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Estimating Potential CII Water Conservation for the Largest Municipal Water Agency in the United States

Los Angeles Department of Water and Power

Presented by
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CDM

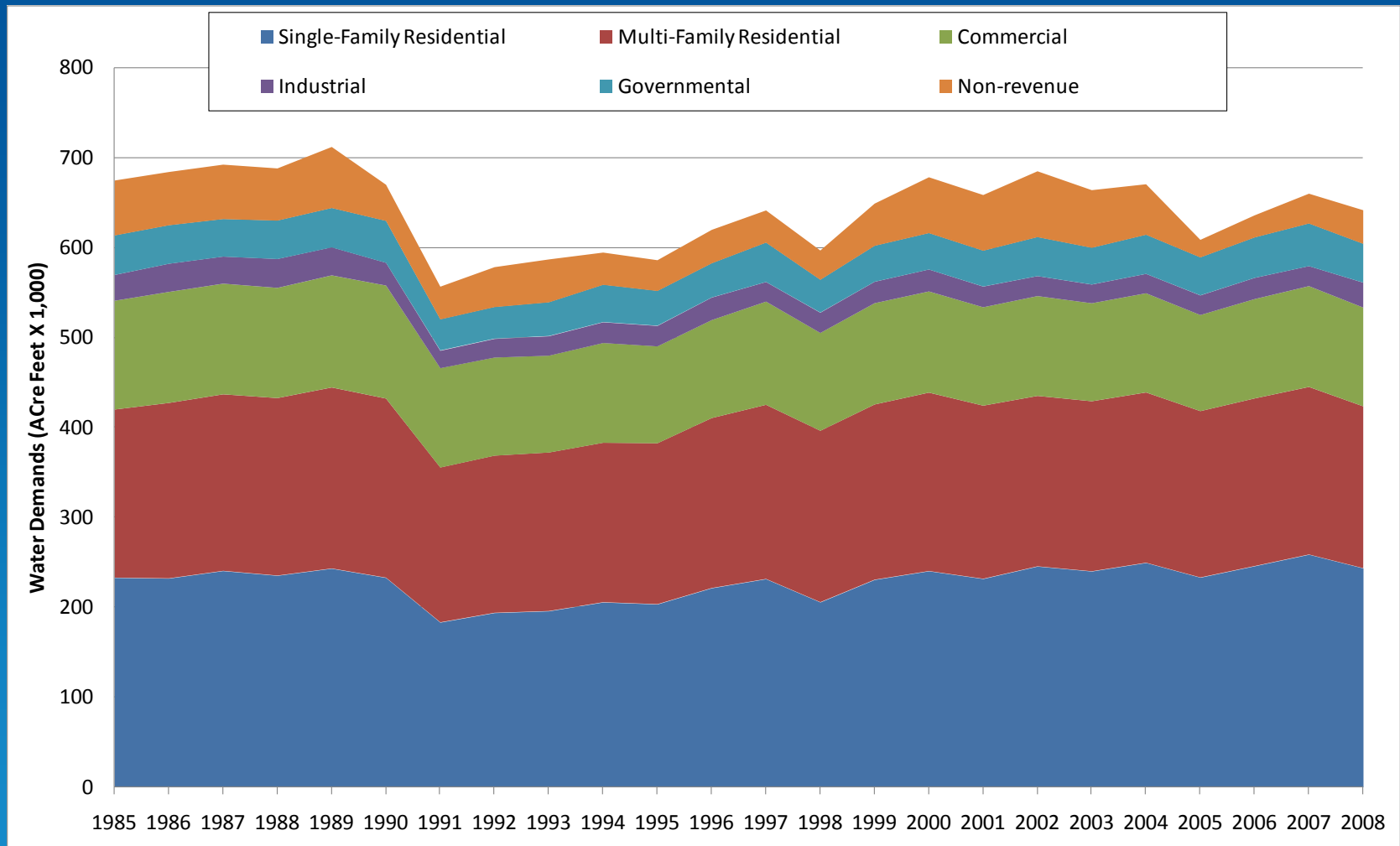
Agenda

- Purpose
 - Planning level evaluation
 - Identify potential indoor water savings for the CII sector
 - Support the Urban Water Management Plan Update
- Past & Present Water Use
- Process
- Potential Savings
- Proposed Research

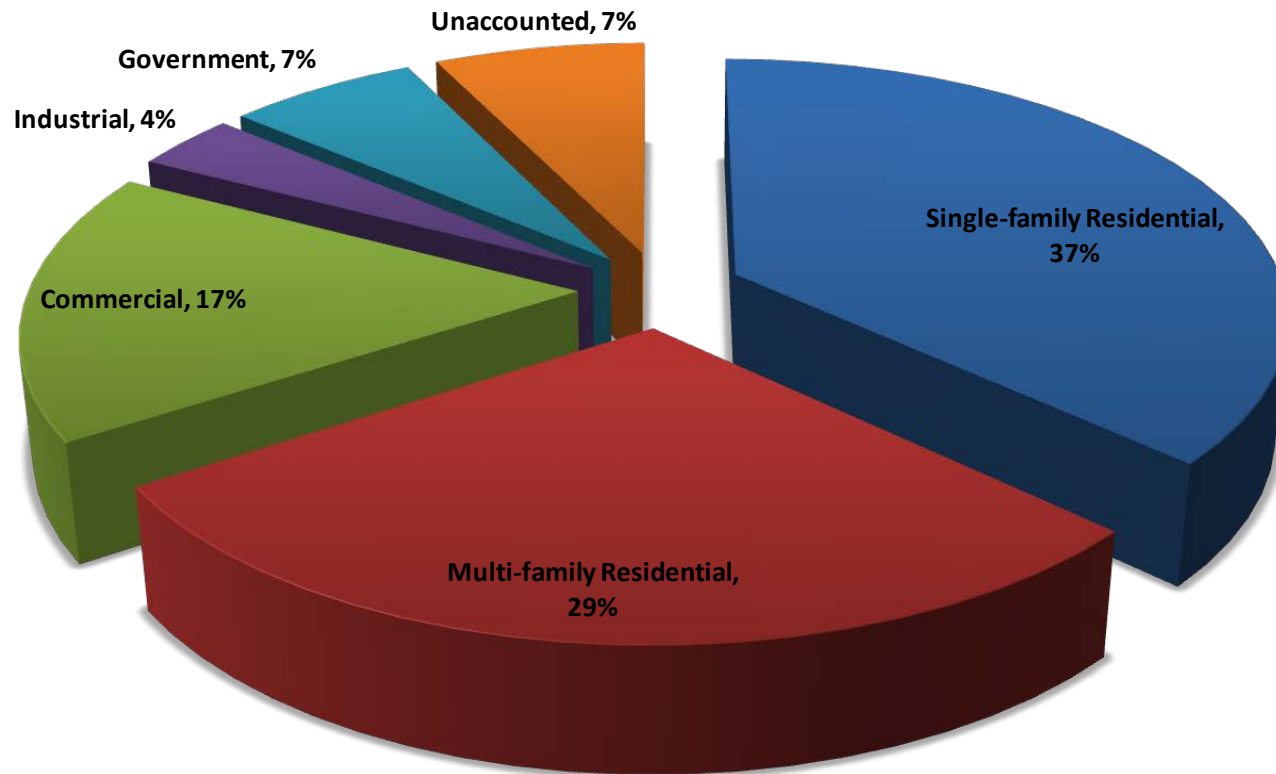
LADWP Service Area



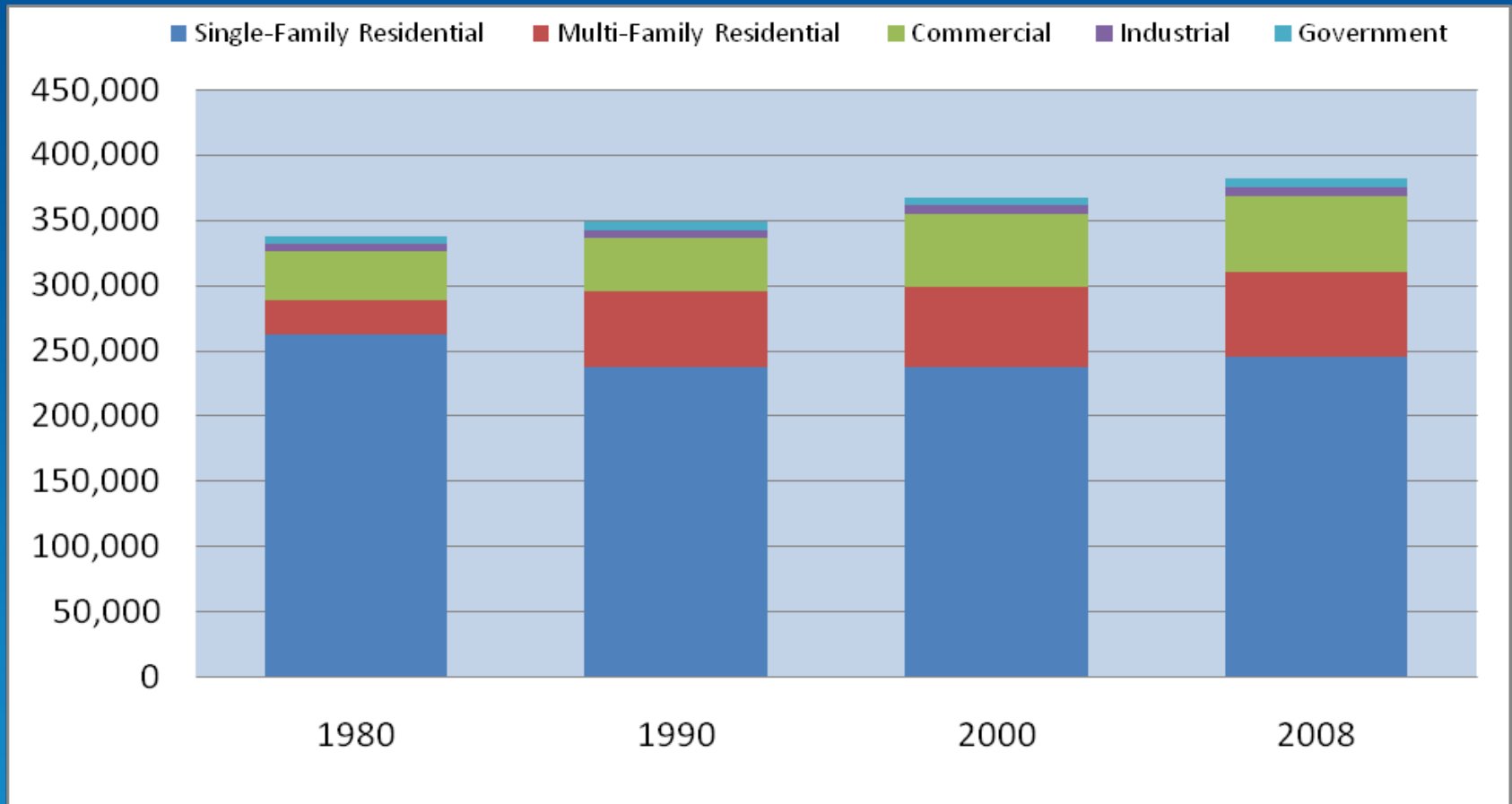
Historical Water Use by Customer Class



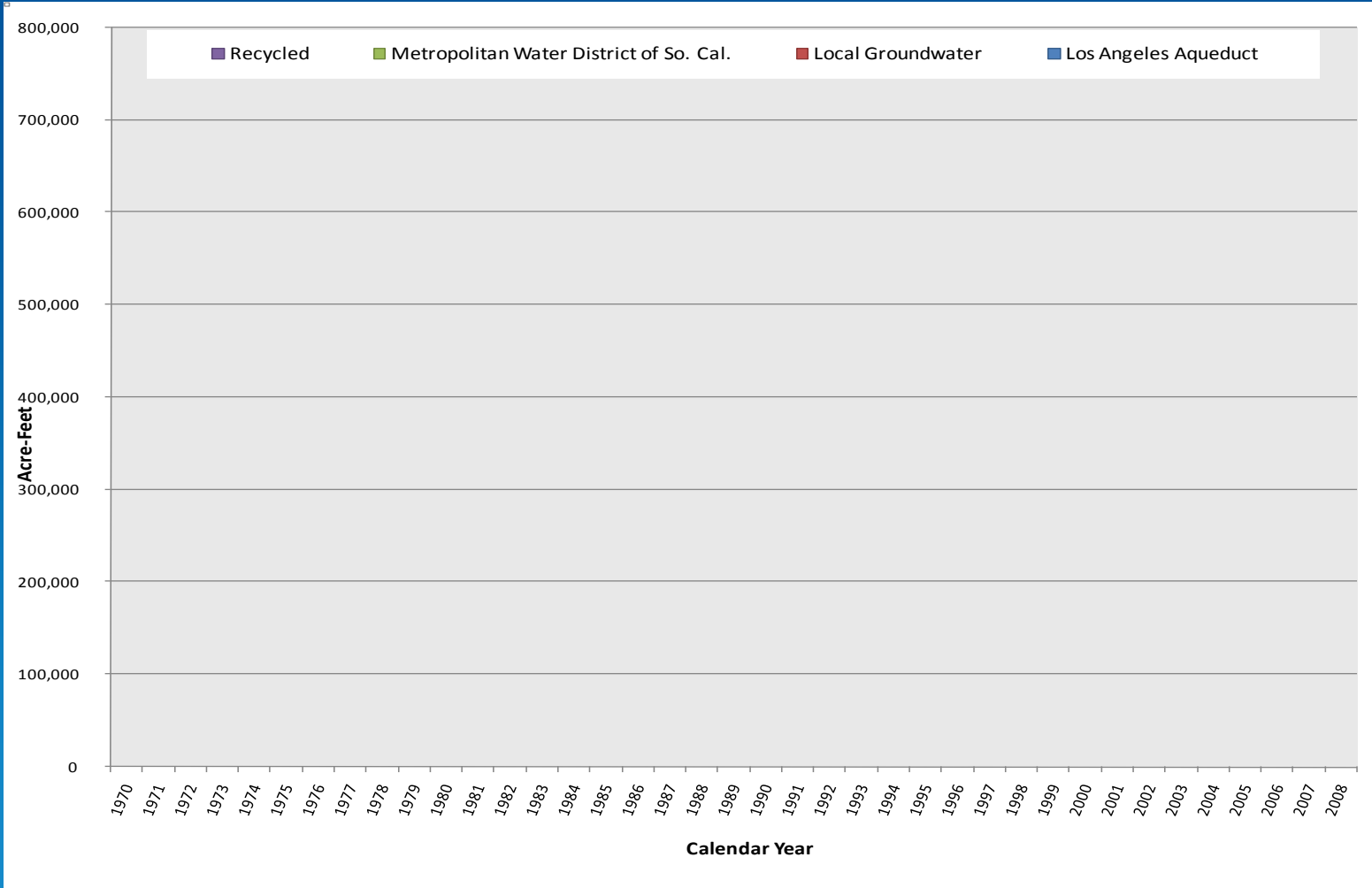
Ten-Year Average Water Use by Class



Historical Average Accounts by Class



Historical Water Supplies



Process

- Estimate CII sector water use by subsector (examples: hospitals, hotels, restaurants)
- Estimate indoor water use by end use (examples: dishwashing, toilets, x-ray)
- Identify potential savings by end use and subsector (example: x-rays for hospitals)
- Estimate potential savings for actual use of top LADWP CII water users as well as each CII subsector present

Estimate CII Subsector Water Use

- Identified targeted subsectors from the top 400 water use accounts provided by LADWP
- Applied Dunn & Bradstreet data to associate water use accounts with employment data using North American Industrial Classification System (NAICS) codes at 3 digit level.
- 152 of the top 400 accounts were able to be associated with employment data
- Calibrated subsector water use estimates to 2008 reported CII use.

Estimate CII Subsector Water Use

Twenty-five Water Use Subsectors by NAICS 3 digit code

Food Manufacturing	311	Educational Services	611
Beverage Mfg.	312	Ambulatory Health Care Services	621
Textile Mills	313	General Medical and Surgical Hospitals	622
Textile Product Mills	314	Nursing and Residential Care Facilities	623
Petroleum Refineries	324	Social Assistance	624
Chemical Manufacturing	325	Performing Arts, Spectator Sports, and Related Industries	711
Fabricated Metal Product Manufacturing	332	Museums, Historical Sites, and Similar Institutions	712
Electronics Manufacturing (High Tech)	334	Amusement, Gambling, and Recreation Industries	713
Transportation Equipment Manufacturing	336	Accommodation	721
Nondurable Goods Merchant Wholesalers	424	Food Services and Drinking Places	722
Food and Beverage Store	445	Death Care Services	8122
Motion Picture and Sound Recording	512	Dry-cleaning and Laundry Services	8123
Real Estate	531		

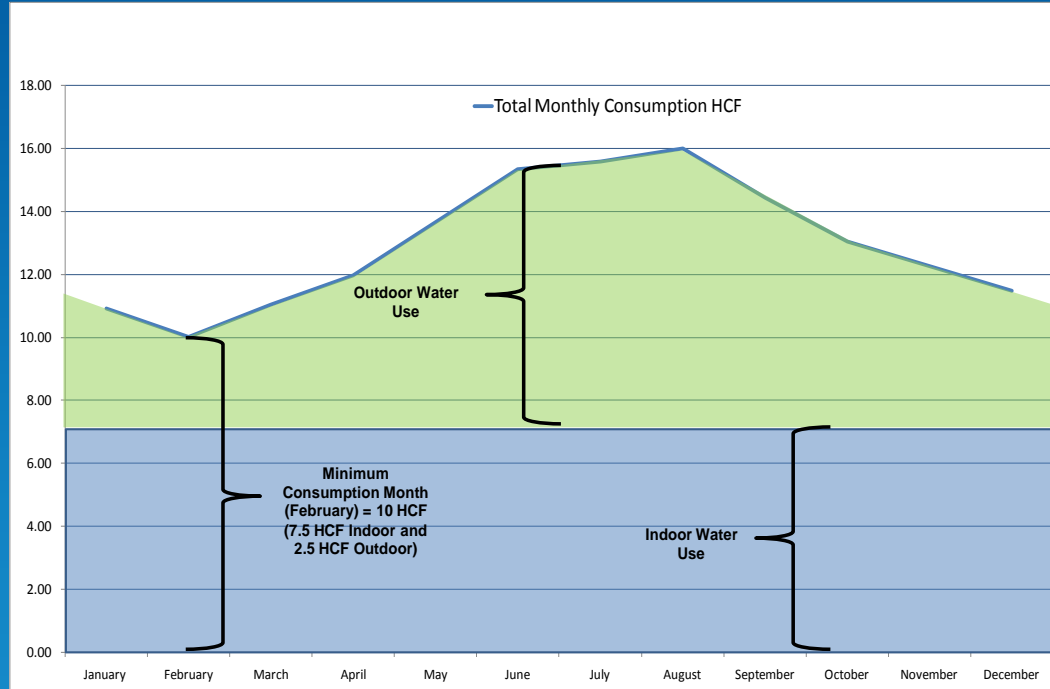
60% of total CII water use. WEEP (2009) Bureau of Reclamation

Estimate Indoor Water Use

- Minimum Month Method
- Indoor = Total – Outdoor



Billing Classification	Percent of Outdoor Water Use
Commercial	8%
Government (Institutional)	15%
Industrial	0%



Source: LADWP Outdoor Water Conservation Potential Technical Memorandum (CDM 2010)

Estimate Indoor Water Use by End Use

Subsector water use assigned to end use

- *BMP 9: A Handbook for Implementing Commercial Industrial & Institutional Conservation Programs (Handbook BMP 9)*. (2001). California Urban Water Conservation Council (CUWCC).
- *Commercial and Institutional End Uses of Water (CI End Use)*. (2000). American Water Works Association Research Foundation (AWWARF).
- *Waste Not, Want Not: The Potential for Urban Water Conservation in California (Waste Not Want Not)*. (2003). Pacific Institute.
- *Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program (WaterSense)*. (2009). United States Environmental Protection Agency (US EPA).
- *Watersmart Guidebook---A Water-Use Efficiency Plan-Review Guide for New Businesses (Watersmart Guidebook)*. (2008). East Bay Municipal Utility District (EBMUD).

Indoor End Use Sources

Subsectors	CI End Use (AWWARF)	WaterSmart			Waste Not Want Not (Pacific Institute)
		Guidebook (EBMUD)	WaterSense (EPA)	BMP 9 (CUWCC)	
Office	X	X	X	X	X
Restaurant	X	X	X		X
Schools	X	X	X	X	X
Hotels	X	X	X	X	X
Hospitals	X	X	X	X	X
Commercial Laundry	X	X	X		X
Grocers		X		X	X
Beverage Manufacturing		X			X
Electronics Manufacturing				X	X
Food Processing					X
Textile Manufacturing					X
Fabricated Metals					X
Petroleum					X

Estimate Indoor Water Use by End Use

General Purpose (Item)	CI End Use (AWWARF)	Watersmart Guidebook (EBMUD)	WaterSense (US EPA)	Handbook BMP9 (CUWCC)	Waste Not Want Not (Pacific Institute)
End use in Hospitals (percent of total use)					
Domestic & Restrooms	0.27	0.31	0.35	0.40	0.25
Kitchen	0.06	0.07	0.07	0.08	0.08
Cooling & Heating	0.31	0.23	0.2	0.13	0.27
Landscape	0.09	0.10	0.07	0.05	0.16
Other*	0.16	0.06	0.07	0.08	
Laundry	0.06	0.06	0.09	0.10	0.02
Sterilizers X-Ray Process	0.05	0.17	0.15	0.16	0.22
Sum	1	1	1	1	1
End use in Electronics Manufacturing (percent of total use)					
Domestic/Restroom				0.05	0.05
Rinsing				0.40	0.70
Fume Scrubbers				0.20	
Cooling & Heating				0.20	0.20
Water Purification				0.10	
Landscaping				0.05	
Other					0.05
Sum				1	1



Percent* Indoor End Use of Water in Restrooms per Industry

Industry	Toilet Annual Use	Urinal Annual Use	Faucet Annual Use	Shower Annual Use
Hospitals	72.55%	14.82%	3.68%	8.95%
High Tech (Electronics Manufacturing)	76.26%	19.60%	4.14%	0.00%

*Percentages based on tables D-2, D-4, D-6 and D-7 from *Waste Not Want Not* (Appendix D) by Pacific Institute.



Identify Savings by End Use and Subsector

Subsector water savings assigned to an end use

- *Santa Clara Valley Water District Commercial Institutional Industrial Water Use & Conservation Baseline Study.* (2008). CDM.
- *Waste Not Want Not.* (2003). Pacific Institute.
- *Water and Energy Efficiency Program for Commercial, Industrial, and Institutional Customer Classes in Southern California (WEEP).* (2009). Bureau of Reclamation (Bureau).
- *Water Use Efficiency Comprehensive Evaluation.* (2006). CALFED Bay-Delta Program.

Indoor End Use Potential Savings Primary Sources

Subsectors	WEEP (Bureau of Reclamation)	Waste Not Want Not (Pacific Institute)
Office	X	
Restaurant	X	X
Schools	X	X
Hotels	X	X
Hospitals	X	X
Commercial Laundry	X	X
Grocers		X
Beverage Manufacturing		X
Electronics Manufacturing	X	X
Food Processing	X	X
Textile Manufacturing	X	
Fabricated Metals	X	
Petroleum	X	X
Chemical Manufacturing	X	
Amusement & Recreation	X	
Scientific & Technical Services	X	
Transportation Equipment		X
Social Assistance		X

Identified Conservation Programs

- Restroom Retrofits
- Process water audit, retrofits and reuse
- Cooling Towers
- Laundromat Retrofits
- Kitchen Retrofits
- Hospital Retrofits



Identify Savings by End Use and Subsector

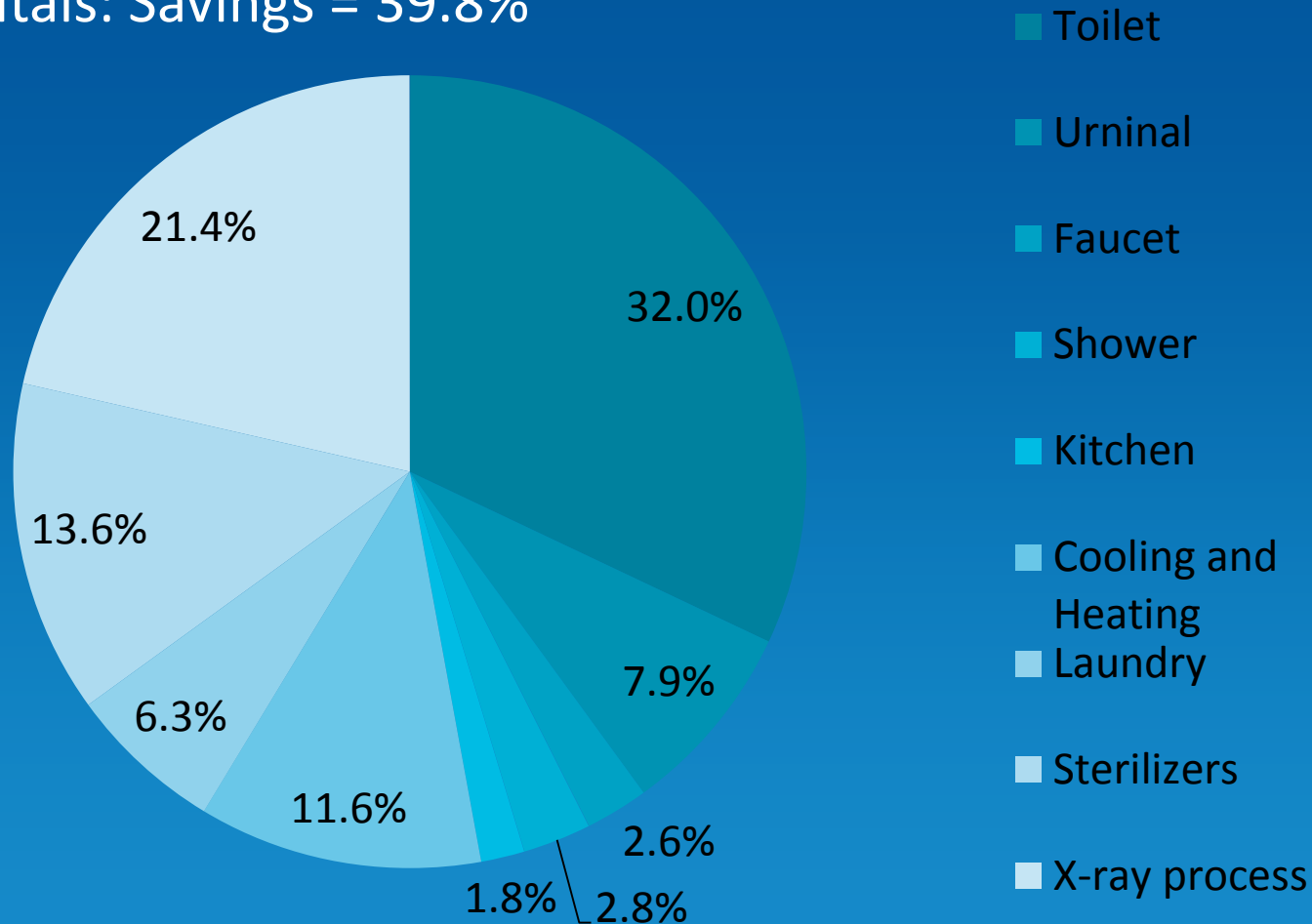
End Use Water Savings by Subsector*		
End Use	General Medical/ Hospital	Electronics Product Manufacturing
Estimated Percent Savings Potential		
Domestic/Restroom		
-Ultra Low Flush (ULF) Toilet**	57%	57%
-High efficiency urinal**	69%	69%
-ULF aerator for faucet	90%	90%
-ULF aerator for shower	40%	
Cooling	20%	9%
Laundry	42%	
Kitchen	10%	
Dishwashing		
- Pre-rinse spray nozzles		
- Ware washers		
Ice Making		
X-Ray Processors	98%	
Sterilizers and Autoclaves	65%	
Washing		
Process		
Preparation Scouring		
Dyeing		
Printing		
Washing		
Rinsing		29%
Ultra Purified Water (UPW)		6%
Fume Scrubbers**		5%
Steam Generation and Distribution (boiler)		
Process Integration		
Heating and Cooling		

* Unless noted differently all percent savings is from WEEP by Bureau.

**Potential Savings source: Waste Not Want Not by Pacific Institute

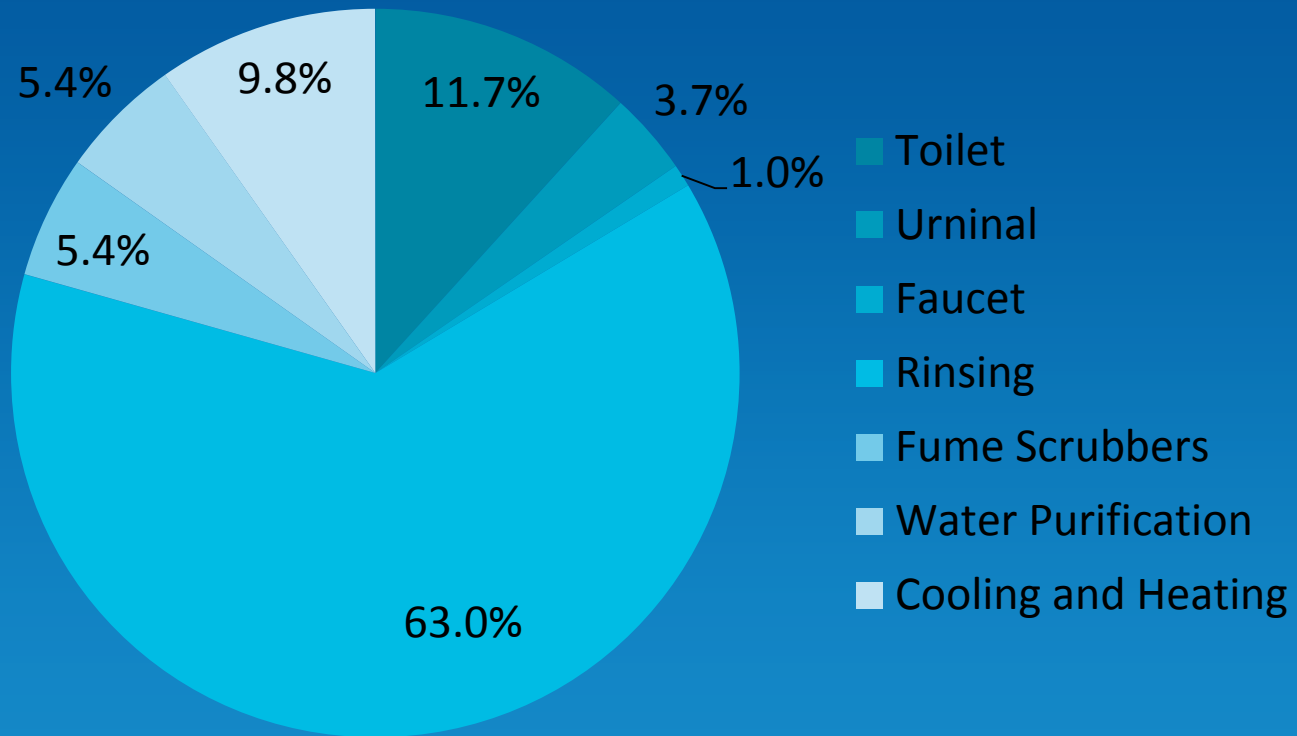
Estimate Potential Water Savings

- Hospitals: Savings = 39.8%



Estimate Potential Water Savings

Electronic Manufacturing: Savings = 18.4%

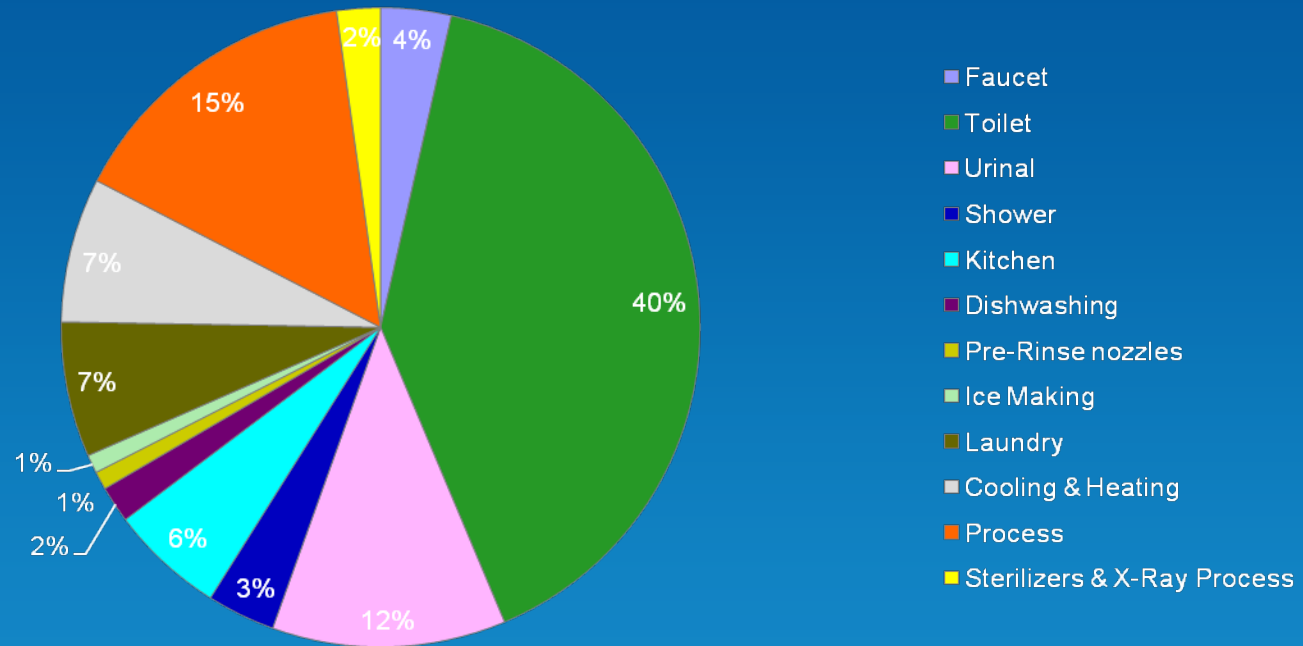


Estimate Potential Savings

- Top Water Users (106 of 400 accounts)
 - Estimated savings of 4,600 AFY
 - 20% of subsectors reflecting 106 accounts
 - 2.5% of total CII sector water use
- Estimated CII Subsector Water Use
 - Estimated savings of 23,000 AFY
 - 23% of subsector estimated water use
 - 13% of total CII sector water use

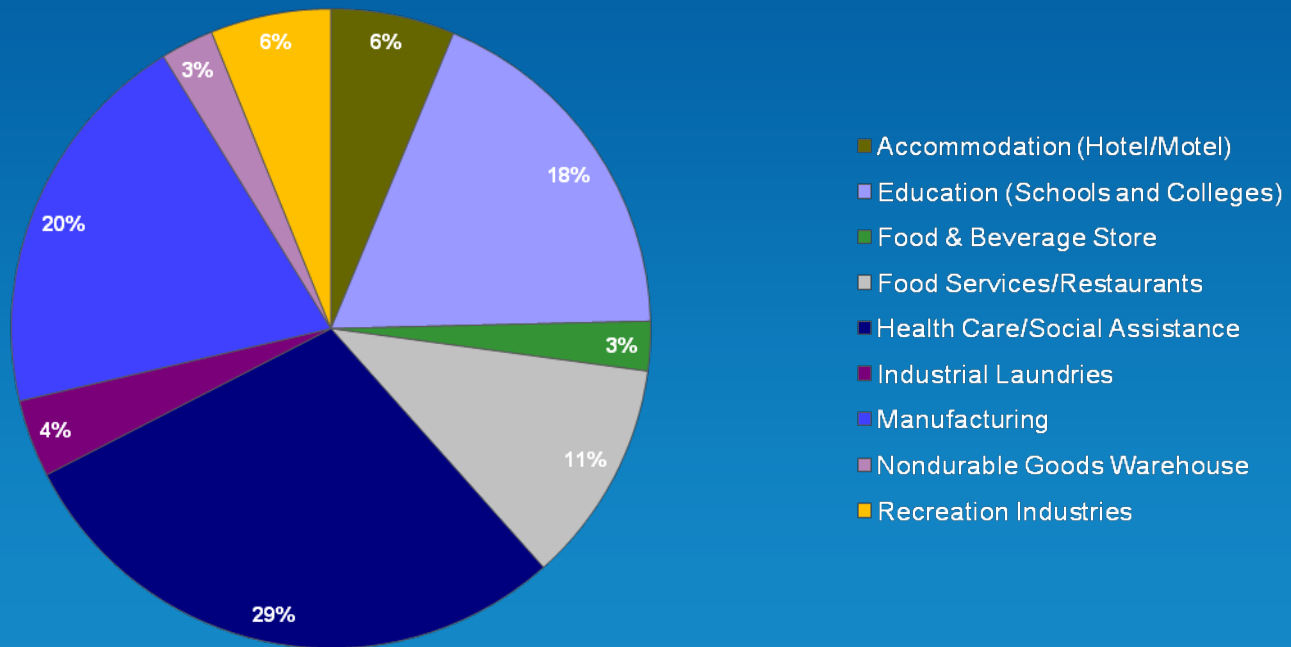
Estimate Potential Savings

Estimated Water Saved Per Indoor End Use Total



Estimate Potential Savings

Percent Water Saved per Subsector



Conclusions/Recommendations to LADWP

- Significant potential indoor water savings in the CII Sector
 - Continue programs targeting domestic uses
 - Gather information regarding various manufacturing process water uses
- Conduct Conservation Baseline Study
 - Saturation
 - Potential/absorption
- Combine with CII sector outdoor savings potential
- Leverage water conservation programs with energy savings initiatives/incentives

CII Needs and Research

- Issues
 - Insufficient data for array of CII subsectors
 - Inconsistent naming conventions
 - Inconsistent breakdown of end uses by subsector
- Solutions
 - Centralized database/clearinghouse with peer review
 - Standardize data collection methods and reporting

Q&A

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