



Tackling WaterSense® Commercial Kitchens

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September 20, 2016



Tackling WaterSense

WaterSense and ENERGY STAR are hosting a joint webinar series throughout 2016 to help you tackle your facility's water use

- | | |
|---|---------------------|
| <i>Tackling WaterSense—Sanitary Fixtures & Equipment</i> | January 28 |
| <i>Tackling WaterSense—Outdoor Water Use</i> | March 30 |
| <i>Tackling WaterSense—Mechanical Systems</i> | May 10 |
| <i>Just Add Water: Incorporating Water Efficiency to
Take Your Energy Savings to the Next Level</i> | July 12 |
| Tackling WaterSense—Commercial Kitchens | September 20 |



Agenda

- Introduction to WaterSense
- Food preservation and preparation equipment
- Dishwashing and food disposal
- Case study
- WaterSense resources

WaterSense Can Help



WaterSense is a voluntary program launched by EPA in 2006 that provides a simple way to identify water-efficient:

- Products
- Programs
- Practices
- Homes

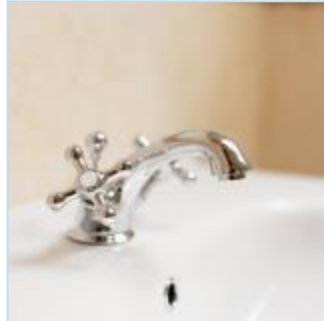
Products are independently certified for water efficiency and performance



WaterSense Labeled Products



Flushing Urinals



Lavatory Faucets



Irrigation Controllers

More than 19,000 product models have earned the WaterSense label



Tank-Type Toilets



Showerheads

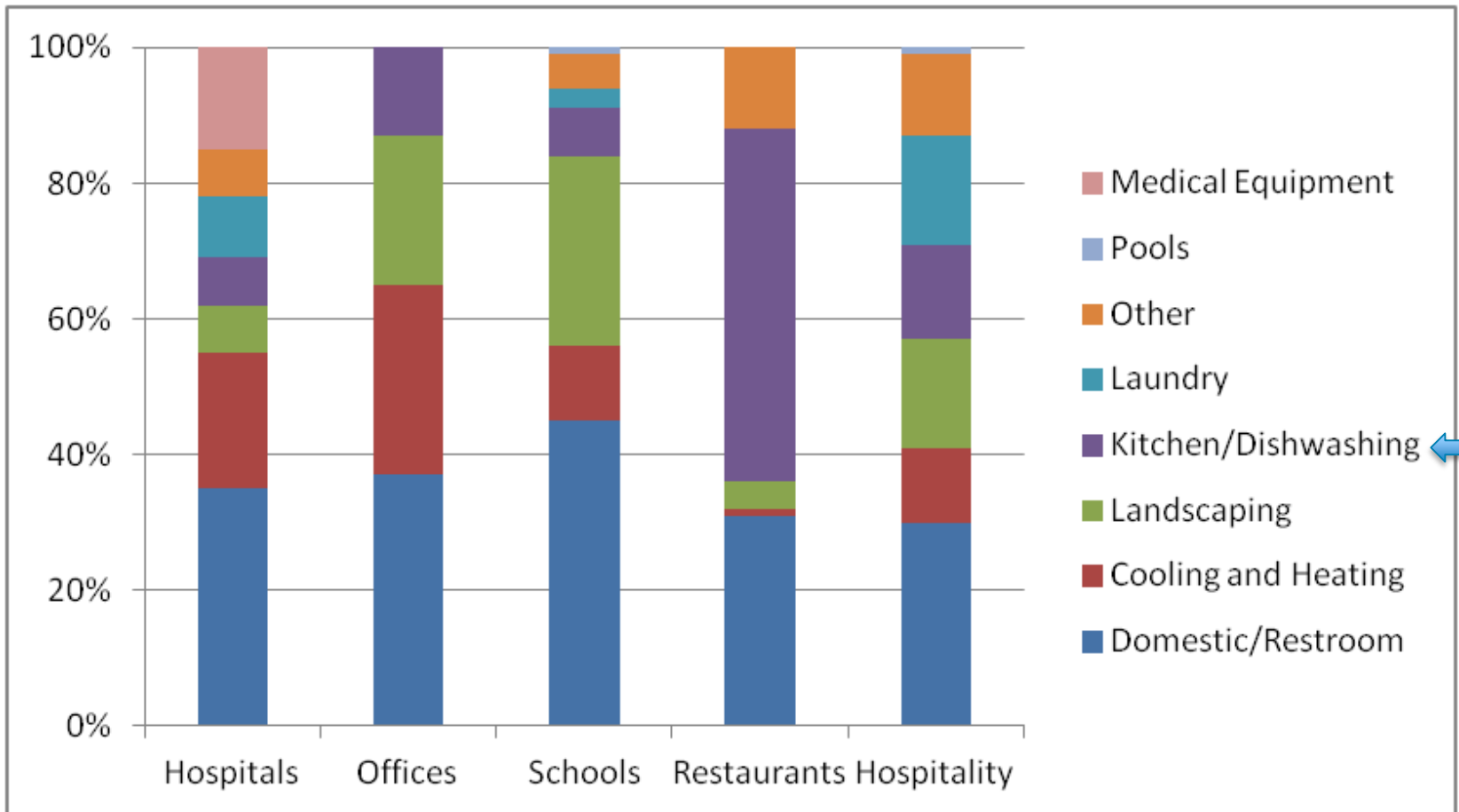


Pre-Rinse Spray Valves



New! Flushometer-Valve Toilets

Water Use Profiles of Commercial 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

Why Reduce Commercial Kitchen Water Use?



Save operational costs

- Water and sewer rates have risen well above the Consumer Price Index

Water-energy nexus

- Saving water often saves energy and vice versa
- Water used in kitchens is frequently hot water

Demonstrate leadership in the green marketplace

- Consumers looking for eco-friendly options while dining
- Can assist with certifications such as the Green Restaurant Association



Just Add Water!



- Include water usage in existing energy management efforts
- Track water usage in ENERGY STAR Portfolio Manager®
- Monitor usage on a per-meal or per-guest basis
- Measure water use with properly installed meters and submeters
- Conduct a facility water audit and include leak detection in regular assessments





Simple Water-Saving Strategies



- Serve water and refill glasses only upon request
- Install educational signage about leaks
- Don't thaw food with running water
- Operate kitchen equipment at capacity
- Use a broom or mop to clean floors



How Is Water Used in Commercial Kitchens?



Food preservation

Food preparation

Cleaning and dishwashing





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How Commercial Ice Machines Use Water



Water use depends upon

- Type of ice produced
- Quality of incoming water
- Water cooled vs. air cooled

Water-cooled machines

- Use 100 to 300 gallons of water per 100 pounds of ice produced

Air-cooled machines

- Use less than 50 gallons of water per 100 pounds of ice produced, but can require more energy



Commercial Ice Machines: Best Management Practices (BMPs)



Retrofit options

- Modify single-pass cooling systems to re-circulate the cooling water through a cooling tower or heat exchanger

Replacement options

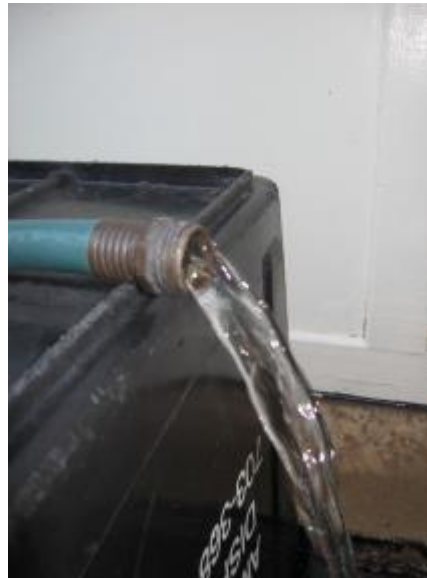
- Select an appropriately sized machine
- Purchase ENERGY STAR® certified models
 - At least 15 percent more energy-efficient and 10 percent more water-efficient than standard, air-cooled models
- Consider purchasing continuous (i.e., flake or nugget) ice machines



Single-Pass Cooling Savings Potential



1 gal/min
500,000 gal/year
\$4,415/year*



2 gal/min
1,000,000 gal/year
\$8,830/year*



6 gal/min
3,000,000 gal/year
\$26,490/year*

*At national average commercial cost of \$8.83 per 1,000 gallons

How Combination Ovens Use Water



Combine three modes of cooking into one unit:

- Steam mode, circulated hot air, and a combination of both

Water use is dictated by steam source

Boiler-based units

- Connected to a central boiler system that provides a constant supply of steam
- Use 30 to 40 gallons of water per hour

Connectionless units

- Have a self-contained water reservoir and heat source
- Use 15 gallons of water per hour or less





Combination Ovens: BMPs



Operational BMPs

- Use steam mode or combination mode sparingly
- Turn the oven off or down during slow times or when not in use
- Ensure oven is loaded to full capacity
- Ensure that doors stay aligned to provide a good seal and retain heat/steam

Replacement options

- Look for ENERGY STAR certified models that use no more than 10 gallons of water per hour or 1.5 gallons per pan per hour
- Select an appropriately sized oven for your cooking needs

How Steam Cookers Use Water



- Used to prepare foods in a sealed vessel that limits escape of air or liquids below a preset pressure
- Traditional boiler-based models: 40 gallons of water per hour
- ENERGY STAR certified connectionless models: 3 gallons of water per hour (90 percent less water)





Steam Cookers: BMPs



Operational BMPs

- Prepare food in batches
- Fill the steam cooker to capacity
- Use only as many steamer compartments as needed
- Set a timer to ensure that the steamer returns to standby mode
- Turn steam cooker off during long periods of non-use

Replacement options

- Look for models that are ENERGY STAR certified
- Choose an appropriately sized cooker for the application

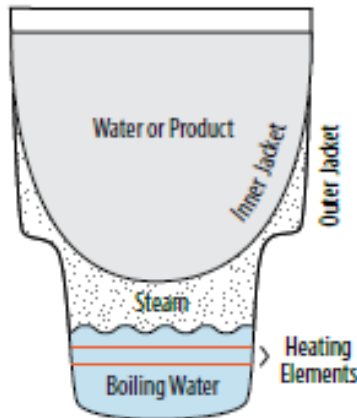
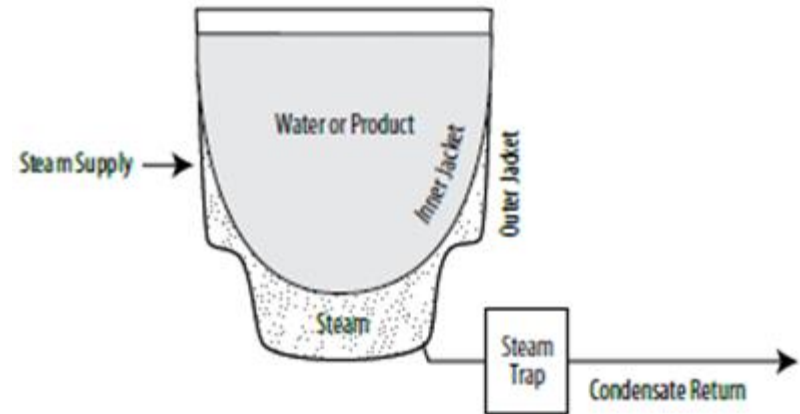
How Steam Kettles Use Water



Use circulating steam inside a kettle jacket to cook food

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: BMPs

Operational BMPs

- Turn down or off between uses
- Ensure the lid is secure
- Dump the water in self-contained units daily

Retrofit options

- For boiler-based steam kettles, install a condensate return system

Replacement options

- Purchase a properly-sized steam kettle
- Consider purchasing a self-contained steam kettle
- If daily operations require a boiler-based steam kettle, purchase a model with a condensate return system

Food Preservation and Preparation Savings



Ice Machine

Water use varies

Potential savings: 10%



Combi-Oven

30-40 gal per hour

Connectionless: <15 gph

Possible Savings: 50-75%



Steam Cooker

40 gal per hour

ENERGY STAR: 3 gph

Potential savings: 90%



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How Dipper Wells Use Water



- Flow continuously to clean utensils
- Typical flow rates of 0.5 to 1.0 gallons per minute (gpm)
- Efficient models flow at 0.3 gpm or less
- Ensure the requirements of the U.S. Department of Health and Human Services Food Code are met when making changes



Dipper Wells: BMPs

Operational BMPs

- Turn off during slow service periods and at the end of the day
- Keep the flow rate of the dipper well at its minimum level
- Consider rinsing utensils with a sink faucet instead

Retrofit options

- Install an in-line flow restrictor or replace the spigot to reduce the flow rate down to 0.3 gpm or less

Replacement options

- Install dipper wells that eliminate continuous flow
- Replace with a push-button, metered faucet
- Replace with an ENERGY STAR certified dishwasher



How Pre-Rinse Spray Valves Use Water



Remove food residue from dishes prior to dishwashing

Standard pre-rinse spray valves

- Flows at 1.6 gpm
- Models older than 2005: 3.0 to 4.5 gpm

WaterSense labeled pre-rinse spray valves

- At least 20 percent more efficient than standard models
- Flow at 1.28 gpm or less





Pre-Rinse Spray Valves: BMPs



Operational BMPs

- Scrape or pre-soak dishes
- Train staff how to properly use the always-on clamp
- Periodically inspect for scale build-up, leaks, and broken parts

Replacement options

- WaterSense labeled models
 - Flow at 1.28 gpm or less
 - Meet performance requirements for spray force and lifecycle testing

Contact your utility!



How Food Disposals Use Water



- Commercial kitchens often dispose of food scraps using a garbage disposal
- Water is run to prevent damage to the food grinder blades
- Some use a sluice trough to feed the garbage disposal
 - Water is applied continuously at 2.0 to 15.0 gpm
- Pulpers and food strainers are water-efficient alternatives



Food Disposals: BMPs



O&M BMPs

- Turn off the water during idle periods
- Scrape larger food items into a trash bin
- Avoid putting both hard objects and oil/grease into the disposal
- Periodically inspect the food disposal system
 - Ensure blades remain sharp
 - Dislodge any debris



Food Disposals: BMPs

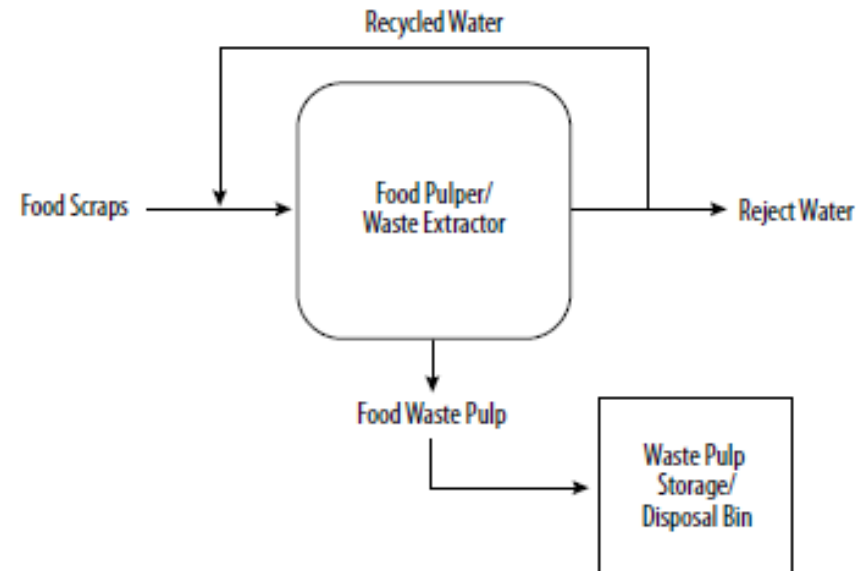


Retrofit options

- Install a device that adjusts water flow to 1.0 gpm during idle periods based on the disposal's motor load

Replacement options

- Purchase a garbage disposal with a load sensor
- Install a food pulper
- Replace mechanical food disposal systems with food strainers



How Commercial Dishwashers Use Water



One of the largest water users in commercial kitchens

Many different types, depending upon facility throughput

- Undercounter
- Stationary door- or hood-type
- Conveyor-type
- Flight-type

ENERGY STAR certified models can reduce energy and water use by 40 percent



Commercial Dishwashers: BMPs



O&M BMPs

- Only run dishwashers when full
- Operate the dishwasher at the minimum flow rate and water pressure
- Turn off the machine when not in use

Replacement options

- Choose an appropriately sized machine for your throughput
- Replace existing dishwashers with ENERGY STAR certified models
- Choose models that reuse rinse water



Cleaning and Washing Equipment Savings



Dishwasher
Potential Savings: 40%



Pre-Rinse Spray Valve
Potential Savings: 20%



Dipper Wells
Potential Savings: 40-70%



Food Disposal
Potential Savings: 75%



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- **Case study**
- WaterSense resources

CASE STUDY

Water Efficient Restaurants

SHARI'S CAFÉ & PIES

- Headquarters in Beaverton, Oregon
- 95 locations in Pacific Northwest
- 24-hour, full service family dining



ARBY'S RESTAURANT GROUP

- National QSR
- 1,050 corporate-owned sites
- Very successful energy reduction efforts



Different Operations - Common Drivers

1. Reduce costs
2. Rate trends
3. Social, environmental need
4. Water intensive operations

SHARI'S CAFÉ & PIES



- Started program in 2009
- Audited sites in 2010
- Water identified as a major opportunity
- Water represents 20% of company's utility cost (electric, natural gas and water)
- Use a holistic, all-of-the-above approach to implementing measures
- Dipper wells stood out as greatest opportunity



SHARI'S CAFÉ & PIES



Projects Implemented

- High-efficiency aerators
- WaterSense pre-rinse spray valves
- ENERGY STAR dishwashers
- ENERGY STAR ice machines
- WaterSense irrigation controls
- Employee engagement
- Dipper wells





WATER LEAK CHECK

A comprehensive water leak check should be conducted at least twice annually regardless of current leak conditions, and an extra audit if there is to be conducted in a building with a leaking or broken hot water system. The leak check will help you determine if you have underground or internal leaks in your water system. On page 2, there is a checklist for determining the extent of water leaks.

It is best to check the building during a slow period when turning off water to the restaurant will have a minimal impact.

Tools needed: flashlight, paper and pen or tape measure.

Follow these steps to check the grounds for underground leaks:

1. Locate your meter/main. It is usually located at a corner or public box with a meter box (see figure 1).
2. Remove the cover on the meter box using a screwdriver. Use the screwdriver to remove any covers or caps on the top. Cleanse the cover to dry.
3. If your building has an air conditioning system for your meter box (see figure 2), turn off the meter to be checked. This will allow you to test for underground leaks from the meter to the building. If you do not have a meter box for your meter, be prepared to use figure 3. The box that is used is usually a building's control box that will allow you to shut down the meter. The box can be changed, floor drains, or similar. In order of preference for figure 4.
4. Turn the water off. Be sure you are not turning through the meter. If this box indicates spinning, there is an underground leak. The table in the "CHECKLIST" is helpful for turning the meter off.
5. Use a water meter to measure the flow rate. Some water meters are provided a meter for some water meters. Check with your water utility to see if your water meter provides a meter for some water meters.
6. If there is no air conditioning meter, use the water supply check on the table in the instructions for checking the meter water meter.

Follow these steps to check your building for internal leaks:

1. Locate your meter/main. It is usually located at a corner or public box with a meter box (see figure 1).
2. Remove the cover on the meter box using a screwdriver. Use the screwdriver to remove any covers or caps on the top. Cleanse the cover to dry.
3. Turn off the water to the building using your air conditioning system, for meter box (see figure 2) or the building's control box. Add employees to help with any water supply. Disconnect the meter using the screwdriver. Add a water meter to the meter box. Use the meter's flow indicator for meter box (see figure 3). The flow rate or meter indicator is provided a meter box that will allow you to shut down the meter. The box can be changed, floor drains, or similar. In order of preference for figure 4.
4. Turn the water off. Be sure you are not turning through the meter. If this box indicates spinning, there is an underground leak. The table in the "CHECKLIST" is helpful for turning the meter off.
5. Use a water meter to measure the flow rate. Some water meters are provided a meter for some water meters. Check with your water utility to see if your water meter provides a meter for some water meters.
6. If there is no air conditioning meter, use the water supply check on the table in the instructions for checking the meter water meter.

ECOVA

SHARI'S CAFÉ & PIES

Dipper Wells

- Dipper wells identified as major opportunity
- Uses running hot water for sanitation
- Five dipper wells per site
- Implemented various improvement iterations

Hurdles

- Faucets



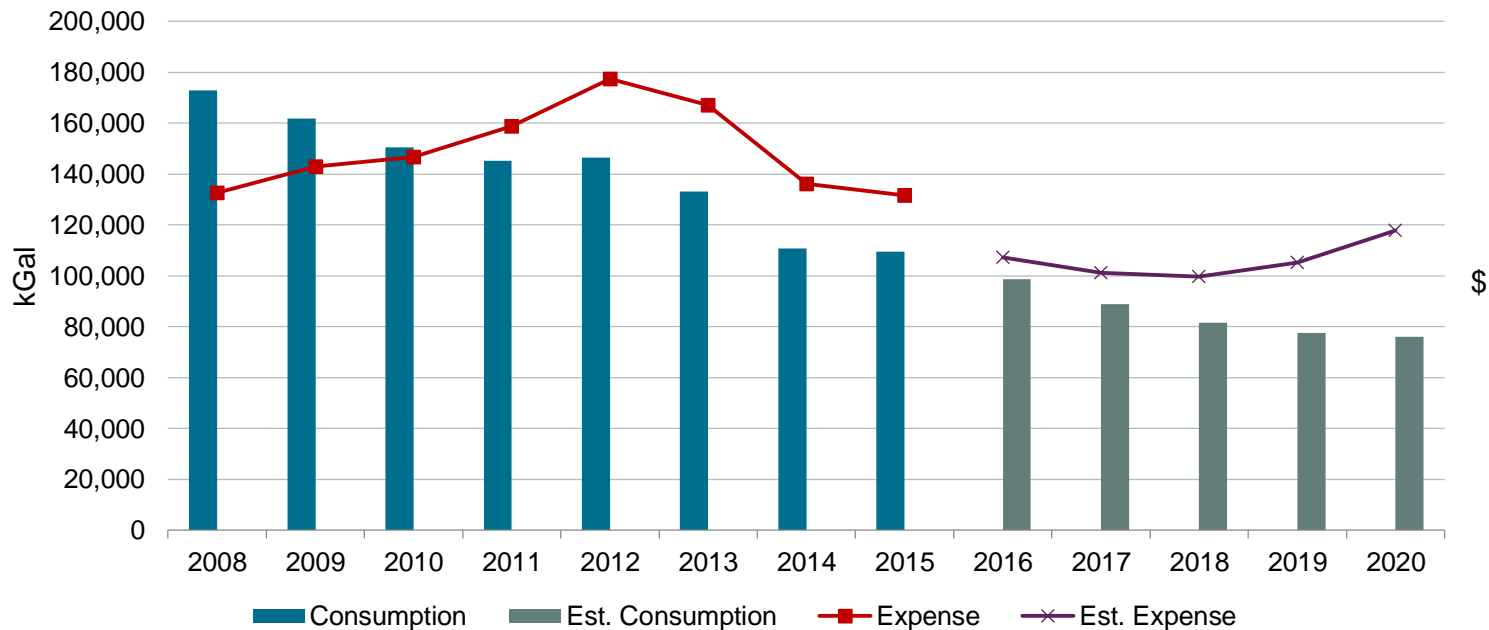
SHARI'S CAFÉ & PIES



Results

- 30% same site reduction since 2008
- Expense essentially flat due to rate increases
- 35% reduction goal
- Smart irrigation next major water reduction measure

Water Use and Expense with Reduction Estimates



- Started program in 2012
- Have implemented award winning energy management program
- Program and measures shared with franchisees
- Water measures are components of energy program
- Creating first water reduction goal in 2017



WaterSense Irrigation Controls

- WaterSense irrigation controls identified as major opportunity
- Weathermatic selected as vendor
- Integrates into Arby's energy management system
- Installed at 135 sites to date
- 30-70% reduction in irrigation consumption
- Program won Environmental Leader Project of the Year award in 2016

Hurdles

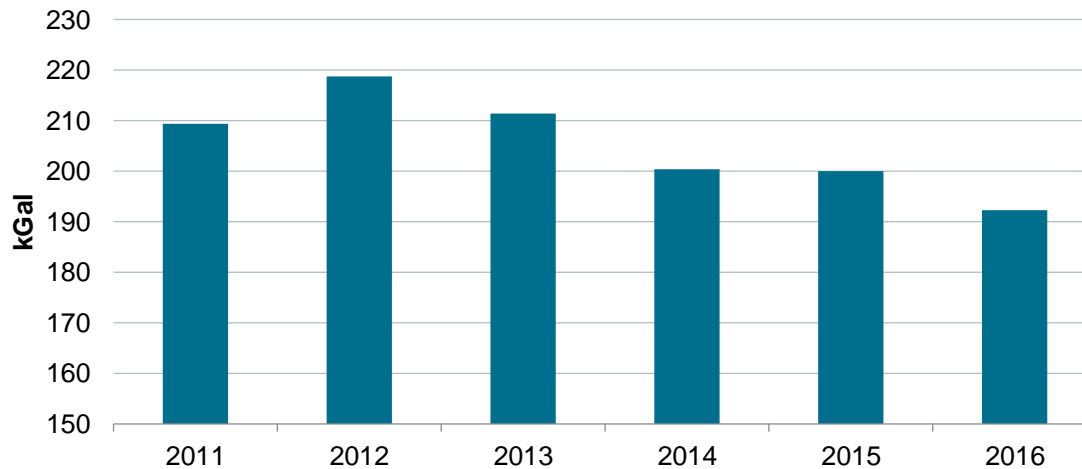
- Inventory of portfolio
- Landscape contractors



Results

- 6.4% reduction per restaurant since 2011
- Integrating water efficiency and goals into strategic resource management program
- Developing reduction goals in 2017
- Continuation of irrigation controls and specifying WaterSense toilets and urinals next major water reduction measures

Per Site Water Use Through Q2





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- Introduction to WaterSense
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ENERGY STAR Commercial Kitchen Equipment Calculator



Savings Calculator for ENERGY STAR Certified Commercial Kitchen Equipment

This calculator was developed by U.S. EPA and DOE to estimate the energy and water consumption and operating costs of commercial kitchen equipment and the savings with ENERGY STAR. Only ENERGY STAR certified products are compared to the average available non-certified new products. Actual savings may vary based on use and other factors. [See www.energystar.gov/buildings/sites/default/files/commercial_kitchen_equipment_calculator.xls](http://www.energystar.gov/buildings/sites/default/files/commercial_kitchen_equipment_calculator.xls)

Where will your equipment be used?

Location:

Electric rate (\$/kWh): U.S. average commercial rates are \$0.1013/kWh, \$0.105/kWh, \$0.10/kWh and \$0.10/kWh. If you know your own rate, enter that here.

Gas rate (\$/therm):

Water rate (\$/thousand gallons):

What kitchen equipment are you planning to purchase? Enter quantities below, then either fill in product information or use the defaults.

Dishwasher		Quantity	Racks washed per day	Building hot water fuel type	Recessed water heater fuel type	Operating days per year	Additional cost per unit for ENERGY STAR model	Optional utility incentive amount
Low Temperature	Under Counter	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Stationary Single Tank Door	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Single Tank Conveyor	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
High Temperature	Multi Tank Conveyor	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Under Counter	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Stationary Single Tank Door	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Fryer	Single Tank Conveyor	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Multi Tank Conveyor	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Flat Pan, and Utensil	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Freezer		Quantity	Volume (cubic feet)	Unit Energy Consumption (kWh/cycle)	Additional cost per unit for ENERGY STAR model	Optional utility incentive amount
Slide Door	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Glove Door	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Fryer		Quantity	Pounds of food cooked per day per unit	Operating hours per day	Operating days per year	Additional cost per unit for ENERGY STAR model	Optional utility incentive amount
Standalone	<input type="text" value="0"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Energy **INPUTS** RESULTS SUMMARY RESULTS DETAILS Dishwasher Data Freezer Data Fryer Data Griddle Data ITC Data Ice Machine Data Oven Data Refrigerator Data Steam Cook ...

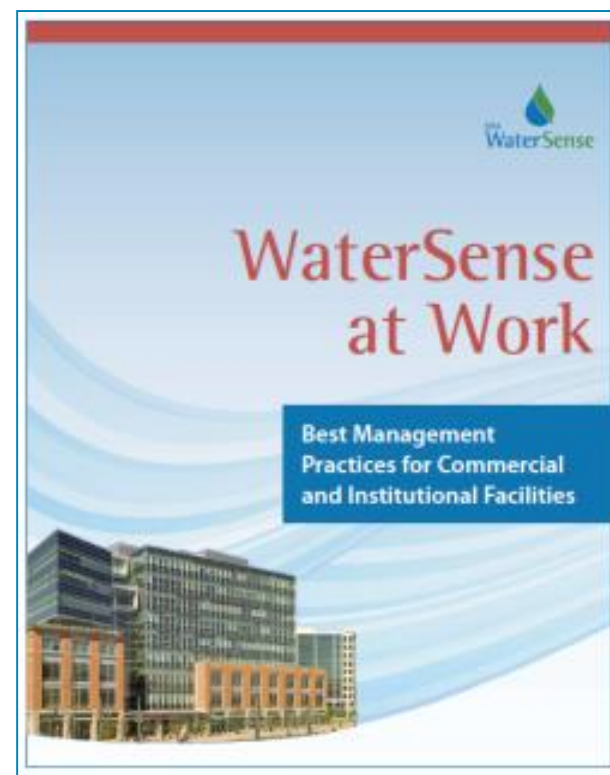
www.energystar.gov/buildings/sites/default/uploads/files/commercial_kitchen_equipment_calculator.xlsx

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



WaterSense Resources



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



www.epa.gov/watersense/commercial/tools.html

Simple Water Assessment Checklist

Water-efficient Project or Practice	Section of <i>WaterSense at Work</i> ¹	Evaluate ✓	Implement ✓	Done ✓
10. Educate employees to turn off equipment including all continuous flow equipment, between uses; use automatic shut-off valves where applicable.	—			
11. Educate employees to use “dry” cleaning methods to avoid washing down equipment or areas with a water hose or mop; sweep or mop instead of spray washing with water.	—			
12. Test water pressure regularly on each floor of the facility to ensure it is within optimal range for fixture and equipment performance; use pressure regulating valves to correct any issues (i.e., optimal pressure is between 20 and 80 psi for most fixtures).	—			
Sanitary Fixtures and Equipment				
13. Regularly check all fixtures and valves for scaling and clean as needed.	3.2 - 3.5			
14. Test and calibrate all automatic- and sensor-flushing devices regularly to prevent double/phantom flushes.	3.2 - 3.3			
15. Check tank-type toilets for leaks, broken flappers, and other parts failures regularly.	3.2			
16. Install retrofit dual-flush conversion devices on 1.6-gallon per flush (gpf) flushometer-valve toilets.	3.2			
17. Display instructional signage with all dual-flush devices to ensure proper use.	3.2			
18. Replace old tank-type and flushometer-valve toilets with WaterSense labeled models, which flush at 1.28 gpf or less.	3.2			



What You Can Do Right Now



- Serve water to guests only on request
- Check to ensure you are using the minimum flow rate needed for water-cooled ice machines, and replace them with ENERGY STAR certified air-cooled models
- Track main meter and submeter readings in ENERGY STAR Portfolio Manager
- Operate cooking equipment in batches, and turn off when not in use
- Replace pre-rinse spray valves with WaterSense labeled models
- When replacing kitchen equipment, install ENERGY STAR certified models to save energy and water



Questions?

ENERGY STAR

For technical questions related to Portfolio Manager or the ENERGY STAR program, please visit:

www.energystar.gov/buildingshelp



WaterSense

www.epa.gov/watersense

www.facebook.com/epawatersense

www.twitter.com/epawatersense



Email: watersense@epa.gov

Helpline: (866) WTR-SENS (987-7367)