WaterSense®

H_2Otel 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.

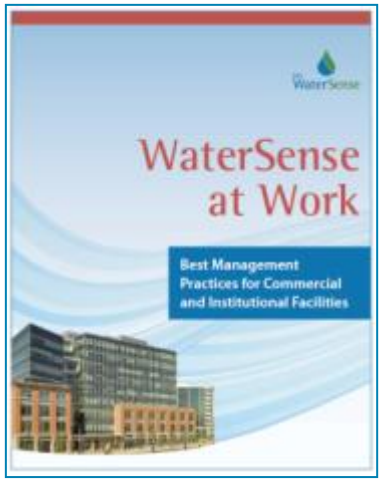
Agenda

- 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

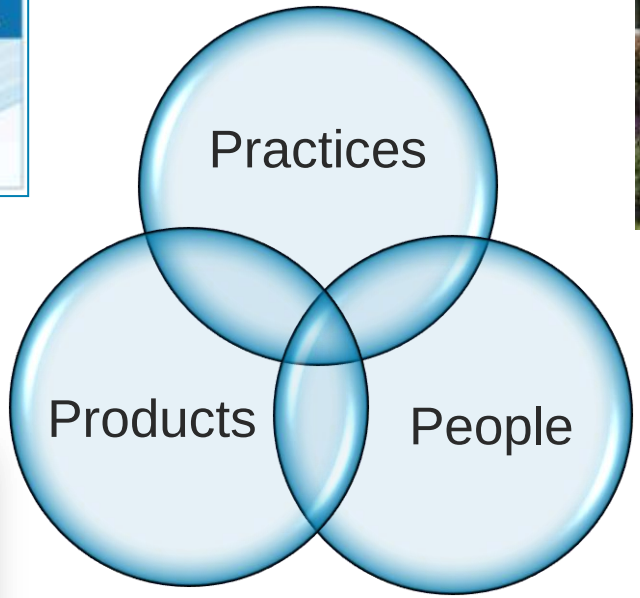
What Is WaterSense?

- 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)

Lavatory Faucets (≤1.5 gpf)

More than 11,000 product models have earned the label

Irrigation Controllers

***NEW:* Pre-Rinse Spray Valves (≤ 1.28 gpm)**

Tank-Type Toilets (≤1.28 gpf)

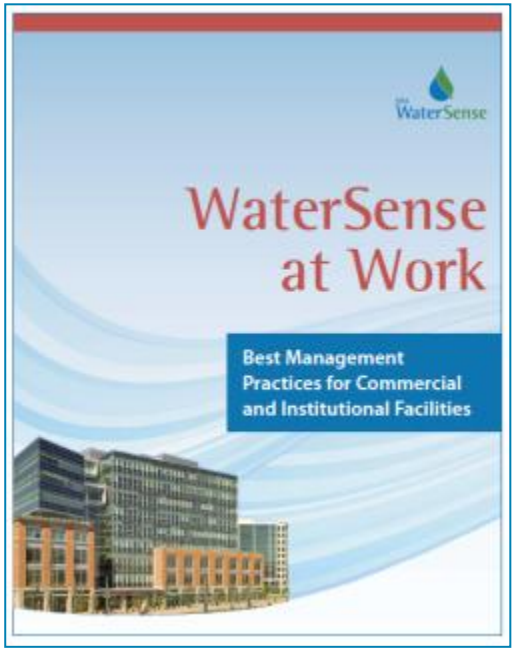
Showerheads (≤ 2.0 gpm)

Water factors are also included in many ENERGY STAR® qualified products

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

The WaterSense H_2Otel 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 H_2Otel 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

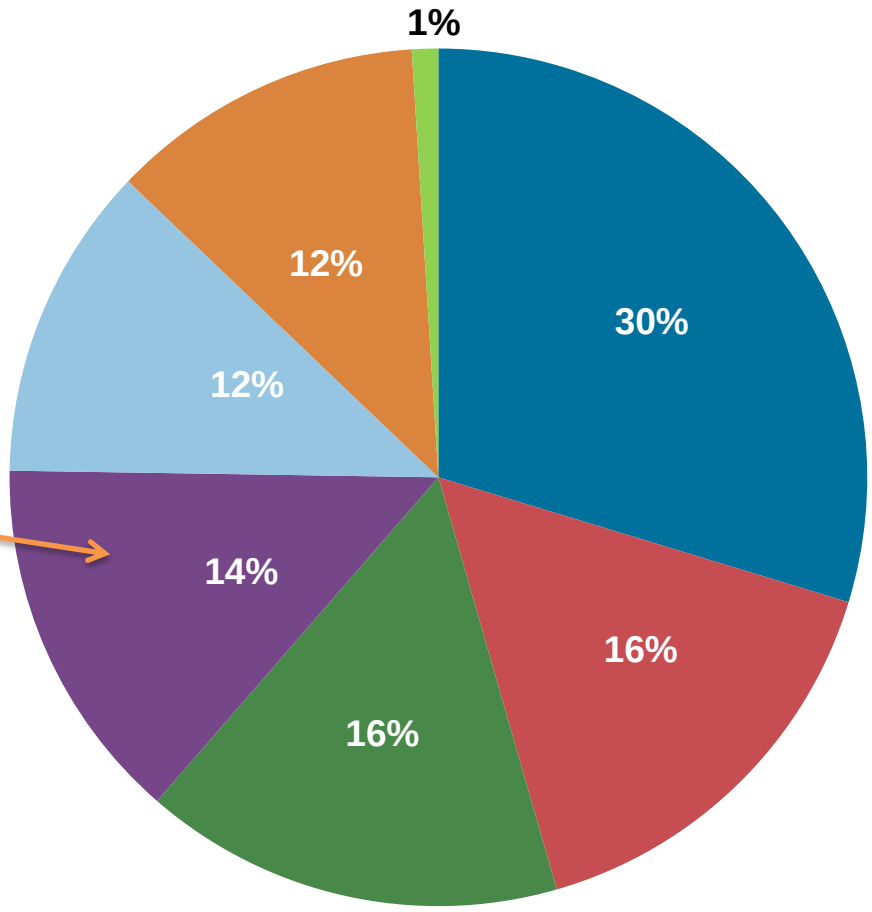
ENERGY STAR in Kitchens

- 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

Questions?

Where Do Hotels Use Water?

Kitchens and Dishwashing



Water Use in Hotel Kitchens

- 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

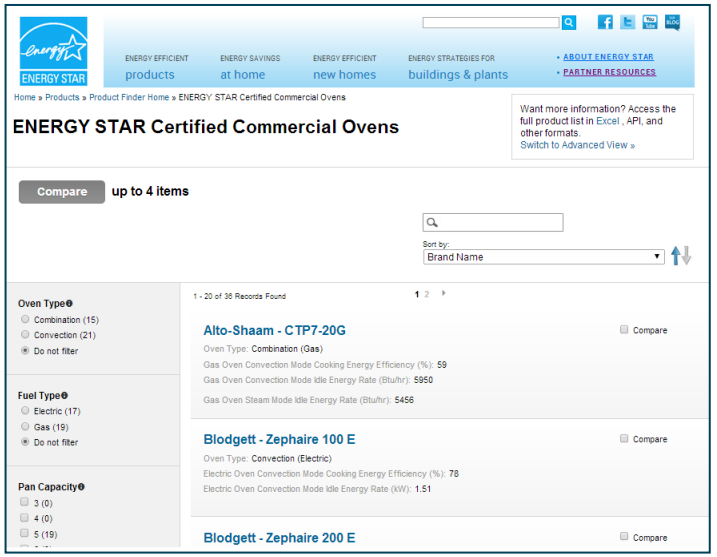
- Combine three modes of cooking into one unit: steam mode, circulated hot air (i.e., dry heat), and a combination of both
- Amount of water used dictated by steam source
  - Boiler-based units are connected to a central boiler system that provides a constant supply of steam
  - Connectionless units 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

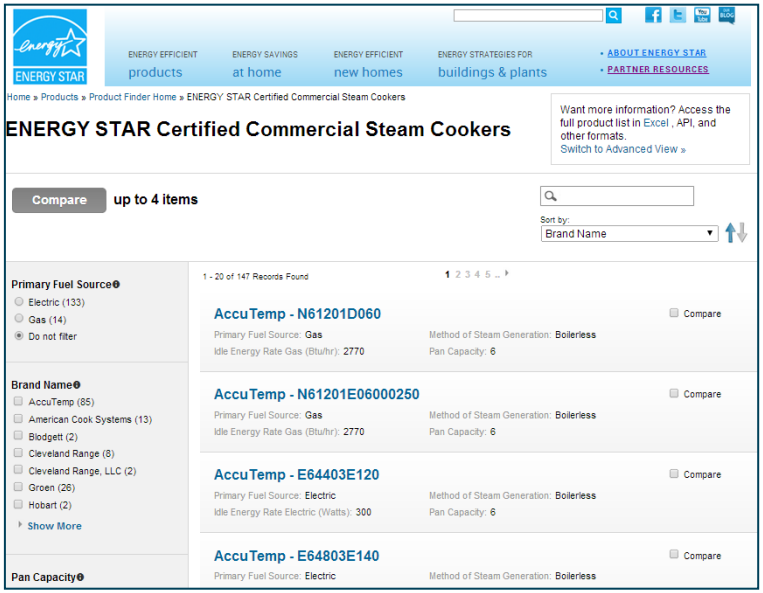
- Used to prepare foods in a sealed vessel that limits escape of air or liquids below a preset pressure
- There are two varieties that differ in water and energy use
  - Boiler-based cookers receive a constant supply of steam from a central boiler
  - Connectionless cookers have a water reservoir that 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)

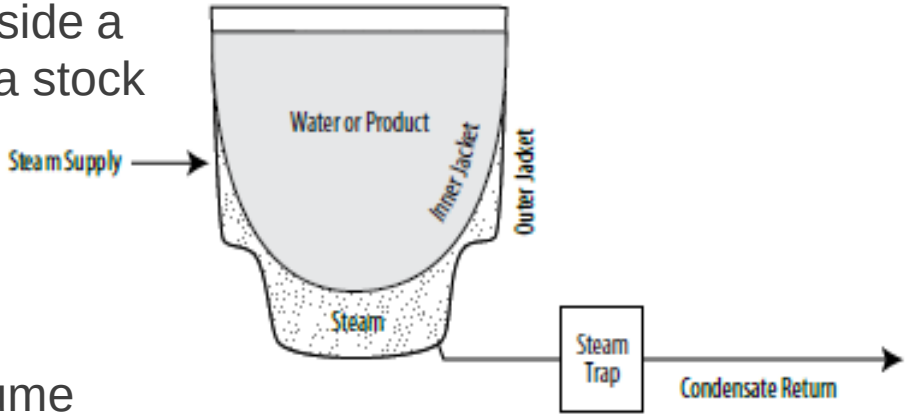
Steam Cookers: Replacements

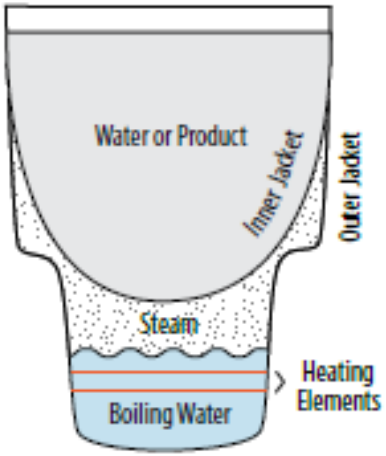
- There are no known retrofit options for steam cookers
- Replacement options
  - Look for models that are ENERGY STAR qualified
  - Choose an appropriately-sized cooker for the application



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

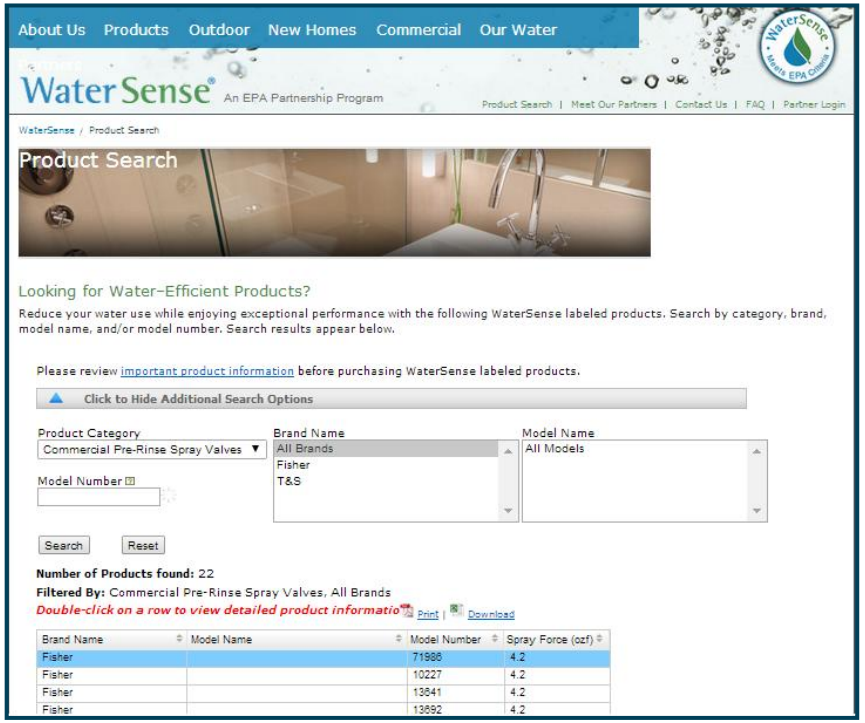
- WaterSense labeled pre-rinse spray valves use less than 1.28 gpm
  - 20 percent more efficient than standard models

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

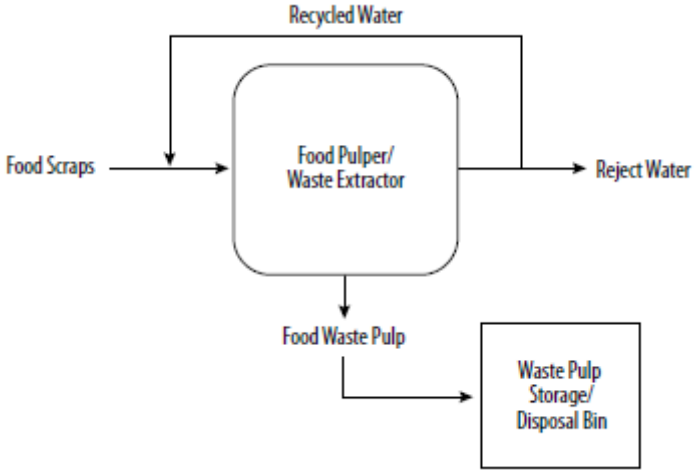
Food Disposals: O&M

- 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

look for WaterSense Meets EPA Criteria

10%

50%

20%

25%

90%

60%

75%

Savings Potential

- 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)

= Steam Cooker Water Use Rate x Daily Use Time x 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)

= Current Water Use of Steam Cooker – 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)

= Project Cost ÷ (Water Savings × Cost of Water and Wastewater)

Where:

- Project Cost (dollars)
- Water Savings (gallons per year)
- Cost of Water and Wastewater (dollars per gallon)

WaterUSE Tool

WaterSense WaterUSE Tool

Hide Instructions | Reset Form

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.

	Estimated Annual Water Use (gal)
Ice Maker(s)	301,000
Steam Cooker(s)	175,000
Combination Oven(s)	131,000
Steam Kettle(s)	Not Estimated
Dipper Well(s)	262,000
Food Disposal(s)	525,000
TOTAL	1,394,000

<< 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

Loyola Marymount University

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 al 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

H_2Otel Challenge Resources

- Recorded webinars available now:
  - Take the Plunge: The H_2Otel 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
- H_2Otel Challenge website: www.epa.gov/watersense/challenge

WaterSense
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Contact Us

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