This presentation premiered at WaterSmart Innovations

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WATER EFFICIENCY BENCHMARKING FOR RESTAURANTS

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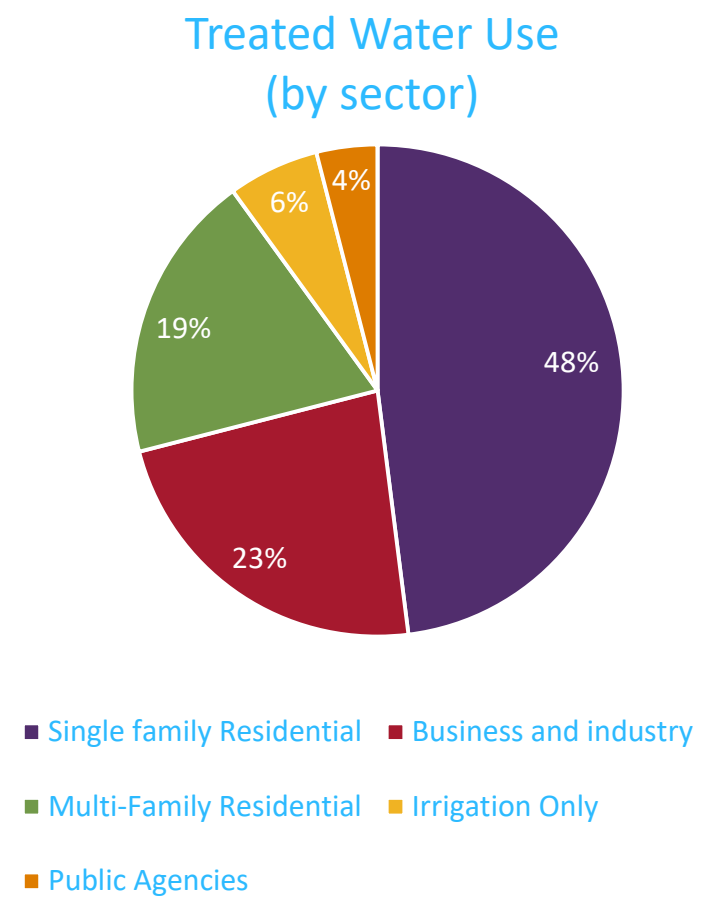
DENVER WATER

Goal of Denver Water: create benchmarks for most customers

- *Like many utilities we have focused more energy and resources on residential customers*
- *Goal: create benchmarks for as many customer types as possible*
- *Challenges:*
  - *What groups should we focus on first?*
  - *Don't know how many there are in a given sector*
  - *Can we reasonably make recommendations without fully understanding their business and regulatory climate?*



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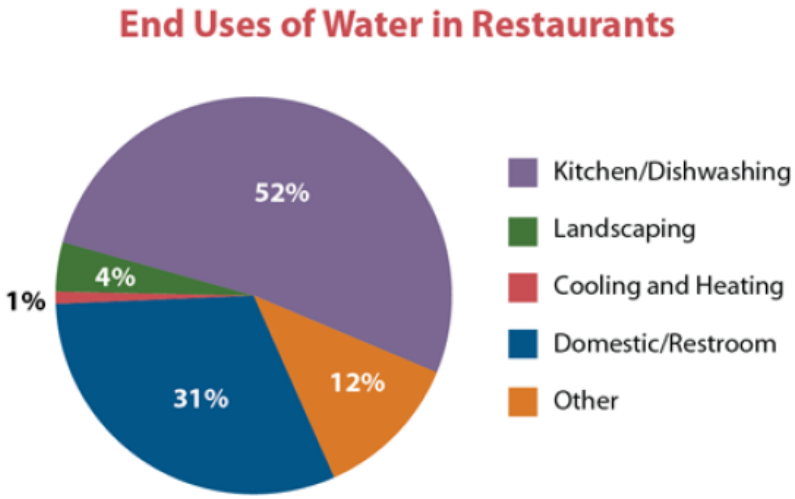
Preliminary Research



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.

Chart Source: EPA "Saving Water in Restaurants" Factsheet. https://www3.epa.gov/watersense/commercial/types.html#tabs-restaurants

- Looked to end use and benchmarking studies
  - EPA
  - Phoenix, New York City
  - AWWA
- Built upon previous experiences with this customer group
  - Restaurant Association
  - Various business groups
  - High bill audits

Goal Setting

Goals for Denver Water

- Understand customer's water use
- See if there are best practices that can be implemented
- See what opportunities and barriers there are to working with restaurants
- Get a sense of differences between individual restaurants
- Move beyond the "my bill is high" discussion

Goals for Customer

- Understand their water use
- See if there are large differences between stores
- Determine if/ how they can use less water

WORKING WITH THE CUSTOMER

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Plan of Action

- Step 1: Selected locations
- Step 2: Audited building's fixtures and observed kitchen/employee practices
- Step 3: Developed estimates for each step in food prep and service process
- Step 4: Metered each site over period of 1-2 weeks
- Step 5: Compared metered data to historical and estimated consumption
- Step 6: Shared results and made recommendations with customers

Sample Size and Participation

- We got lucky: they reached out to us as a part of a sustainability initiative
- Customer is national restaurant chain with their own specific sustainability goals
- Sample size: 6 of 28 in our service area
  - Removed shared tap customers and those behind outside water districts
  - Performed work in winter to avoid irrigation (very few had any)
  - No sites we worked with have cooling systems that use water

Ultra-Sonic Metering and End Uses

- We used a non invasive tool to isolate end water uses
- Had the customer document all the water using activities
- Some actions were easy to identify in data: filling of tub sinks/ heating tables
  - Once customers came into the store it was more difficult to differentiate water uses
  - We used pre opening water use and recorded actions to get an estimate (i.e. multiplied observed use for rice cooking/ veggie cleaning/ other prep and multiplied it by the number of batches that was written down).

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RESULTS AND LESSONS LEARNED

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Comparison of our analysis to the EPA's

EPA Analysis

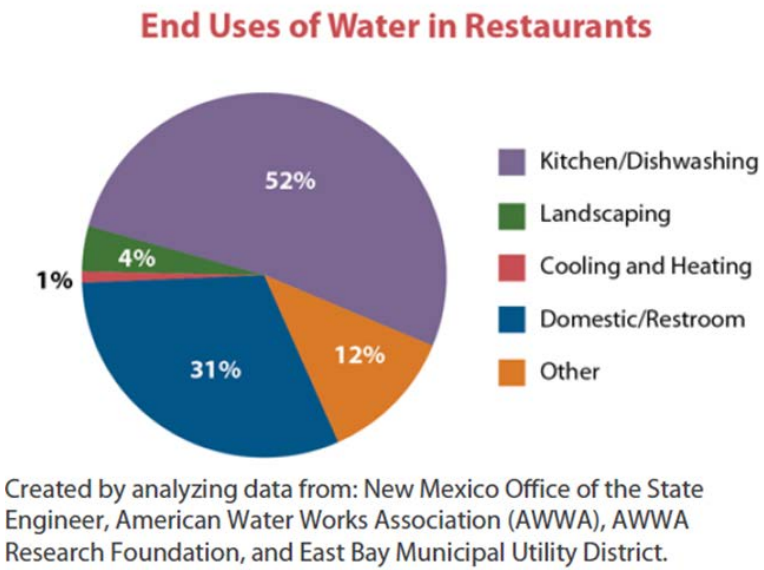
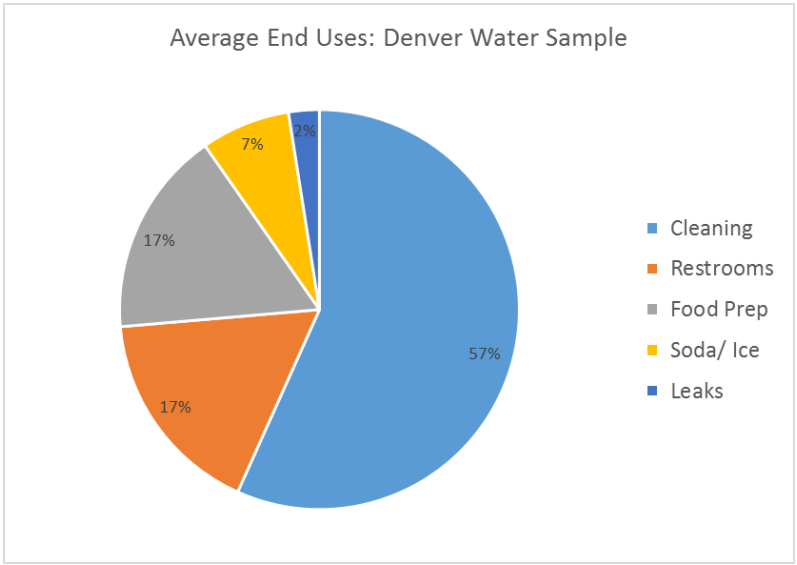


Chart Source: EPA "Saving Water in Restaurants" Factsheet. https://www3.epa.gov/watersense/commercial/types.html#tabs-restaurants

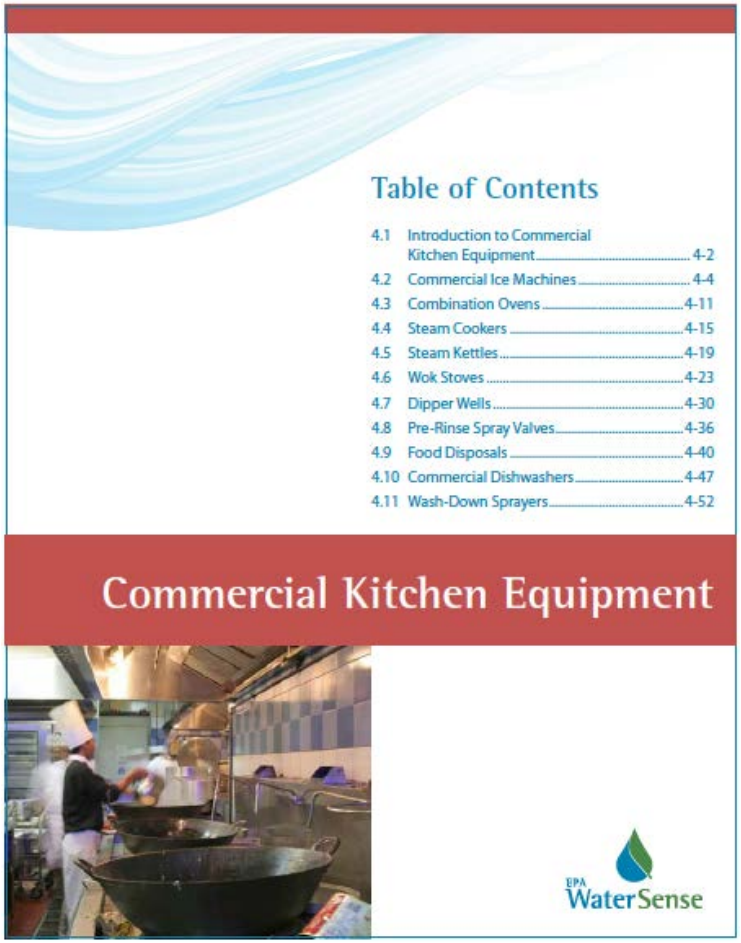
Denver Water Pilot Average



Reminder: no irrigation or water using cooling systems were in our study

Lessons Learned: Opportunities for Restaurants

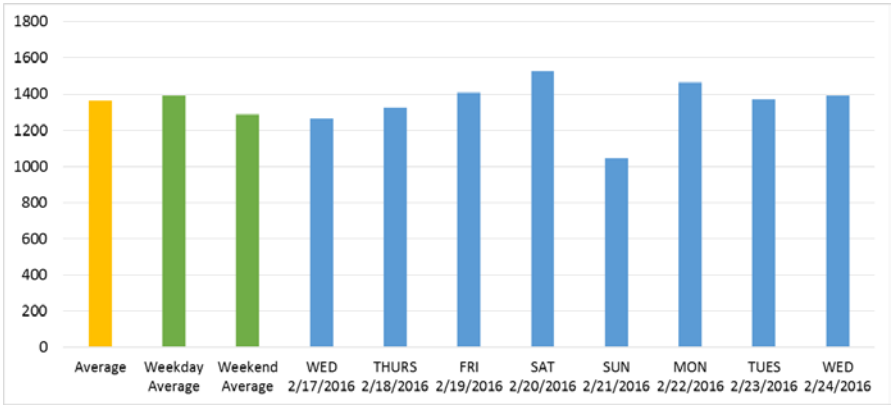
- Concentrate on fixtures and equipment first
  - Chains typically buy the same equipment for all stores
  - Single pass ice and other cooling offer big opportunity although, not in this case
- Training on leak detection and BMPs still important
- Restaurants with good training tended to be more consistent and easier to track usage
- Cleaning and sanitation driven by health codes and the customer
- Important to have an efficiency champion for utility to work with



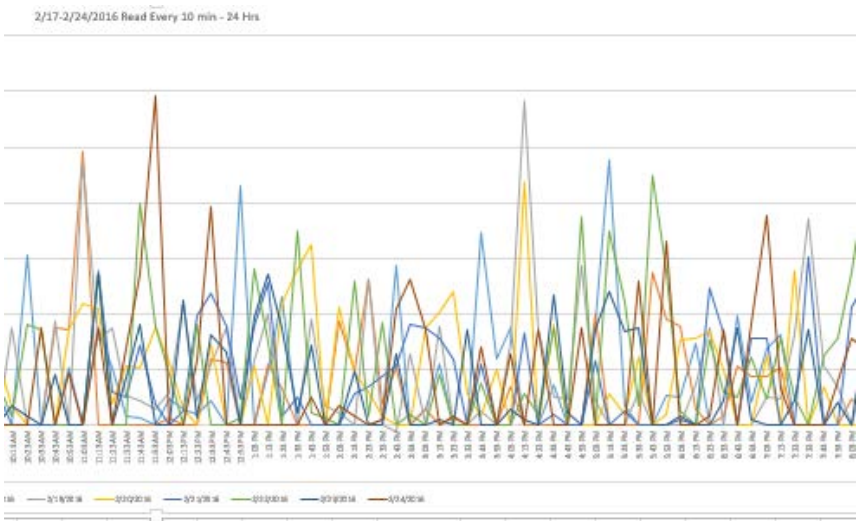
Cover of the EPA's WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities, Chapter 4: Commercial Kitchen Equipment, October 2012

Lessons Learned: Metering

- Still many opportunities for submeters in the industry
- The need for sub-metering to determine water use in mixed use is crucial
- Sonic metering nice, but
  - Time intensive
  - Probably not necessary, only provides snapshot
  - Easy to improperly use/ install without training
  - Not sure we'd use it again for restaurants unless important to customer
- AMI: good for leaks but unlikely to be useful for most restaurants



Daily Average was preferred and used by Customer



10 min read allowed us to see different processes but was cumbersome and not especially useful otherwise

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Lessons Learned: Benchmarking

- EPA provides good information and starting point for restaurants
- Building square footage not a great measure for benchmarking
  - GPSF Range: 141-343
  - Size of building and number of customers served did not appear to be linked
- Difficult to benchmark with shared meters and all the different types of restaurants
- Meals served would be better but difficult to get from customers
  - Maybe use tax receipts as a proxy?
- Investigate subcategories: Fast food, fast casual, casual/buffet, fine dining, bar, coffee shops, other?
- Trying to estimate use worked reasonably well
  - Could estimate using historical consumption for stand-alone, further measures needed for mixed use
  - But you'd have to sit down with the customer and this may be too intensive.
  - Only recommend this if there is an end use that is far outside of EPA study average

QUESTIONS?

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