate and water pressure recommended by the manufacturer
- Turn off the machine at night and when not in use
- Repair leaks, inspect valves, and rinse nozzles
Commercial Dishwashers: Retrofits & Replacements

• Retrofit Options
  • For conveyor-type machines, install rack sensors that allow water flow only when dishes are present

• Replacement Options
  • Choose an appropriately-sized machines for your throughput
  • Replace existing commercial dishwashers with ENERGY STAR qualified models
  • For flight-type dishwashers, choose models that use less than 0.01 gallons per dish
  • Choose models that reuse rinse water
Wash-Down Sprayers

- Used for cleaning surfaces in kitchens (e.g., countertops, floors, mats)
- Use large volumes of water to provide high-pressure streams to clean dirt and residue
- Typically deliver 7.0 gpm, but heavy-duty sprayers can deliver anywhere from 9.0 to 20.0 gpm
- Lower water use alternatives are available to provide similar services
  - Pressure washers
  - Water brooms
  - Sweeping/mopping
Wash-Down Sprayers: O&M

- Only use wash-down sprayers to clean floors, countertops, and other surfaces
  - Do not use on dishware, which should be cleaned using a pre-rinse spray valve
- If the wash-down sprayer doesn’t have a self-closing nozzle, shut off the water supply when sprayer is not in use
- Consider sweeping, mopping, and/or using a squeegee to wash floors
Wash-Down Sprayers: Retrofits & Replacements

• Retrofit Options
  • Install a self-closing nozzle, reducing flow rate from 20.0 gpm down to 7.0 gpm and preventing water waste when sprayer is not in use

• Replacement Options
  • Consider using a pressure washer instead, which run at flow rates around 3.0 gpm or less and often have similar performance
  • For floor cleaning applications, consider mopping, sweeping, or using a water broom instead
Water Savings Potential

10%  25%  50%  90%

20%  60%  75%
Replacing a standard pre-rinse spray valve with a WaterSense labeled model can:
- Save more than 7,000 gallons of water per year
- Save more than $115 per year in water and energy costs annually
- Pay back in as little as 8 months

That’s enough water to wash nearly 5,000 racks of dishes in a commercial dishwasher and enough energy to run your convection oven for 12 hours a day for 3 weeks
Savings and Payback Calculations

- *WaterSense at Work* helps you calculate water use, water savings, and simple payback from kitchen retrofit and replacement options.

**Equation 4-5. Water Use of Steam Cooker (gallons per year)**

\[ \text{Steam Cooker Water Use Rate} \times \text{Daily Use Time} \times \text{Days of Operation} \]

Where:
- Steam Cooker Water Use Rate (gallons per hour)
- Daily Use Time (hours per day)
- Days of Operation (days per year)

**Equation 4-6. Water Savings From Steam Cooker Replacement (gallons per year)**

\[ \text{Current Water Use of Steam Cooker} - \text{Water Use of Steam Cooker After Replacement} \]

Where:
- Current Water Use of Steam Cooker (gallons per year)
- Water Use of Steam Cooker After Replacement (gallons per year)

**Equation 1-1. Simple Payback (years)**

\[ \text{Project Cost} \div (\text{Water Savings} \times \text{Cost of Water and Wastewater}) \]

Where:
- Project Cost (dollars)
- Water Savings (gallons per year)
- Cost of Water and Wastewater (dollars per gallon)
# WaterUSE Tool

## Commercial Kitchen Water Use (Excluding Dishwashing)

### Current Water Use

Your existing commercial kitchen equipment uses approximately 1,394,000 gallons of water per year. The following table provides your estimated water use for each appliance and equipment type.

<table>
<thead>
<tr>
<th>Estimated Annual Water Use (gal)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice Maker(s)</td>
<td>301,000</td>
</tr>
<tr>
<td>Steam Cooker(s)</td>
<td>175,000</td>
</tr>
<tr>
<td>Combination Oven(s)</td>
<td>131,000</td>
</tr>
<tr>
<td>Steam Kettle(s)</td>
<td>Not Estimated</td>
</tr>
<tr>
<td>Dipper Well(s)</td>
<td>262,000</td>
</tr>
<tr>
<td>Food Disposal(s)</td>
<td>525,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,394,000</strong></td>
</tr>
</tbody>
</table>

**Note:** WaterSense is not able to establish a water use estimate for steam kettles.

### Recommended Best Management Practices and Potential Water Savings

- Your standard single-pass water-cooled ice makers use more than 279,200 gallons of water per year for cooling purposes alone. Replacing your existing, water-cooled ice makers with ENERGY STAR qualified models could save you approximately $2,400 per year in utility costs annually. If replacing existing ice makers is not feasible, modify them to operate on a closed loop that recirculates the cooling water through a cooling tower or heat exchanger. If eliminating single-pass cooling for your ice makers is not possible, consider reusing the cooling water for other applications where non-potable water could be used.

- Consider replacing your existing ice makers with ENERGY STAR qualified models. This can help you save approximately 0 gallons of water and 1,900 kilowatt-hours of electricity annually, saving you about $200 per year in utility costs.

- Replacing your existing inefficient steam cookers with ENERGY STAR qualified models can reduce your water use by approximately 162,000 gallons per year, saving you about $1,400 in utility costs annually. ENERGY STAR qualified steam cookers reduce water use by 90 percent and are as much as 50 percent more energy-efficient, reducing energy costs as well.
Questions?
Loyola Marymount University

Location: Los Angeles, California

Industry: Institution of Higher Education - Princeton Review Green Campus

Demographics:
• 6,000 undergraduates/2,000 graduates /2,000 employees
• 4 commercial kitchens-14 satellite venues, increasing volume, serve 45,000 customers per week collectively
  • Lair Marketplace 25,000 weekly guests
  • Roski Dining 5,000 weekly guests
  • Remainder of campus 10,000 to 15,000 weekly guests
Why LMU is Waterwise:

- California is in the 3rd year of statewide drought conditions
  - Water restrictions in force!
- Southern California Metropolitan Water District reserves at lowest level in 4 years
- Voluntary restrictions in place by Los Angeles Dept. of Water Power (LADWP)
- Approved 5 year rate increase of 8% per annum
  - Sewer service connection associated increases
- Environmentally Conscious Faculty Staff/Students
- Pursue triple bottom line as it relates to tuition/cost controls
Loyola Marymount University

Why LMU is Waterwise:

• Strategic Plan: “Strengthen the University commitment to Stewardship, Ethical Sustainability, Environmental Justice and Human Resilience.”

• Competitive advantage
  • Rankings and marketplace delineation
  • Green Restaurant Association (GRA)
  • LADWP Green Partner
  • US Zero Waste Business Council (USZWBC)
Loyola Marymount University

Water end uses addressed:

• Drought tolerant landscaping
• Restrooms
• Dishroom
• 3 Compartment sinks
• Handwash sinks
• Food preparation
• Fountain machines
• Cleaning and sanitation
Water Efficiency Actions

- University dining operations open 227 academic days a year
  - 7:30AM to 3:00am, students demand round the clock convenience and service
- LMU Hospitality by Sodexo has a hybrid retail a la carte and “All you care to Eat” dining program.
  - Service is comprehensive of faculty dining, staff, catering, students, guests, camps, conference visitors, contractors, and alumni events
- LMU Dining only procures ENERGY STAR equipment
- Efficiencies:
  - Metering and submetering
  - No running water thawing- freezer-refrigerator- prep area
  - Garbage disposal free kitchens
  - Salvajor capture- to recycled water Somat pulper-dehydrator
  - 11 low flow jet sprays (GRA Approved)
  - 18 sink/faucet aerators (GRA Approved)
  - Replaced flight type warewashing machine
  - Added fats, oils ,and grease (FOG) Tank
  - Replaced ice machines
  - Low flow sensor toilets & faucets (GRA Approved)
Water Efficiency Outcomes

Results:

– Curtailment of hydrojetting with organic enzyme
– Jetsprays save 1,045,440 gallons per year
– Aerators save 2,021,760 gallons per year
– Replaced dish washer saves 578,160 gallons per year
– FOG tank saves 743,004 gallons per year
– Sensor faucet saves 281,880 gallons per year
– Sensor toilets use 20% less water per flush
Questions?
What’s Cooking: Commercial Kitchen Savings

Webinar Review

- Water use in commercial kitchens can account for 14 percent of water use in a hotel

- Implementing water-efficient O&M practices for water-using food storage, preparation, and cleanup fixtures can save water and energy with little capital cost required

- Retrofitting or replacing some kitchen fixtures can result in significant water savings and may pay back quickly
  - Replace pre-rinse spray valves with WaterSense labeled models
  - Consider ENERGY STAR qualified ice machines, steam cookers, combination ovens, and dishwashers
  - Consult WaterSense at Work for replacement options for steam kettles, food disposals, wash-down sprayers, wok stoves, and dipper wells
What You Can Do Right Now

• Ensure that kitchen equipment is properly maintained to prevent avoidable water and energy losses
• Train kitchen staff to scrape food off of dishes and soak them prior to pre-rinse spray valve or dishwasher use
• Encourage kitchen staff to load cooking equipment and dishwashers to full capacity
• Replace existing pre-rinse spray valves with WaterSense-labeled models
• Use the WaterUSE Tool to evaluate savings opportunities for commercial kitchen equipment
H₂Otel Challenge Resources

• Recorded webinars available now:
  – Take the Plunge: The H₂Otel Challenge
  – Assess, Track, and Realize Payback
  – Washing 101: A Plumbing and Laundry Efficiency Primer
  – Make a Splash With Outdoor Water Savings
  – Demonstrating WaterSense’s WaterUSE Tool
  – Minimize Water Use in Mechanical/HVAC Systems
  – Let’s Talk about Education and Outreach

• H₂Otel Challenge website: www.epa.gov/watersense/challenge
Contact Us

WaterSense Helpline

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