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4619: Developing Water Use Metrics
and Class Characterization for Categories in the CII Sector

brendle GROUP

Becky Fedak & Russ Sands
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Water Smart Innovations
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Agenda

- Introduction and Background

- Research Approach

- What's Next

Why CII Metrics are Important

- CII makes up 30% of utility water sales in U.S.
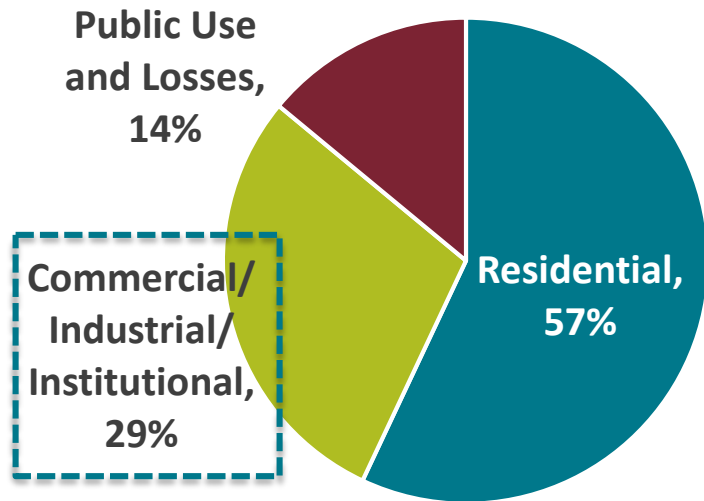
- Less than 20% of utilities have CII efficiency programs
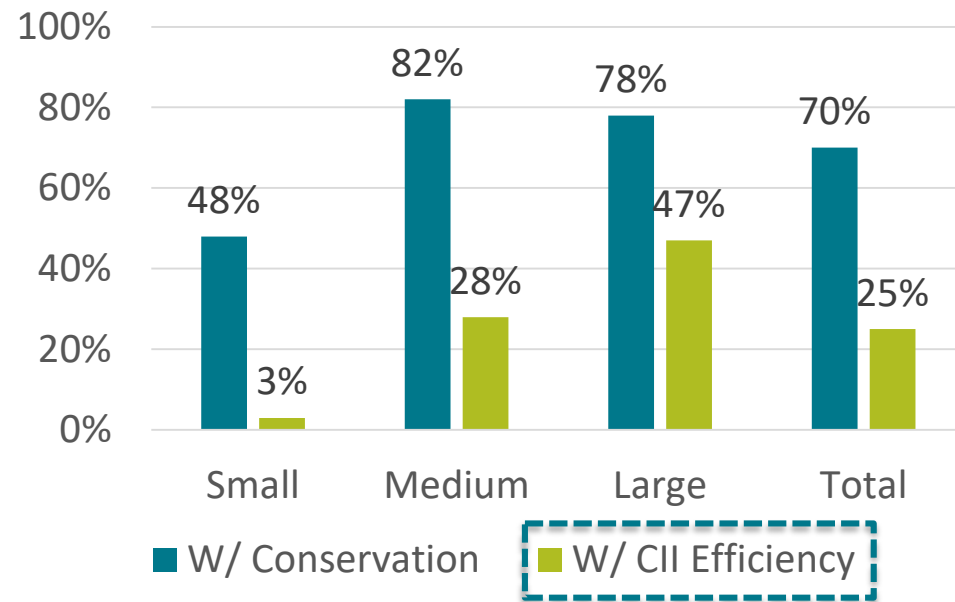
Figure 1: U.S. Water Public-Supply Withdrawals 2010

Public Use and Losses, 14%

Commercial/ Industrial/ Institutional, 29%

Residential, 57%

Figure 2. Prevalence of Utility Conservation Programs by System Size

System Size	W/ Conservation	W/ CII Efficiency
Small	48%	3%
Medium	82%	28%
Large	78%	47%
Total	70%	25%

■ W/ Conservation   ■ W/ CII Efficiency

Many factors
influence
metric values:

-building age

-water rates

-plumbing codes

-etc.

Working with the CII Sector

- Current challenges:
  - Staff availability and budgets
  - Customer type and water use
  - Inconsistent Categorization
  - Managing and collecting CII water use data (e.g., single water meter serving multiple customers with varied uses)

- Progress in the energy industry:
  - Department of Energy's Building Performance Database[1] (BPD)
  - U.S. Energy Information Administration's Commercial Buildings Energy Consumption Survey[2] (CBECS)
  - U.S. EPA Portfolio Manager

[1] https://energy.gov/eere/buildings/about-building-performance-database
[2] https://www.eia.gov/consumption/commercial/about.php

Research to Date

- Methodology for Evaluating Water Use in the Commercial, Institutional, and industrial Sectors (**WRF 4375**, 2015)

- Estimating Commercial, Industrial, and institutional Water Use on the Basis of **Heated Building Area** (Morales et al, 2011)

- **Santa Clara Valley** Water District Commercial, Institutional, and Industrial (CII) Water Use and Conservation Baseline Study (2008)

- **Benchmarking Task Force** Collaboration for Industrial, Commercial & Institutional Water Conservation (Colorado WaterWise Council & Brendle Group, 2007)

- **Commercial and Institutional End Uses** of Water (Dziegielewski et al, 2000)

WRF 4619 Research Objectives

- Implement a defined process for evaluating CII water use

- Develop rate-of-use metrics
  - Adapted from WRF 4375 (Methodology for Evaluating Water Use in the CII Sectors)

- Estimate water use metrics and set benchmarks for selected CII categories.

- To develop a CII water use metrics database that can be integrated with an existing resource (like the EPA Portfolio Manager).

- Provide guidance for water utilities on how to use/implement CII benchmarks.

Project Advisory Committee

Charlotte Ely
Climate & Conservation
California State Water
Resources Control Board:
Sacramento, CA

Heather Zarski
Manager-Planning
EPCOR Utilities:
Edmonton, AB (Canada)

Jack Kiefer
Senior Associate
Hazen and Sawyer:
Marion, IL

Kristan VandenHeuvel
Research Manager
Water Environment & Reuse
Foundation: Alexandria, VA

Chris Meenan
Senior Resource Analyst
Las Vegas Valley Water
District: Las Vegas, NV

Darren Sversvold
City of Phoenix Water
Services Department:
Phoenix, AZ

Phil Segura
Staff Analyst III
Denver Water:
Denver, CO

Bill Hoffman
President
Hoffman & Associates:
Austin, TX

Participating Utilities

Aurora Water (AW)
151 mi^2
79,000 accounts
115 GPCD

Colorado Springs Utilities (CSU)
195 mi^2
140,000 accounts (10% CII)
145 GPCD

Tacoma Water (Tac)
117 mi^2
99,925 accounts (6% CII)
49 GPCD

American Water (AmW)
170 mi^2
132,290 accounts (4% CII)
318 GPCD

City of Sacramento (Sac)
993 mi^2
135,830 accounts (6% CII)
208 GPCD

Southern Nevada Water Authority (SNWA)
862 mi^2
562,698 accounts (5% CII)
205 GPCD

Athens-Clarke County (ACC)
121 mi^2
40,000 accounts (10% CII)
93 GPCD

Research Approach

1) Customer Classification

2) Preliminary Metric Development

3) Primary Data Collection

4) Metric Refinement and Benchmark Development

10 Customer Categories

- Auto/auto service
- Eating/drinking place
- Health care facility
- Lodging
- Office building
- Retail store
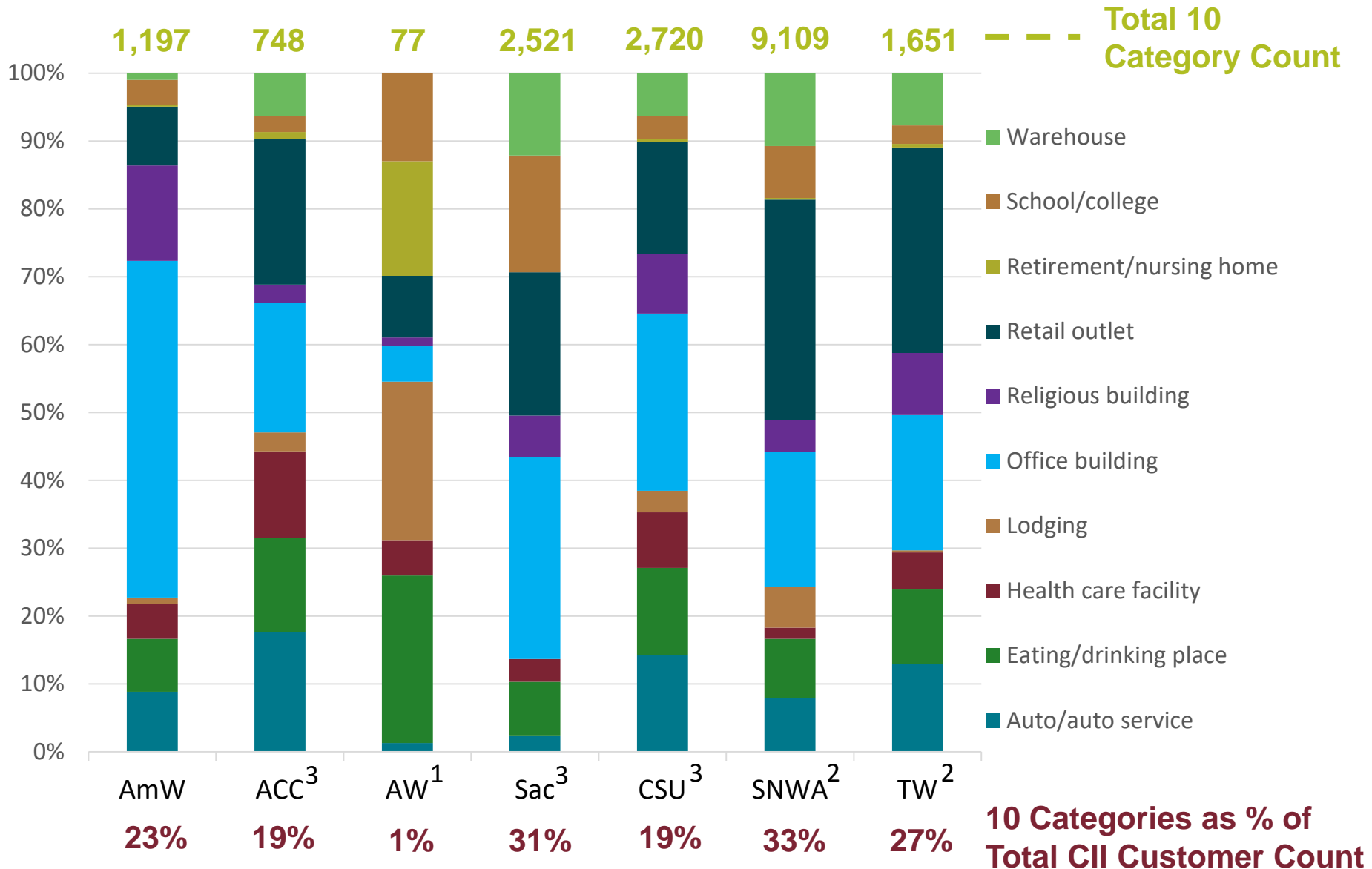- Religious building
- Retirement/Nursing home
- School/college
- Warehouse

Customer Counts by Category

Metric Refinement

Category	Subcategories	Additional Normalization
Auto/Auto Service	With(out) car wash	n/a
Eating/Drinking Place	Full service | Fast food | Bakery/cafeteria | Bar/club	Number of seats
Health Care	Hospitals and sanitariums | Medical centers, doctor offices, and labs	Number of patients, beds, discharges, or patient days
Lodging	Hotels/motels | Resort/large convention hotel with(out) cooling tower	Number of rooms
Office Building	With(out) cooling tower	n/a
Religious Building	n/a	n/a
Retail Outlet	Shopping centers and malls | Grocery stores and supermarkets | Convenience stores | Pharmacy	n/a
Nursing/Retirement Home	Long-term nursing homes | Retirement homes	Number of residents (or beds)
School	Pre-schools and daycare | Primary and secondary schools | Universities/college campuses	Number of students
Warehouse	Warehousing cold storage | Other warehouses	n/a

Utility User's Guide

Intended to help utility staff understand:
1) How to apply research to their intended outcomes.

2) How data availability, data accuracy, goals, and resources drive which category (below) they are in.

Coordinated Planning Guide
A How-To For Setting Commercial, Industrial and Institutional Efficiency Metrics

WRF Project 4619

Analyze & Engage
The water provider is largely interested in understanding CII customers water usage and working with their top users but may not have the intent, resources, or political support for further refining CII water use metrics.

Identify Metrics & Set Targets
The water provider wants to use, compare, or establish comparative metrics for CII water users and set targeted goals as an outreach tool but does not intend to enforce compliance.

Track Compliance & Set Rates
The water provider wants to establish metrics and benchmarks for CII customers to meet restrictive water reduction goals and/or set benchmark-based rates which it will enforce.

In Closing

- Working on metric refinement, results interpretation/comparison, and benchmarking

- Draft deliverables to WRF in Spring 2018; publication by summer/fall

- Project outcomes include
  - **Research report**
    - Rate of use metrics
    - Research findings
    - Best practices for data collection and processing

  - **Utility user guide**
    - Practical guide for developing and using CII rate-of-use metrics
    - Insight from participating utilities to balance desired outcomes and available resources

Continue the Conversation!

- Becky Fedak: BFedak@BrendleGroup.com

- Russ Sands: RSands@BrendleGroup.com

  - Brendle Group Office: (970) 207-0058