

This presentation premiered at WaterSmart Innovations

watersmartinnovations.com



Using Water Use Metrics and Benchmarking to Target ICI Customers



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Presented at WaterSmart Innovations 2015

The water industry is entering the era of **BIG DATA!**

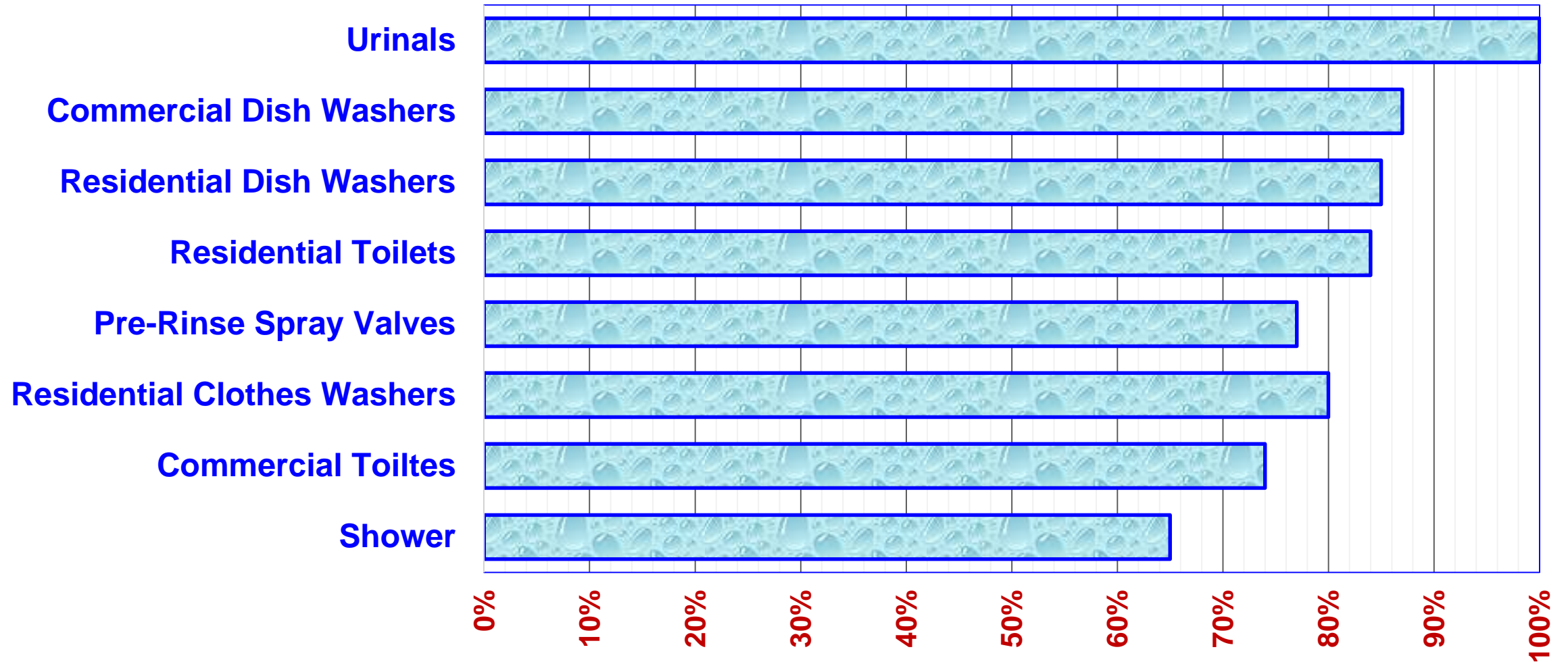
- AMI metering
- Portfolio manager data base now includes water use
- The new LEED requires sub metering and five years of water use data to be sent to the USGBC
- Many States have intensified water use data gathering
- New billing systems are becoming much more data rich

What will be covered

- 1. Time Series Analysis;**
- 2. Utility ICI Sales and Use;**
- 3. How water is actually used; and**
- 4. Benchmarking ICI water use.**

Time Series Analysis

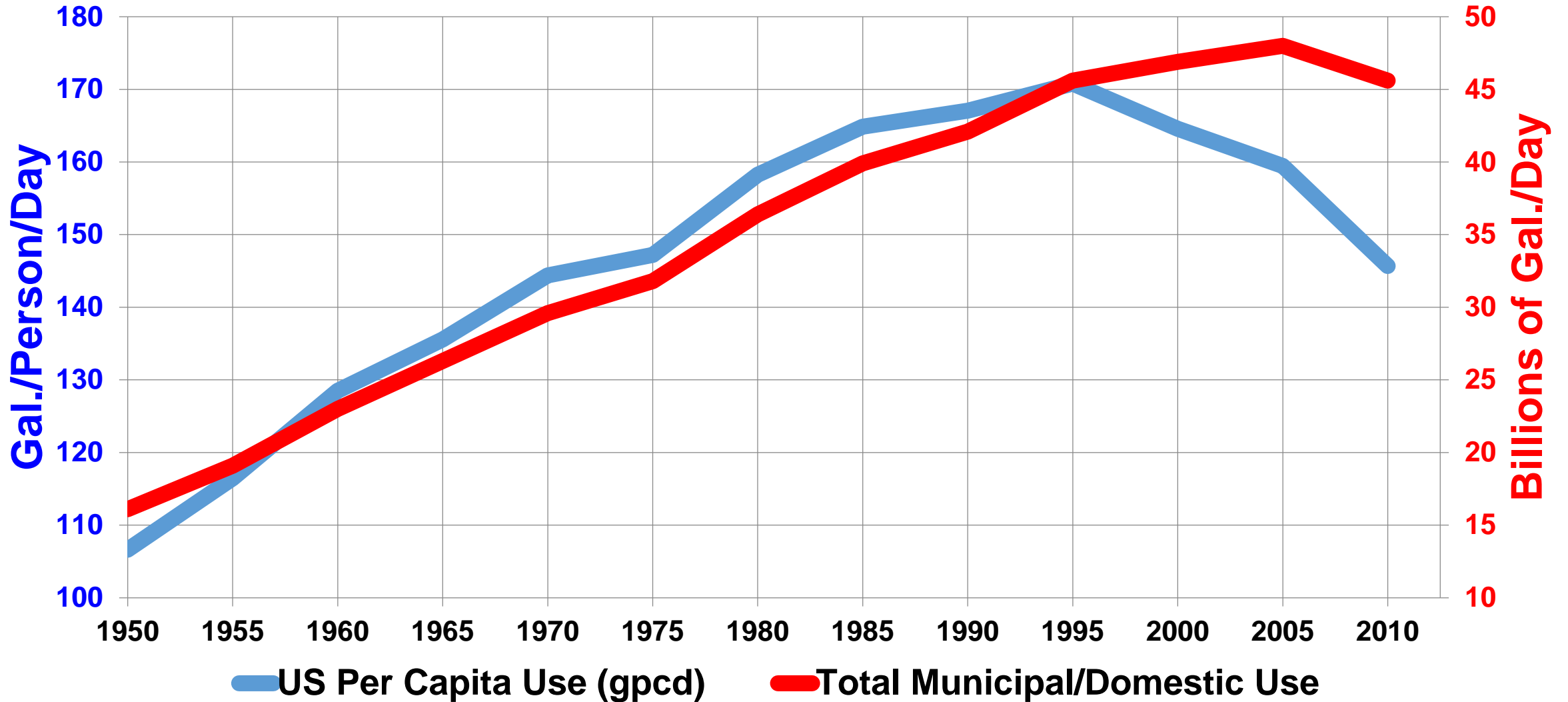
Reduction in Water Use Since 1980 for Appliances and Plumbing Fixtures



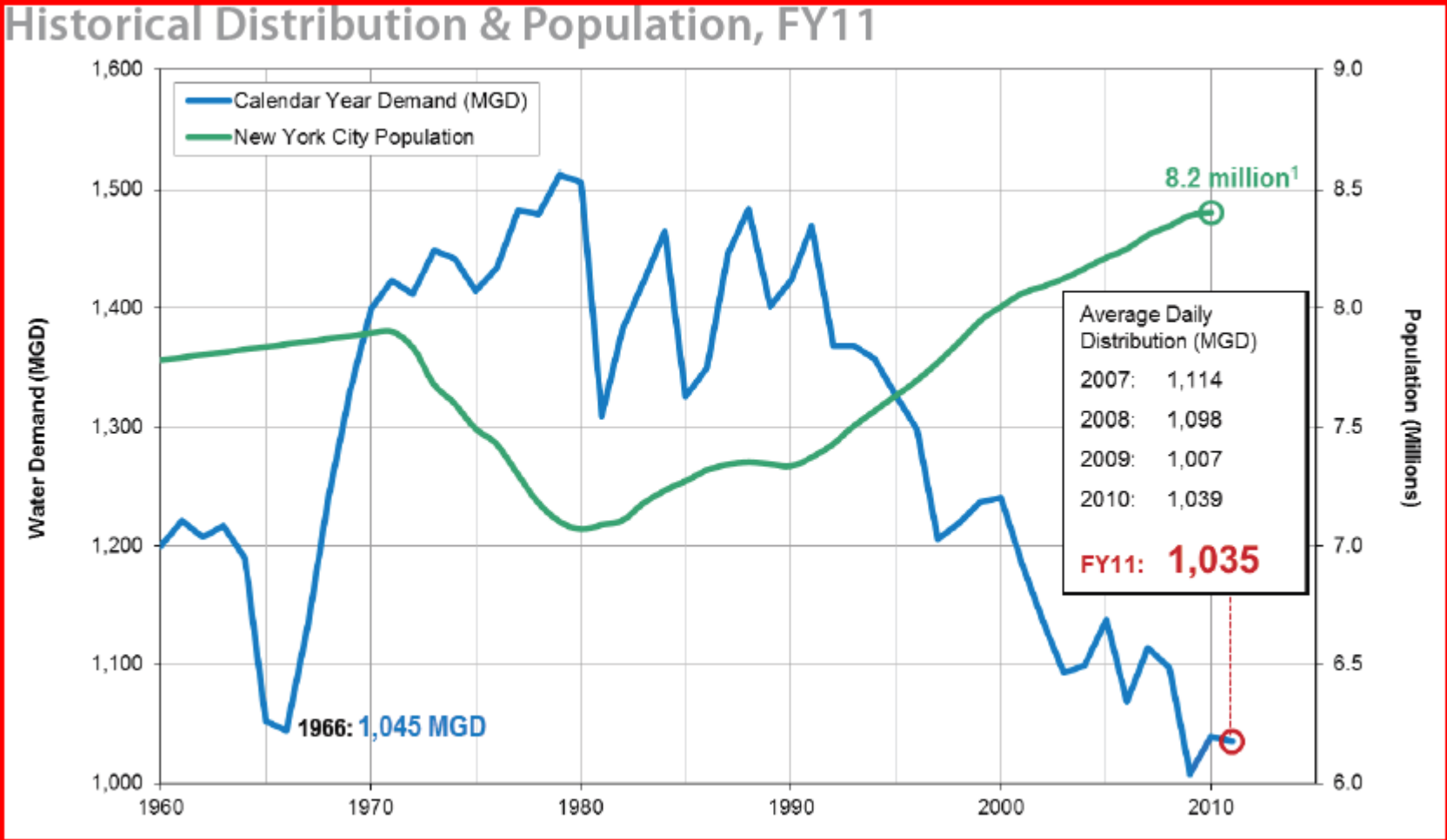
Percent Reduction in Use From **Best in Class**

Public and Domestic Water Use

USGS 2014



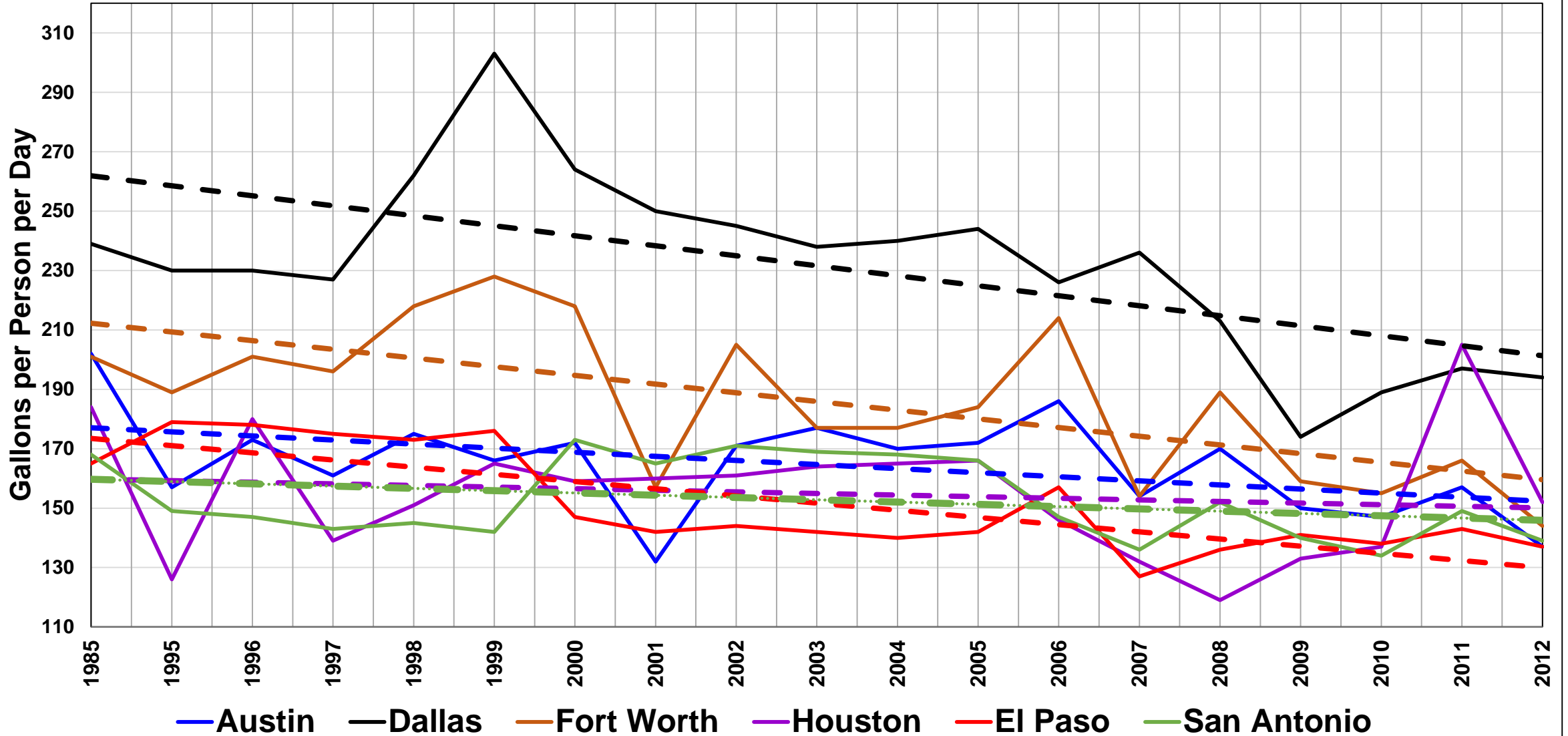
New York City



Large Texas Cities

Austin, Dallas, Fort Worth, San Antonio, El Paso & Houston

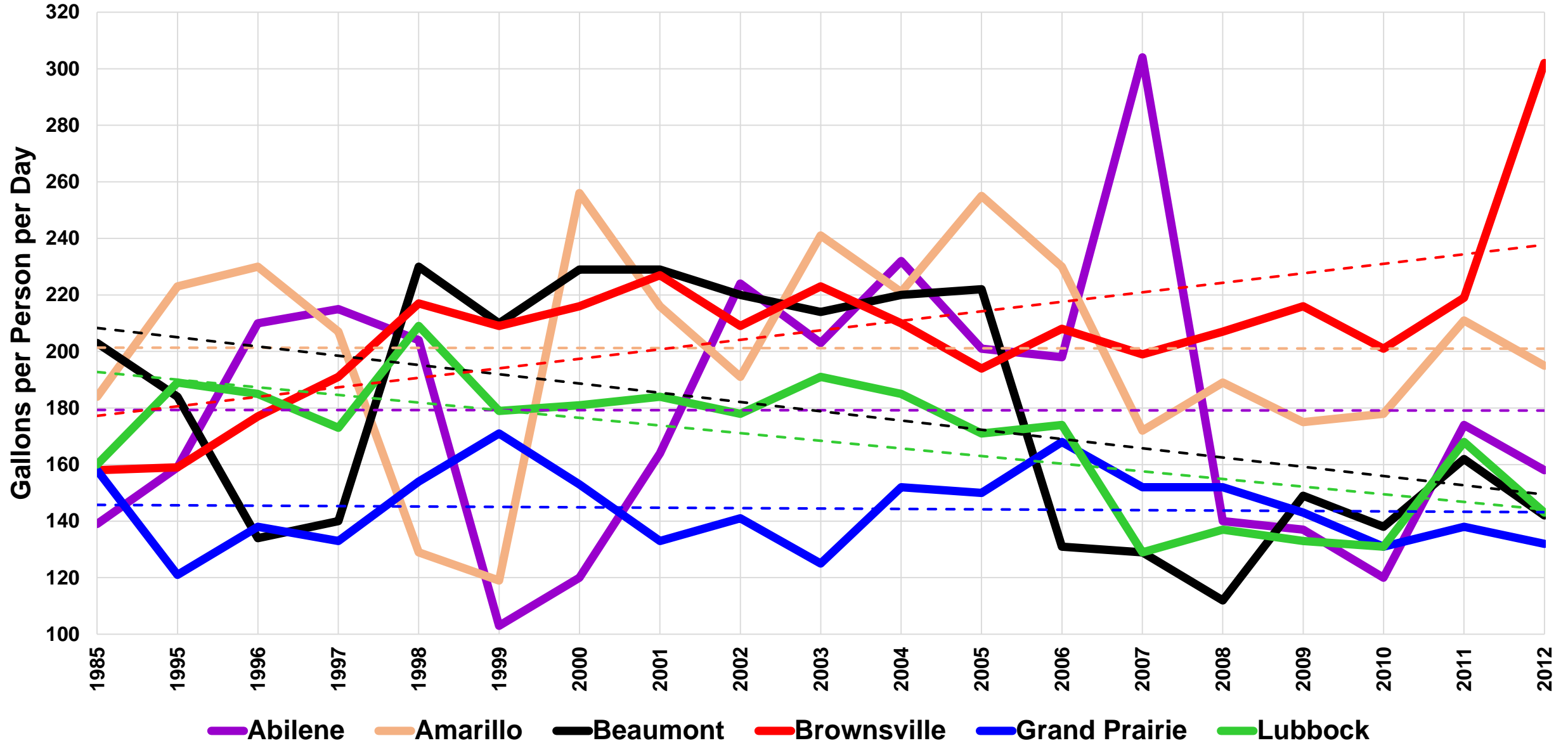
Source: TWDB



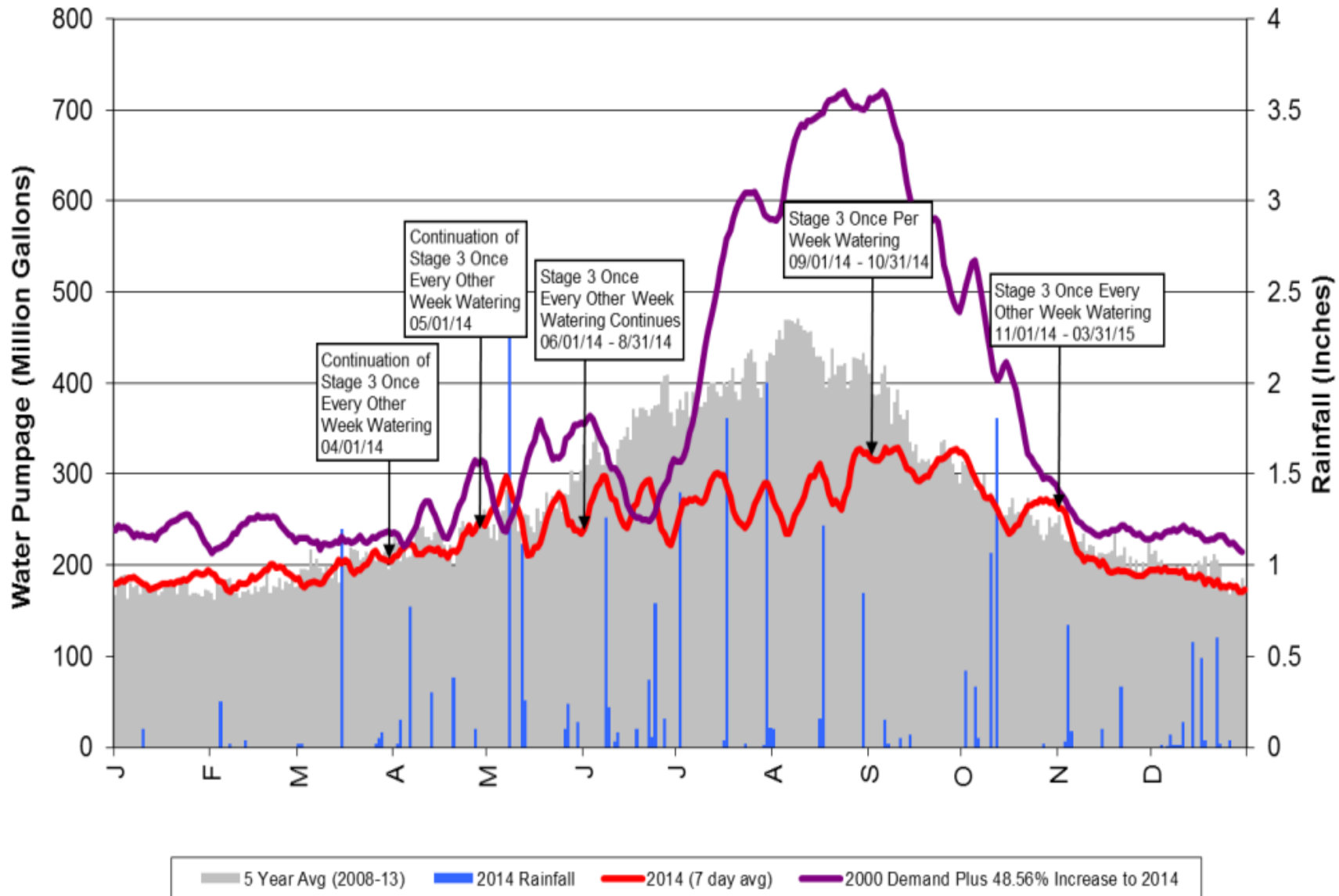
Mid Size Texas Cities 100,000 - 250,000 Population

Abilene, Amarillo, Beaumont, Grand Prairie, & Lubbock

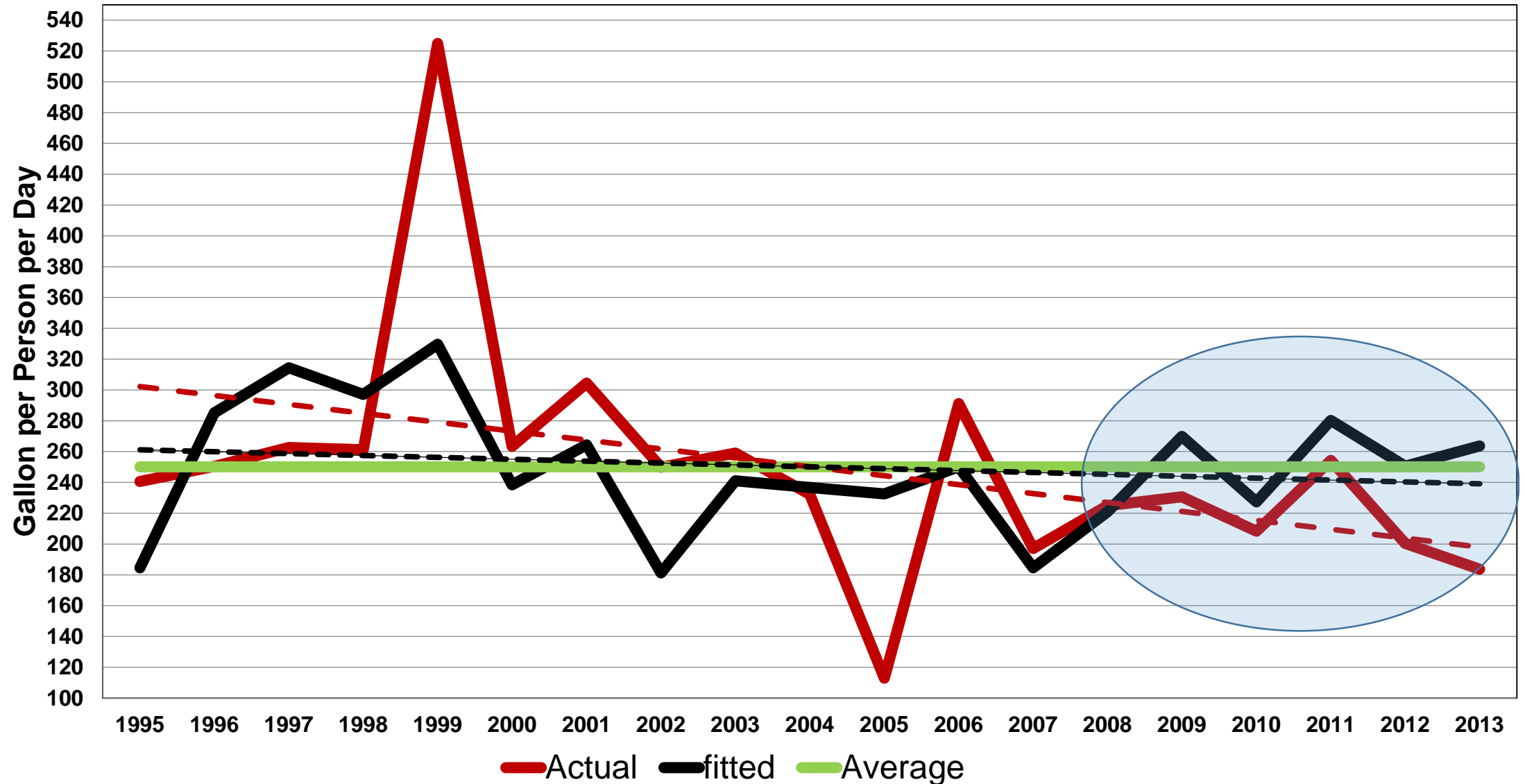
Source: TWDB



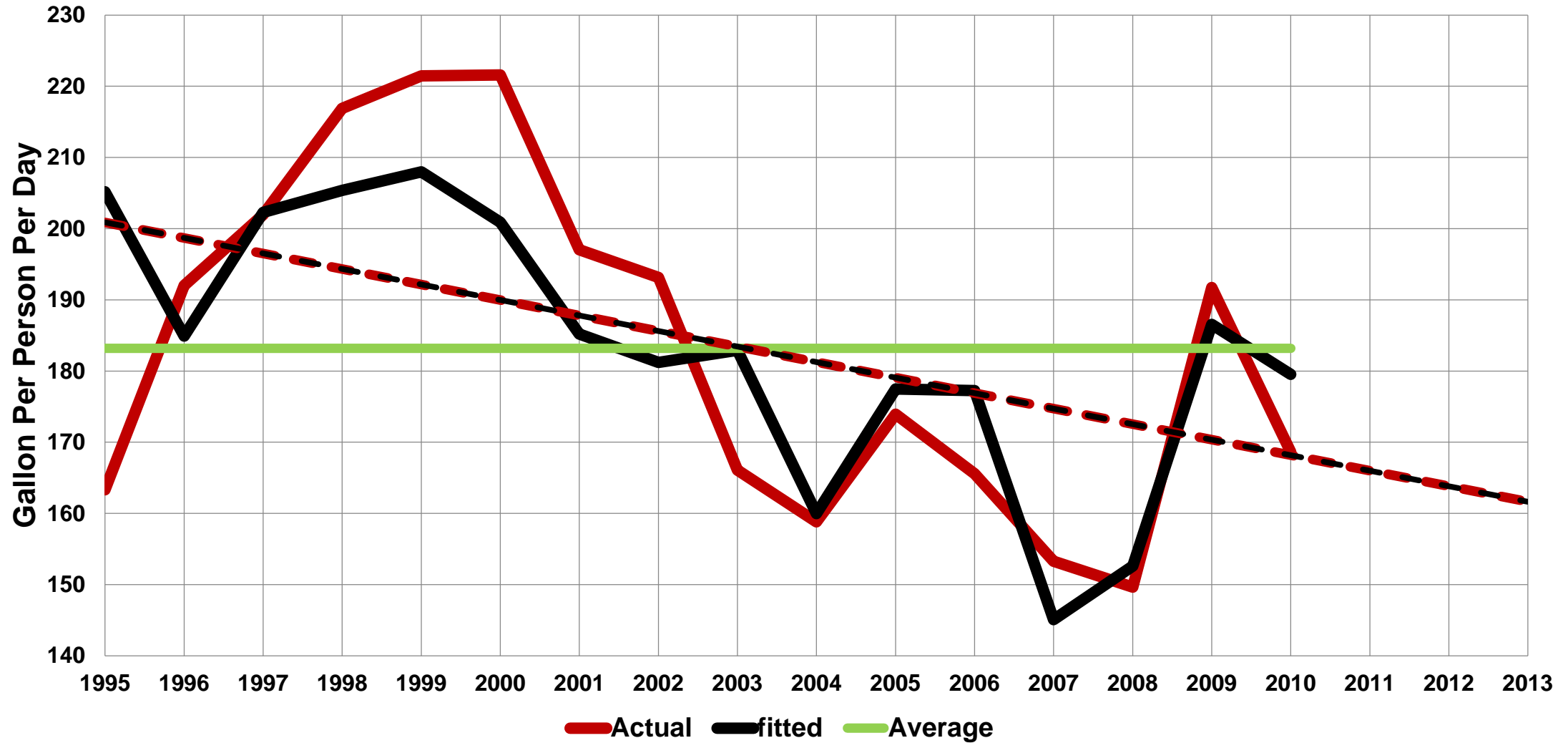
North Texas Municipal Water District Year 2000 with Projected Increases vs. 2014 Actual Usage Daily Water Consumption



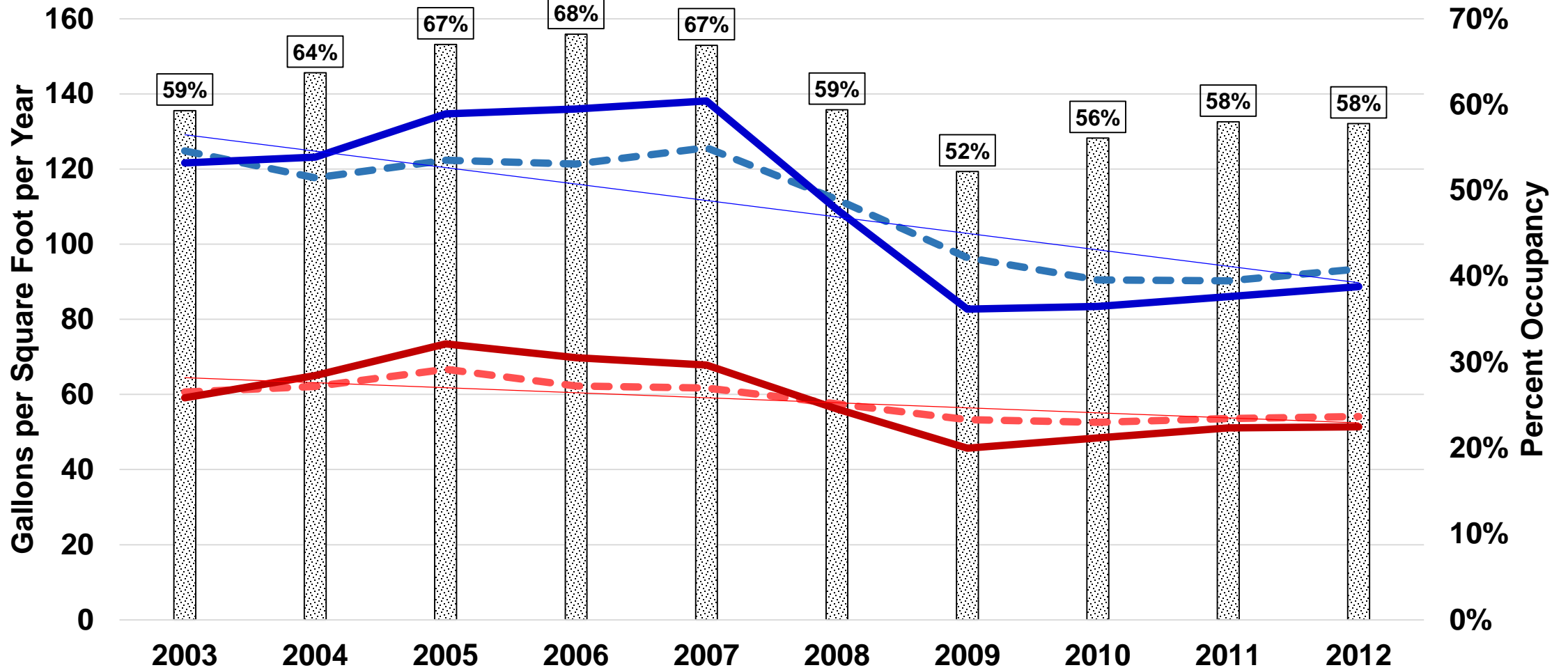
August Austin Actual vs Fitted vs Average Water Consumption



Pasadena, Texas Actual vs Fitted vs Average Water Consumption for August



Hotel and Motel Water Use Factors for Phoenix - 2003 to 2012



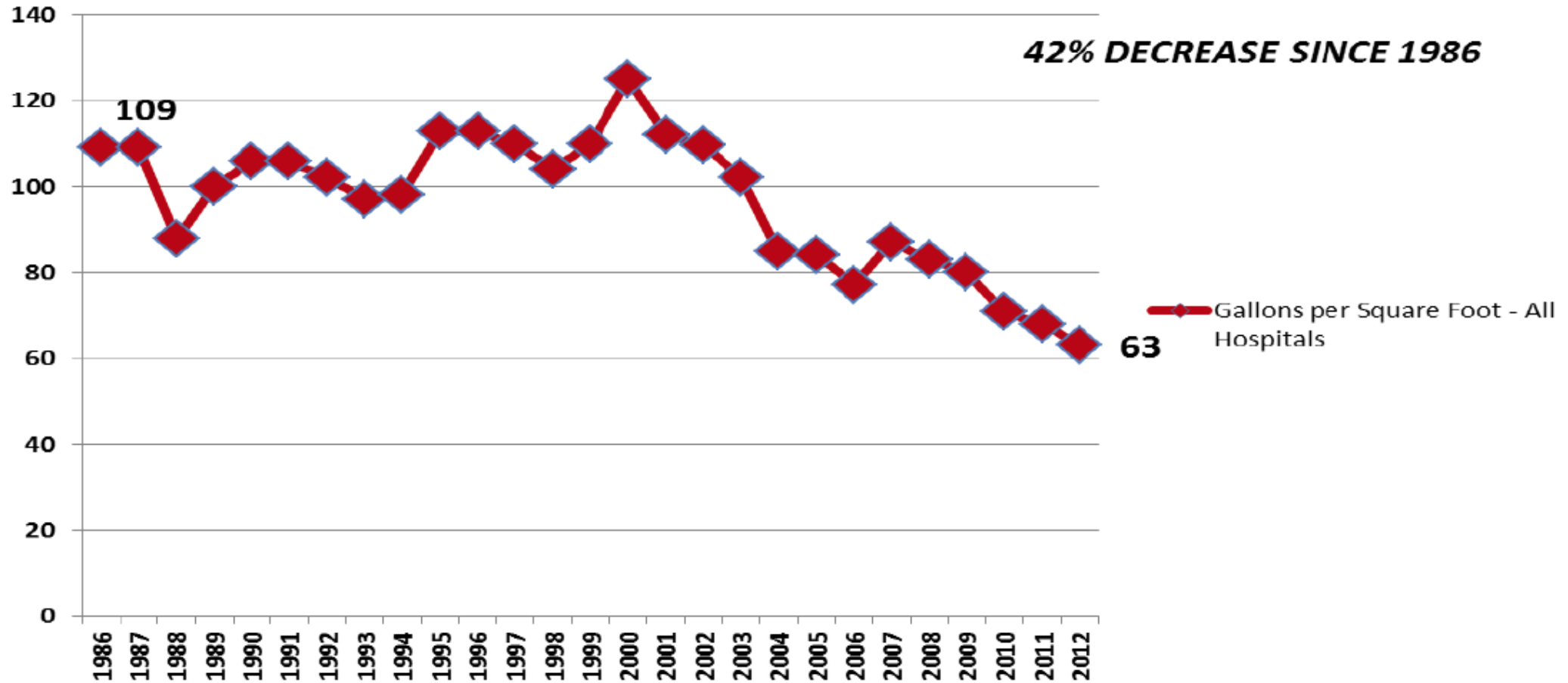
- Percent Occupancy
- Motel Adjusted for Occupancy
- Motel Unadjusted for Occupancy
- Hotel Adjusted for Occupancy
- Hotel Unadjusted for Occupancy

Hospital Water Use in Phoenix

From a special study – Phoenix Medical Facilities 2014

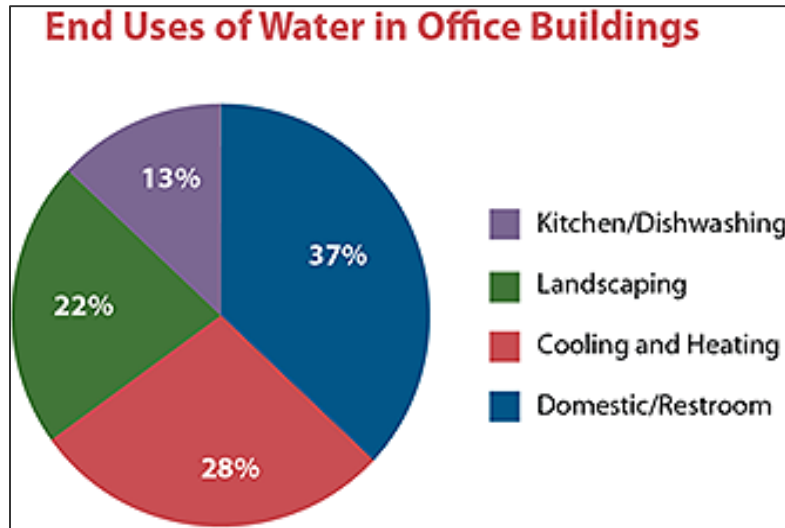
Figure 4 – Cumulative Hospital Water Use Intensity (1986-2012)

Gallons per Square Foot - All Hospitals

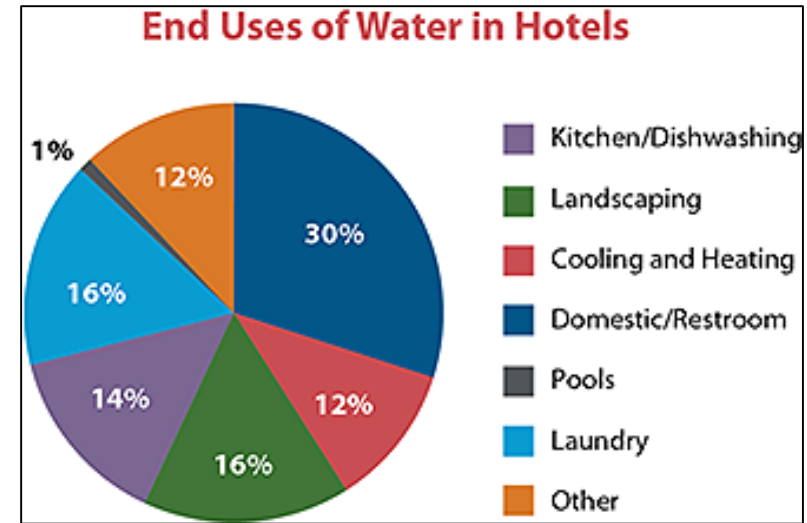


***Down in the weeds look at how
water is actually used.***

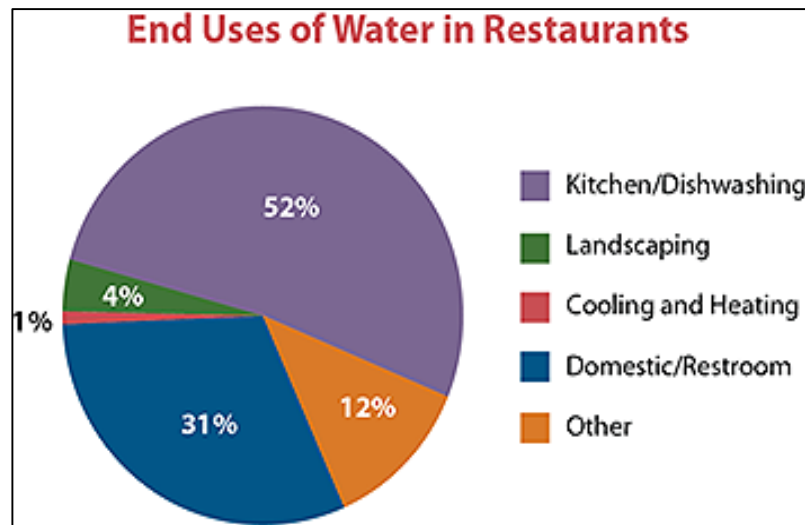
EPA WaterSense National Averages



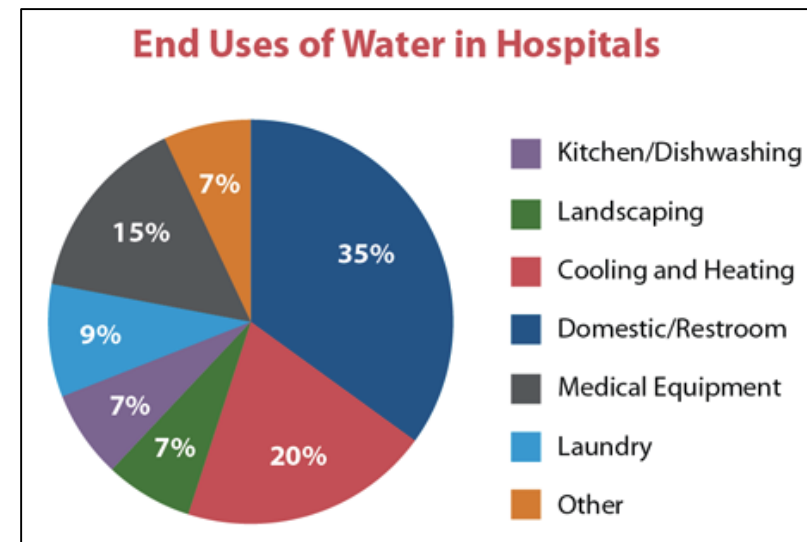
<http://www.epa.gov/watersense/commercial/types.html#tabs-office>



<http://www.epa.gov/watersense/commercial/types.html#tabs-hotels>



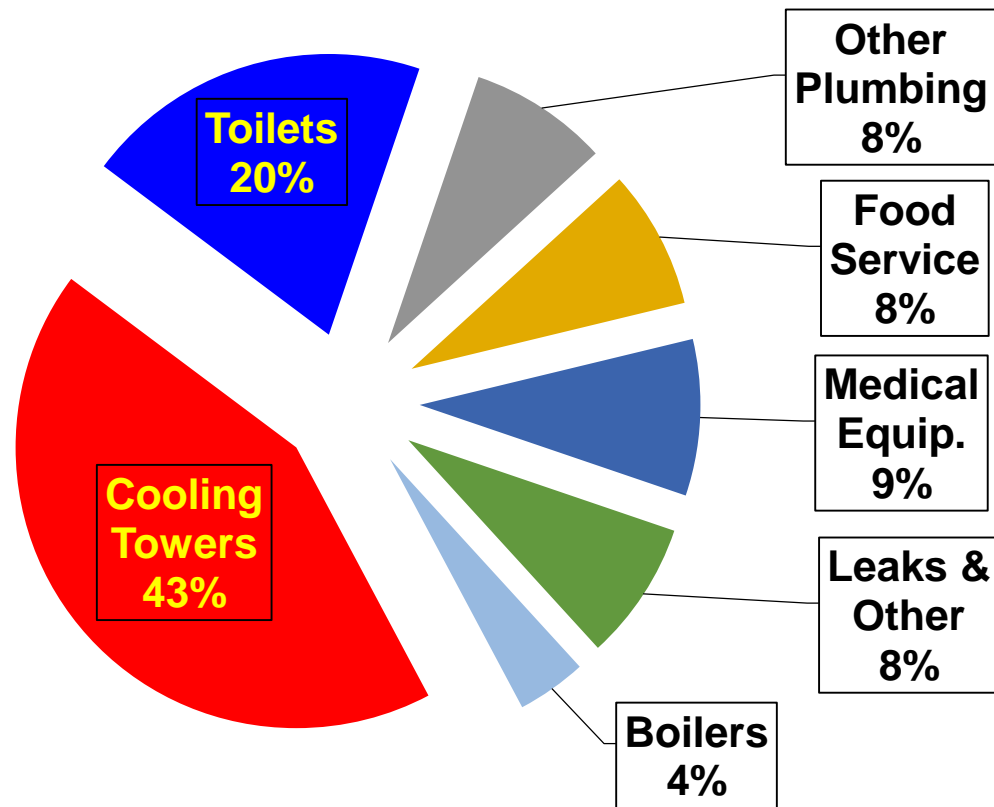
<http://www.epa.gov/watersense/commercial/types.html#tabs-restaurants>



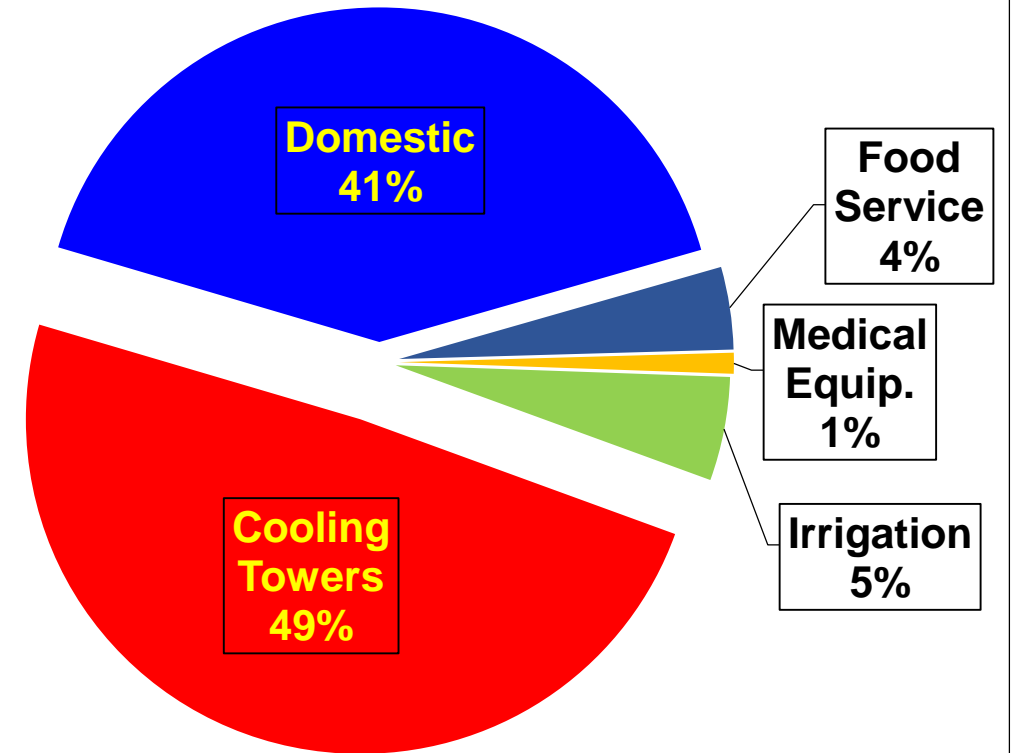
<http://www.epa.gov/watersense/commercial/types.html#tabs-hospitals>

Two Hospitals from Across the Nation

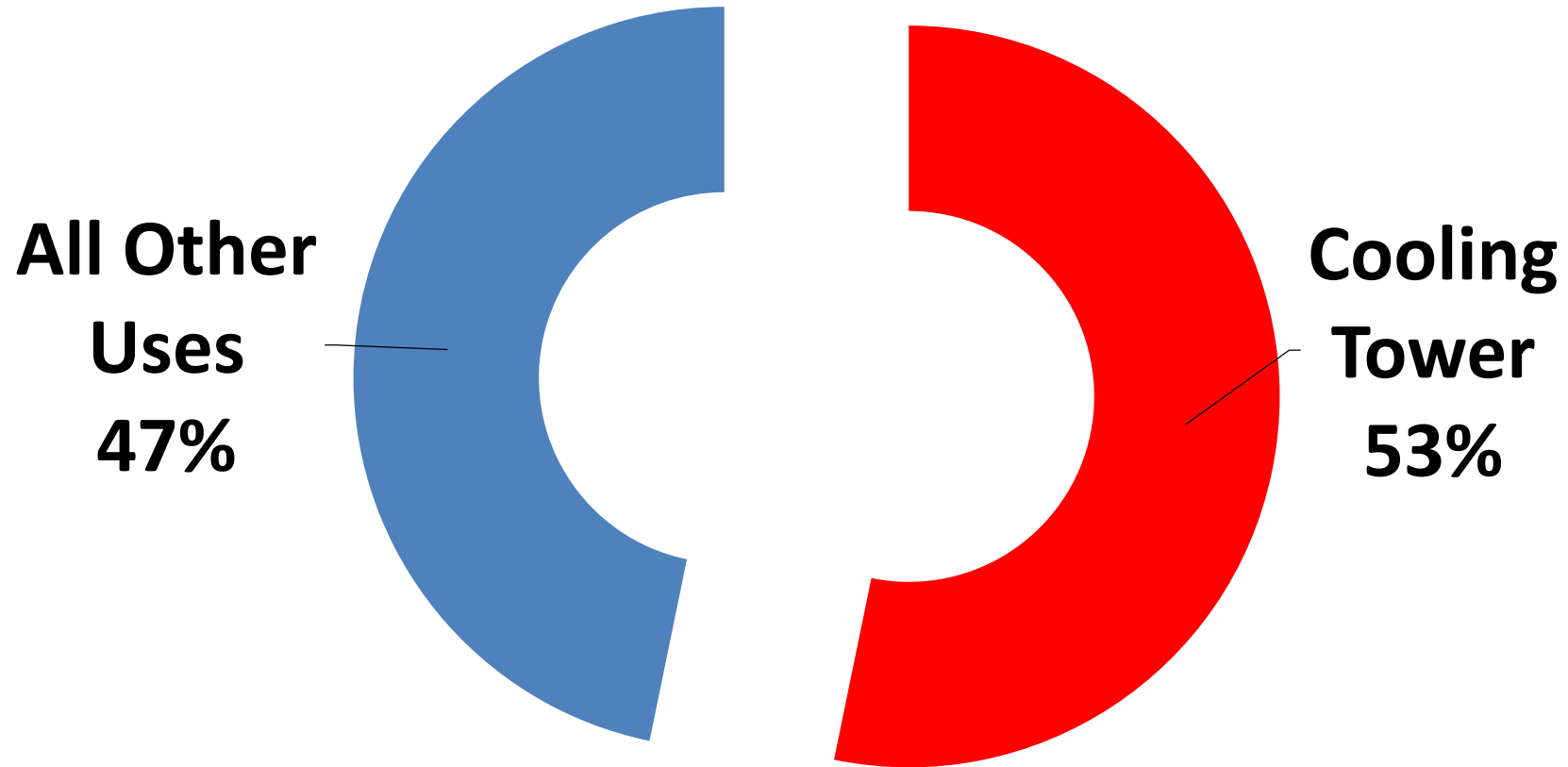
Florida



Arizona

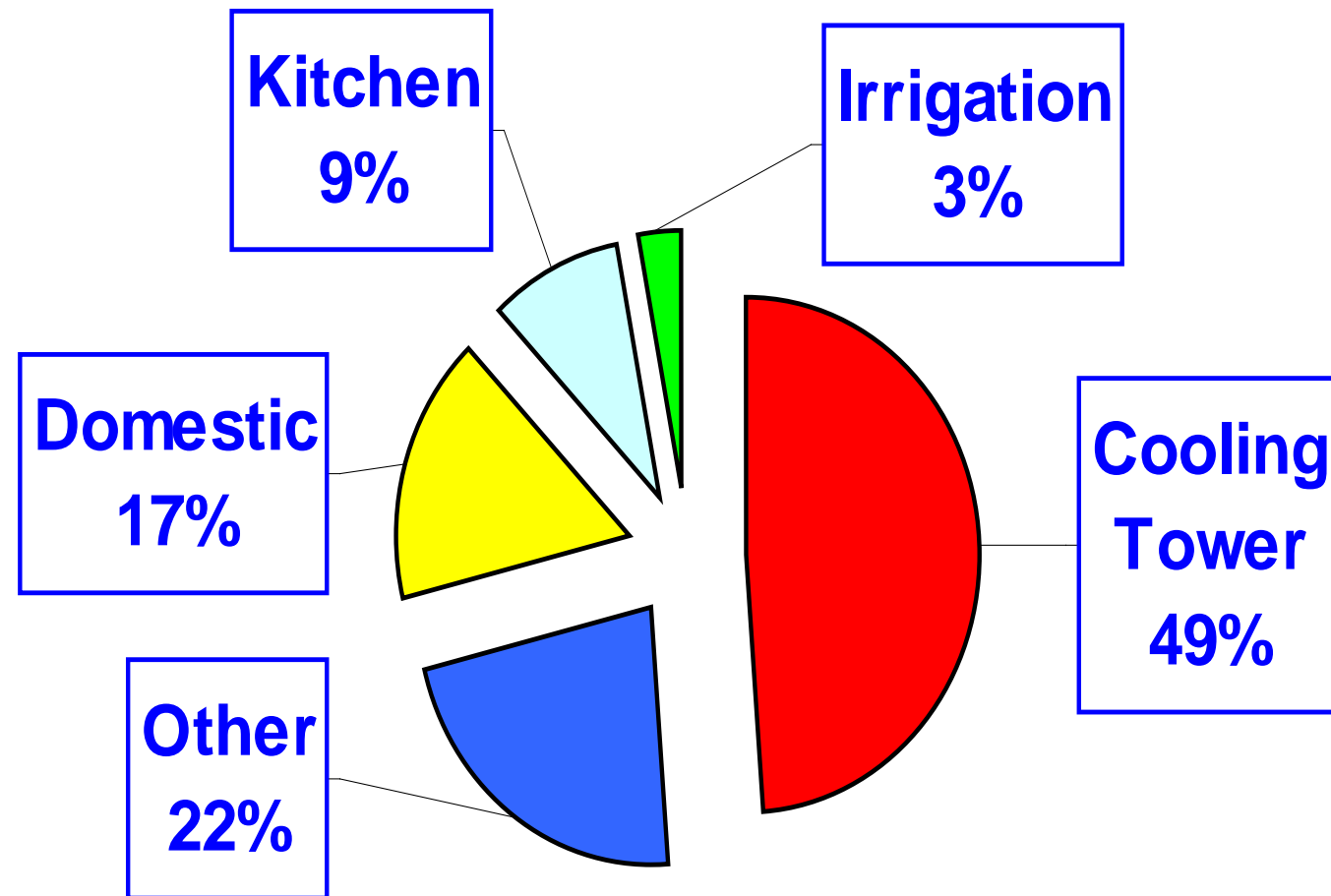


Eleven Office Buildings in Austin, Texas



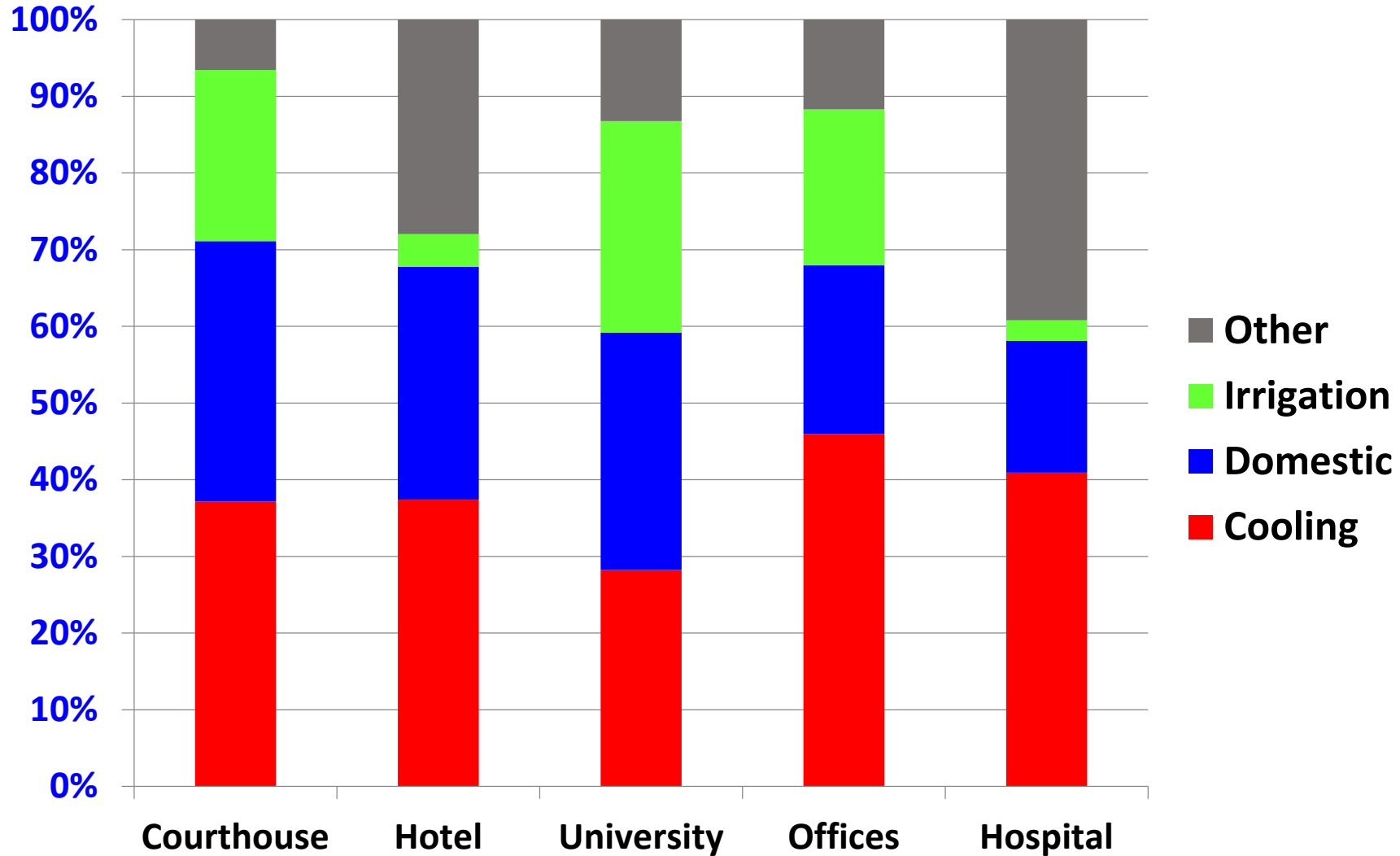
Grocery Store Water Use in California

Pacific Institute



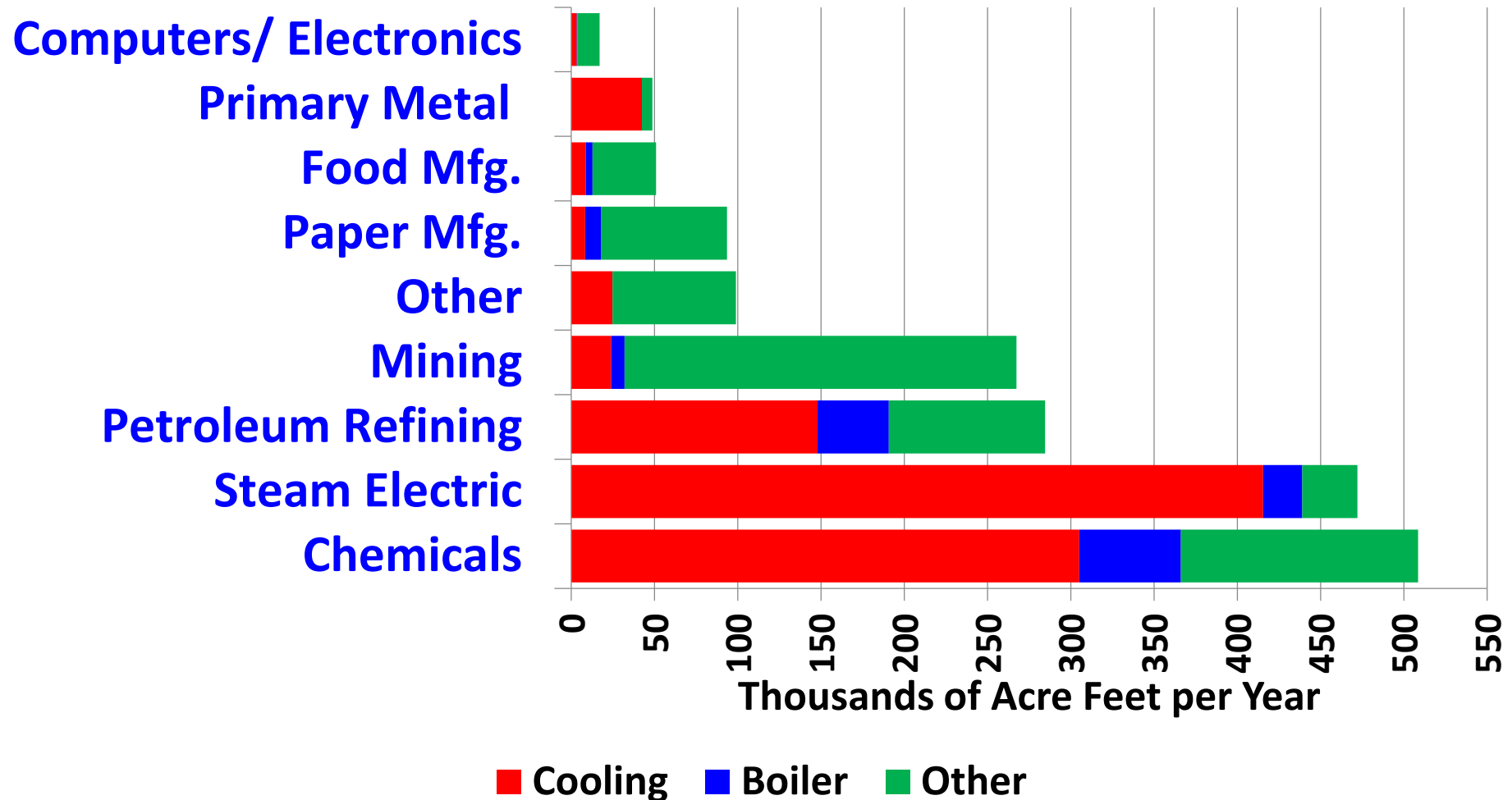
Summary of Audits of 30 Large Facilities with Cooling Towers in Downtown Fort Worth Texas

Water Management, Inc.

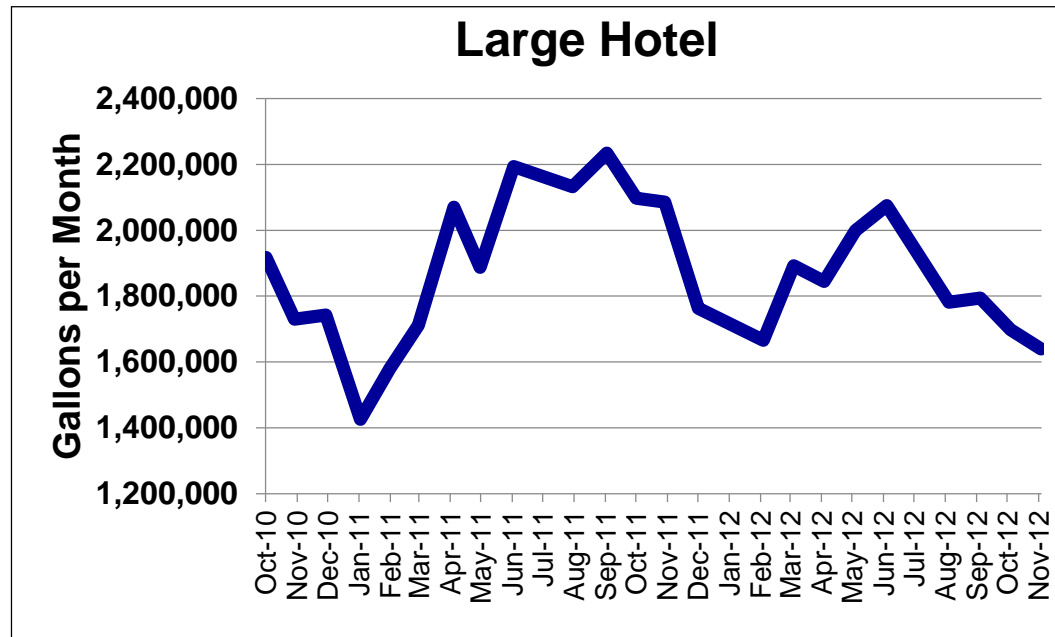
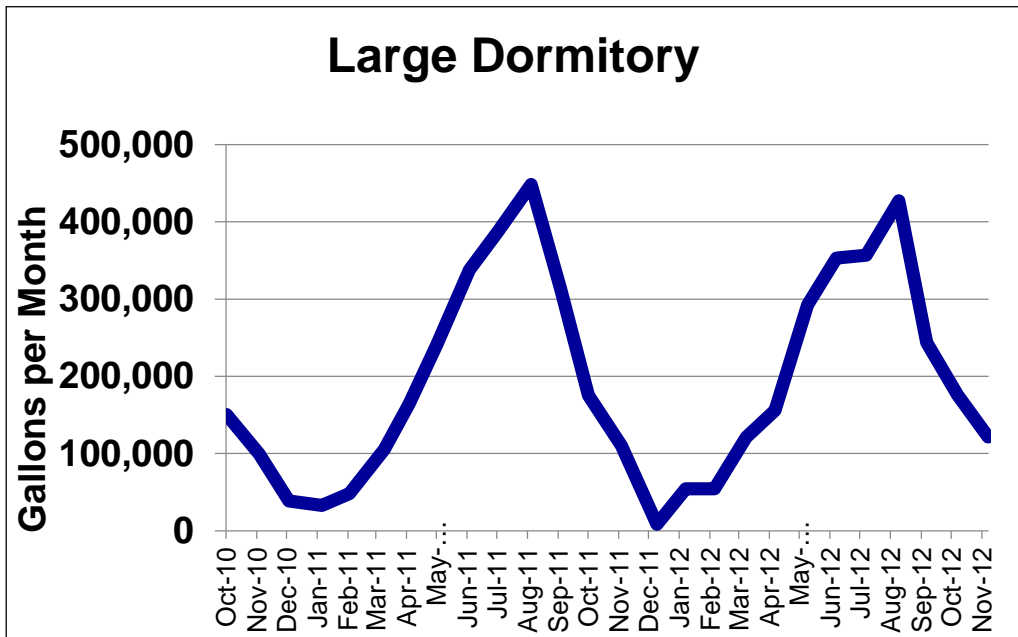
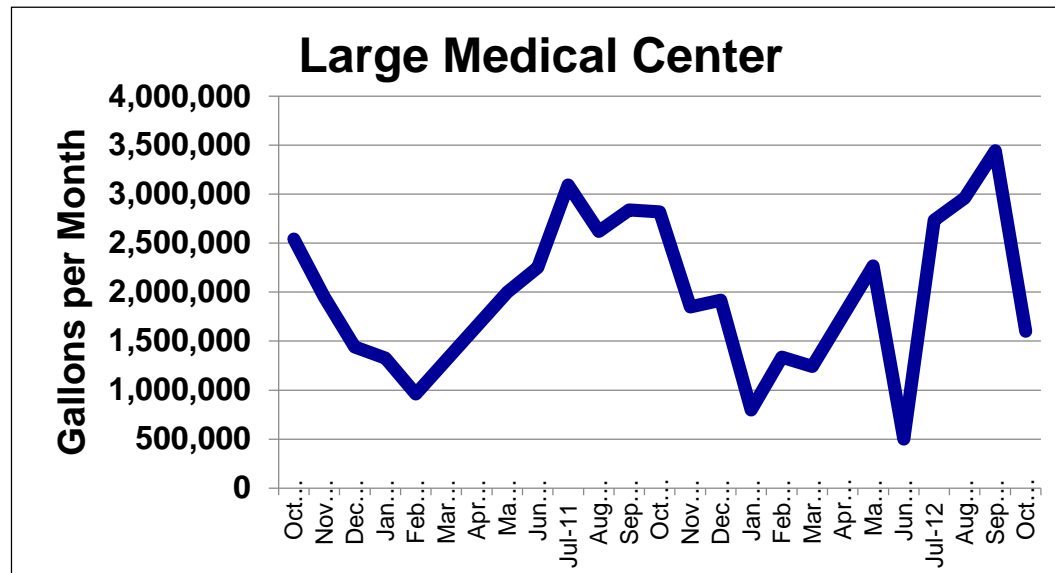
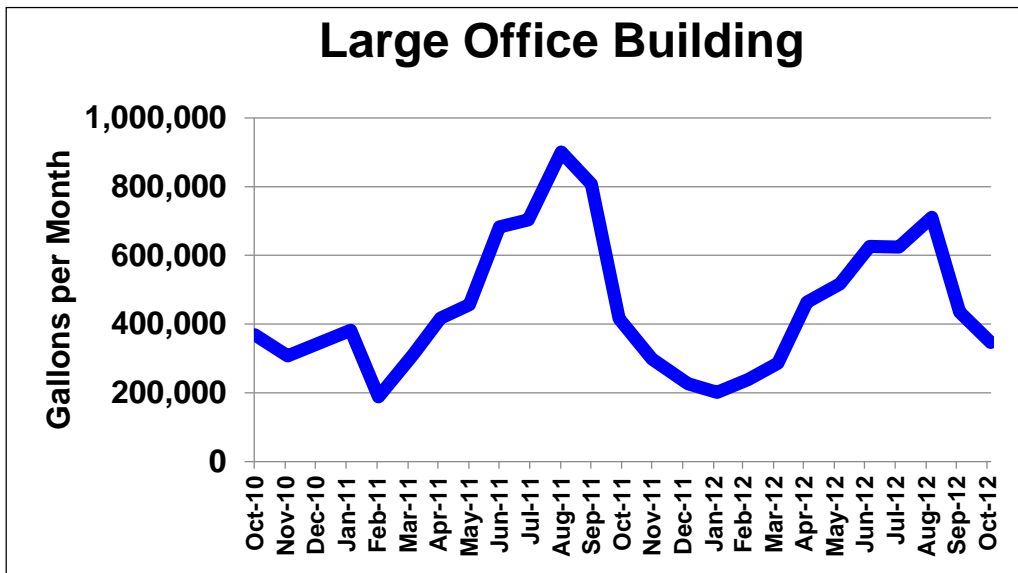


Industrial Water Use in Texas 2011

1.84 million acre feet per year



Monthly Cooling Tower Use Examples in Austin Texas

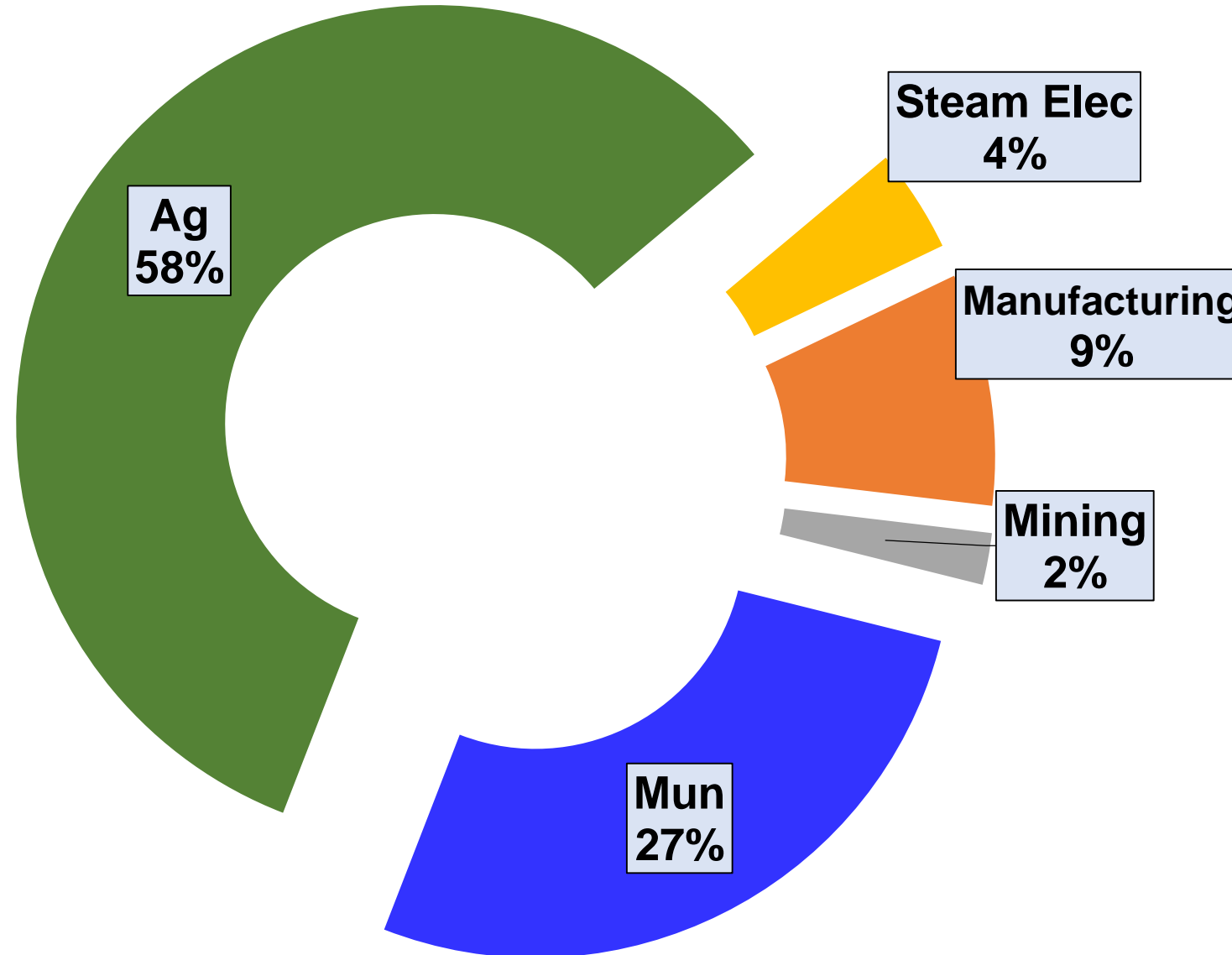


Utility ICI Sales and Use

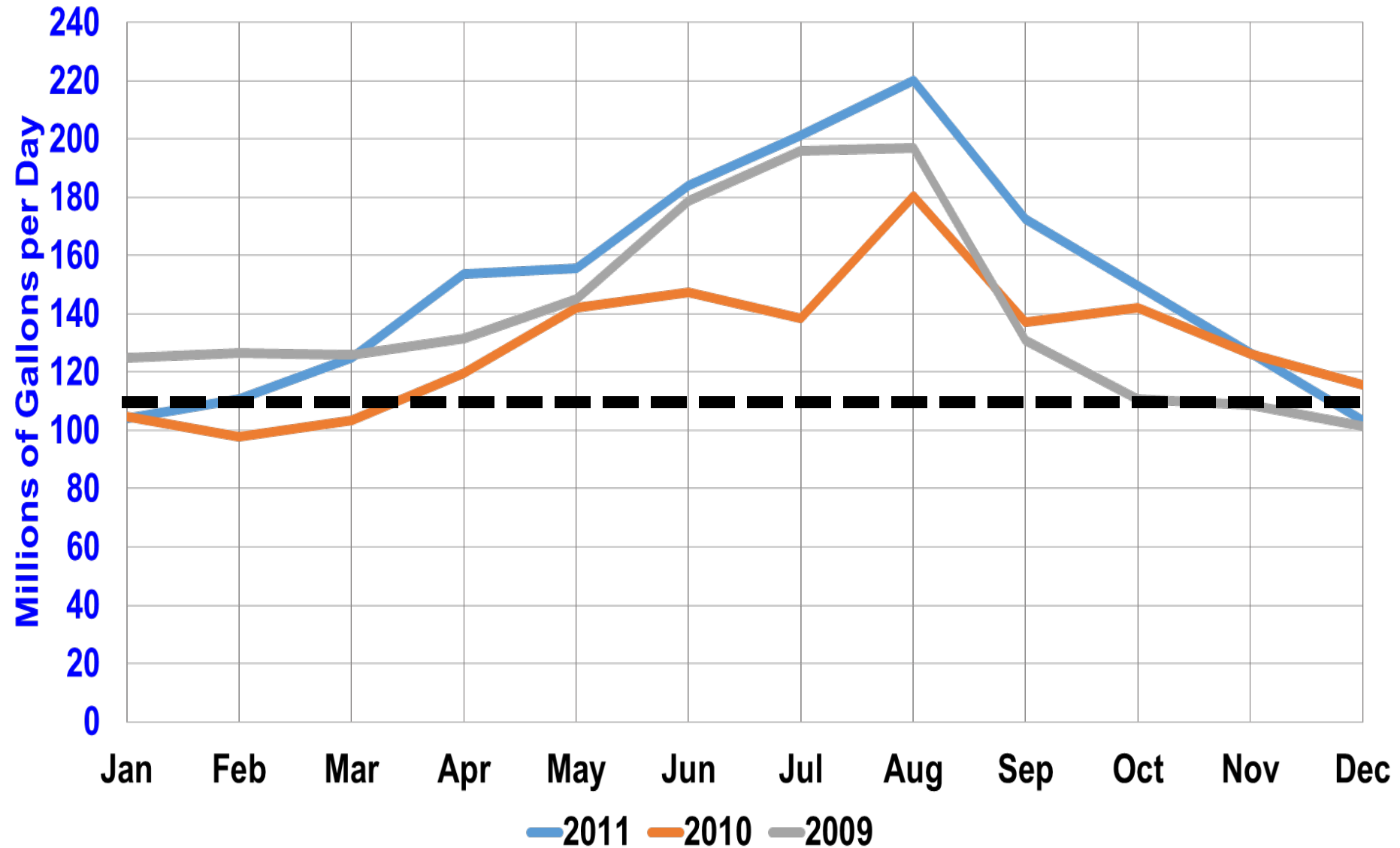
A Texas Example

Texas Water Use - 2010

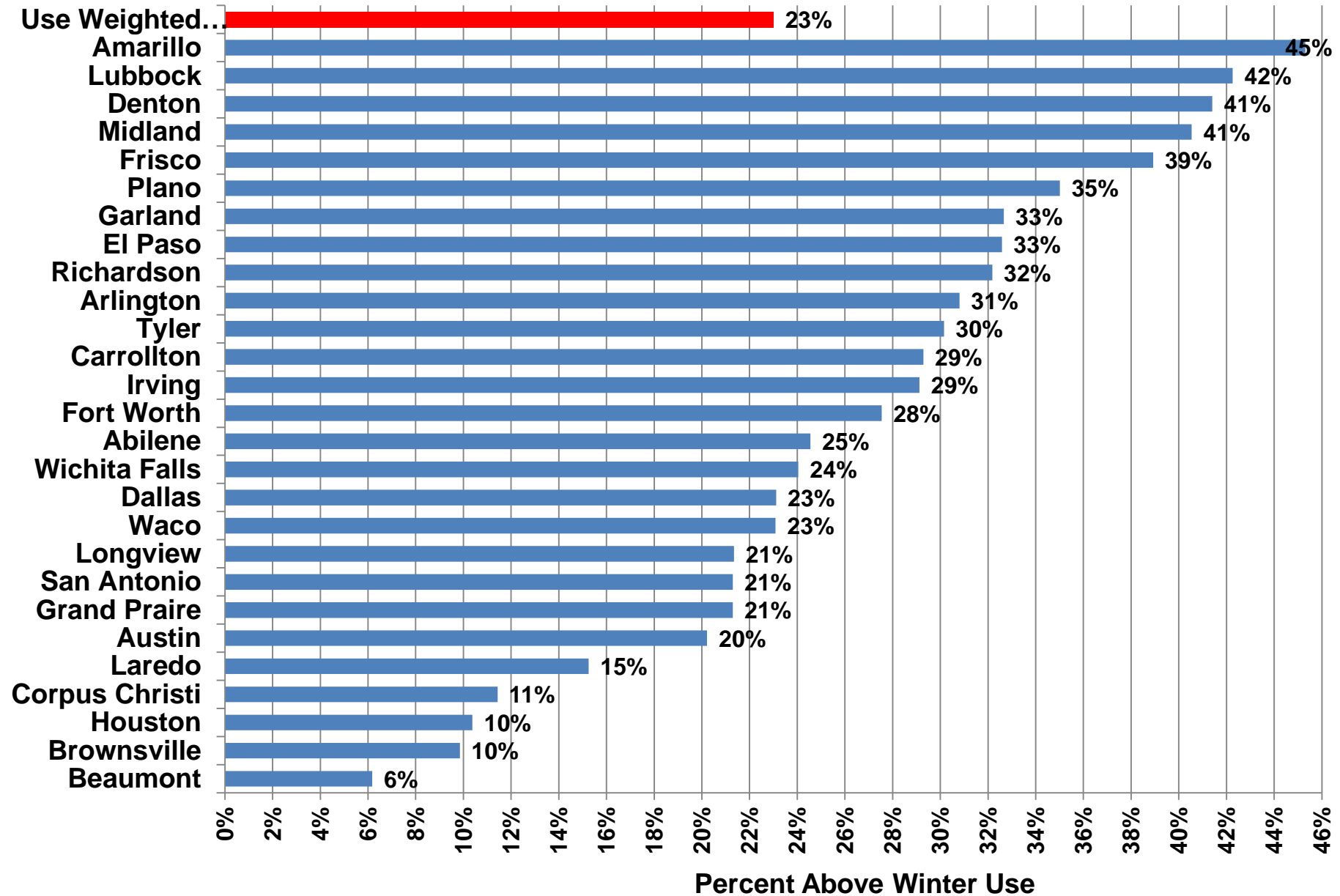
18.1 million Ac-Ft per Year



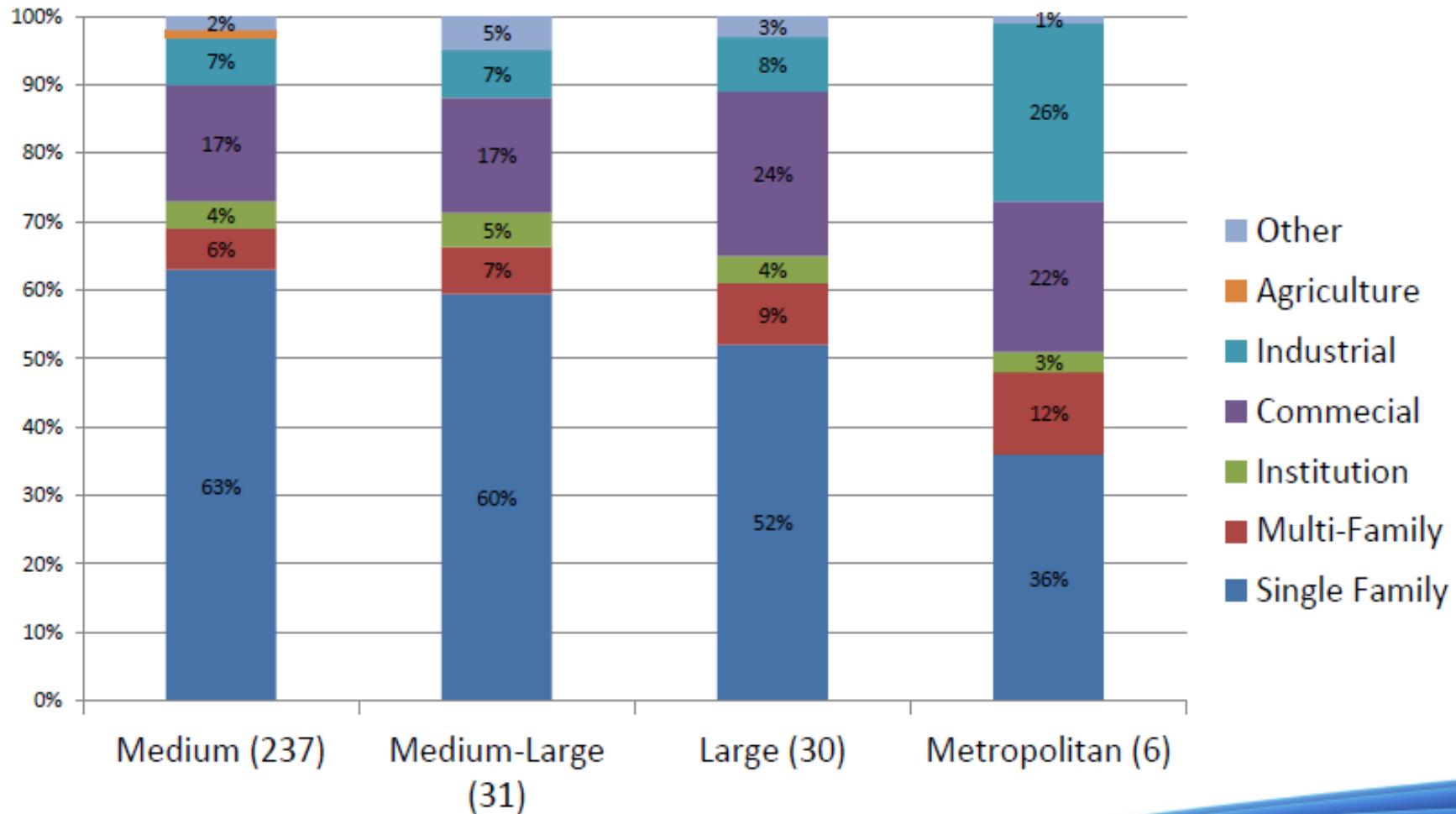
Austin Monthly Use



Volume Percent of Municipal Use that is Above Winter (Jan, Feb, Dec) Use – 10 year average

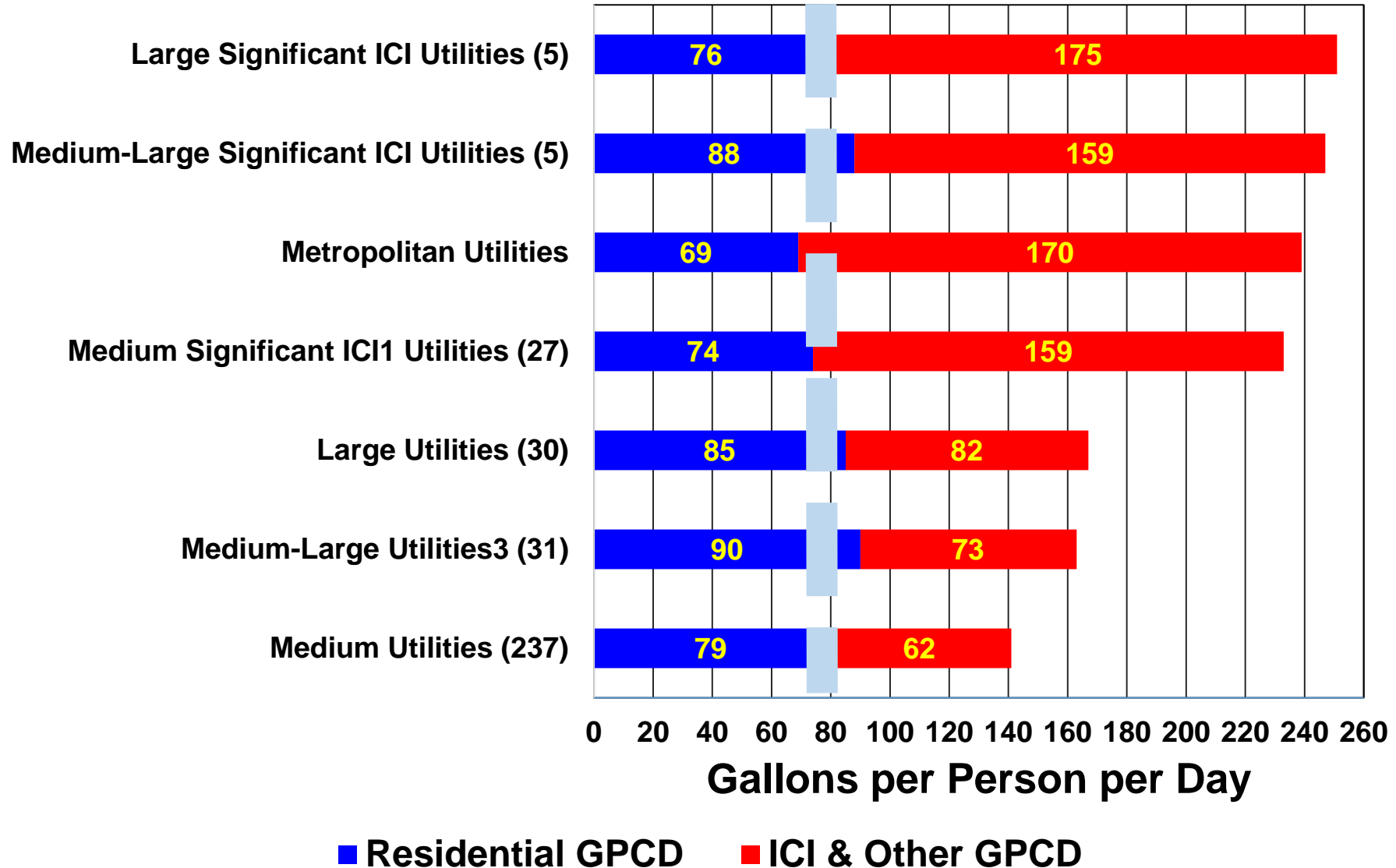


DRAFT Utility Water Percentages By Utility Size



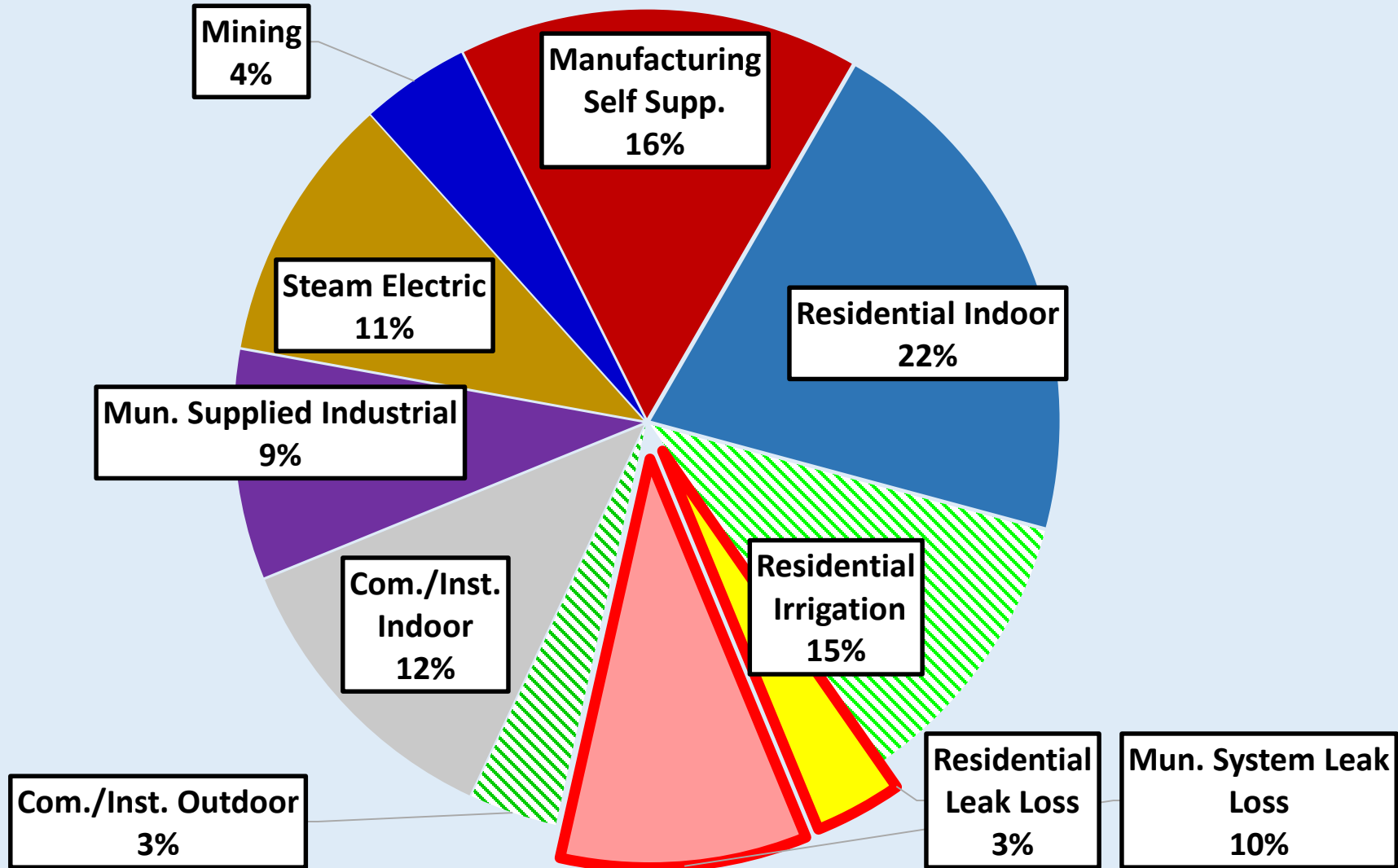
Water Use of Texas Utilities

TWDB 2015 - SB 181 Report



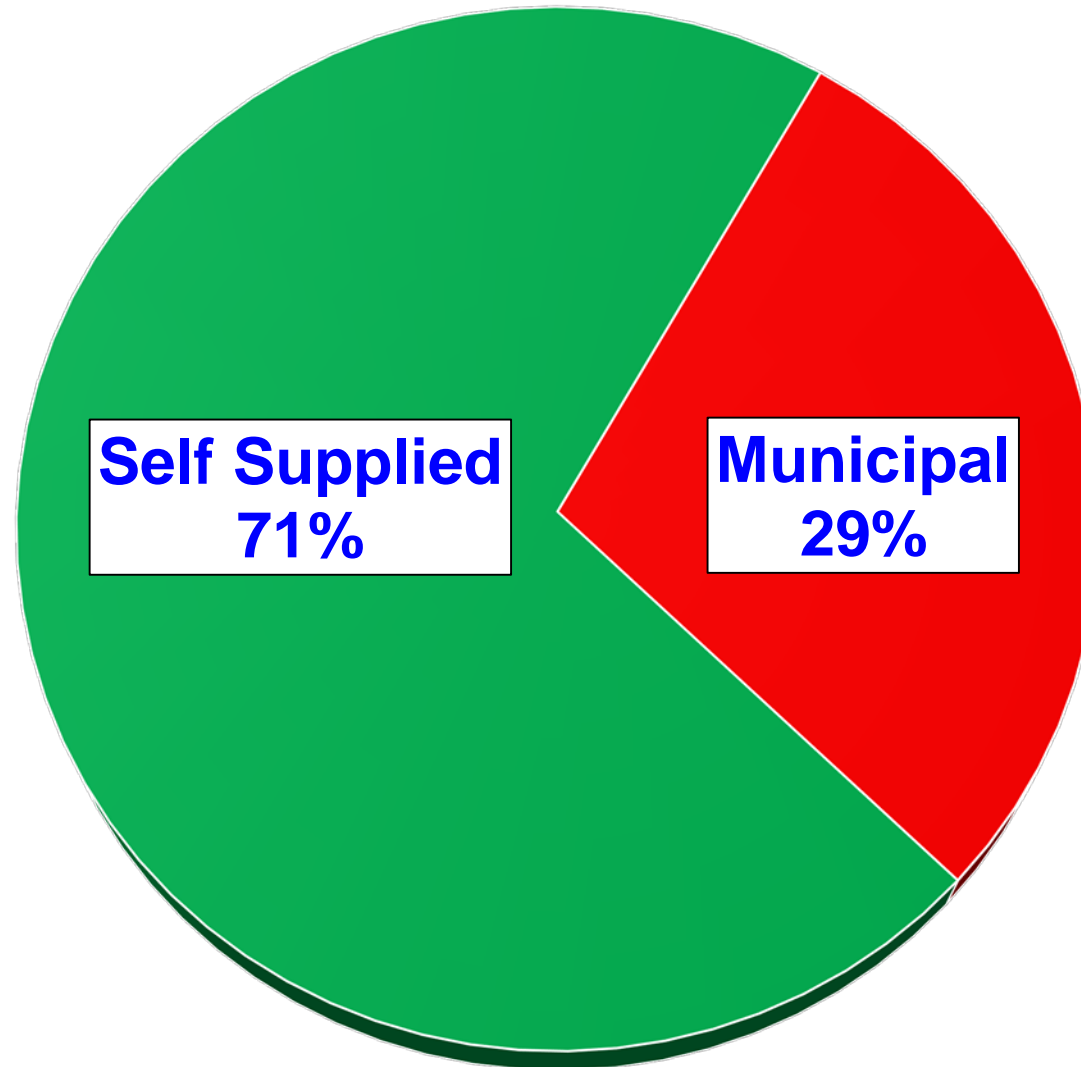
Non-Agricultural Water Use in Texas

ICI = 55%



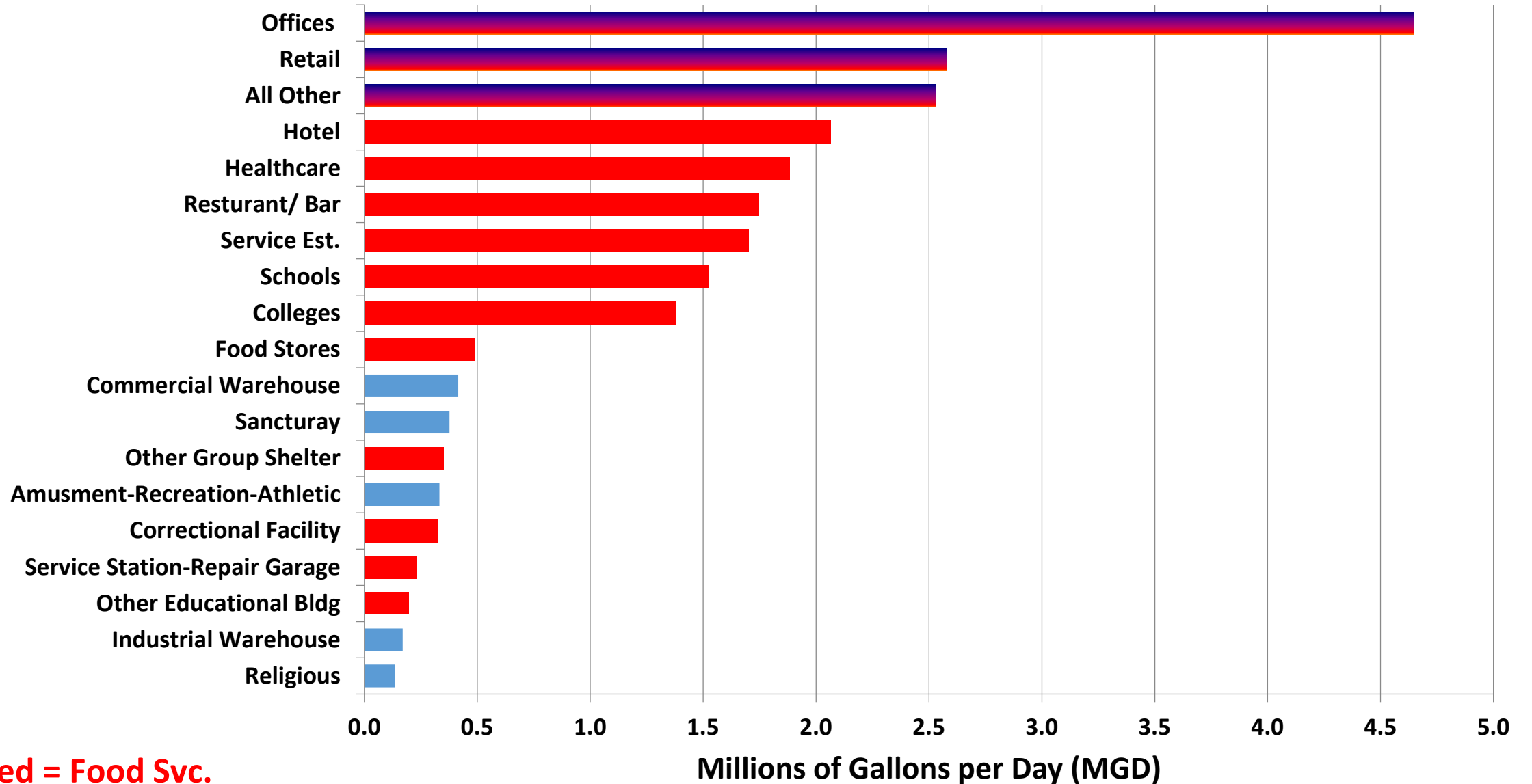
Fresh Water Sources for Industry in Texas

1.84 Million Acre Feet a Year



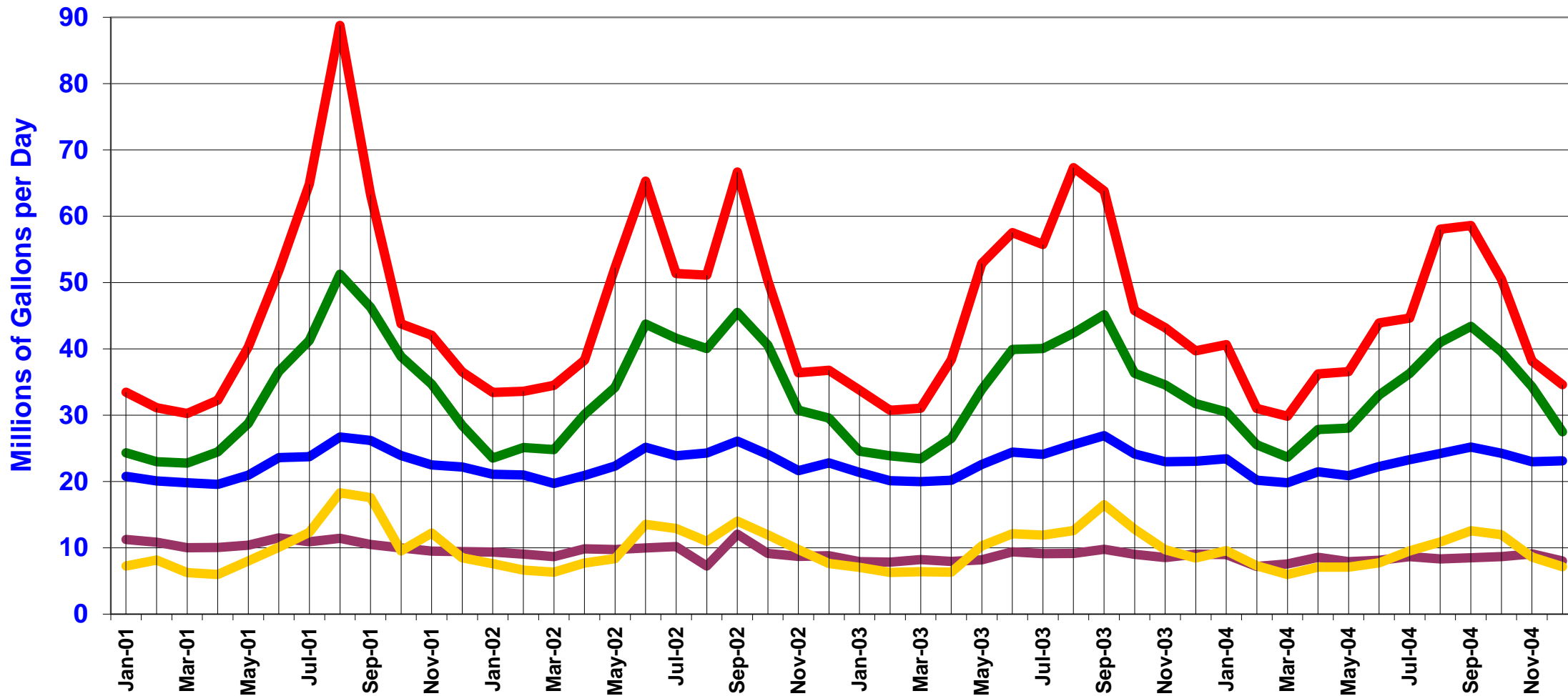
Water Use by Commercial/Institutional Users

Austin, Texas Study



Average Monthly Water Sales by Group

2001 - 2004



Residential

Apartments

Commercial

Industrial

Wholesale

Benchmarking ICI water use

Summary of Six United States Studies Reporting Water Use by Gallons per Square Foot of Heated Space per Year

Type of Facility	EPA Portfolio Manager ¹	University of Florida ²	Santa Fe, New Mexico ³	Colorado Water Wise - Brendle Group. ⁴	AWWA End Use Study 2000 ⁵	Austin 2013 ⁶
	Gallons per Square Foot of Heated Space per Year					
Restaurants		221		173 to 211	130 to 330	215
Senior Care Facilities	61	106		62 to 101		
Hotels	54	85		79 to 165	60 to 115	72
Hospitals	52	31				58
Grocery/Supermarkets	24	95	36		52 to 64	
Medical Offices	19	34	49			
Offices	13	20	26		9 to 15	19
Banking/Financial	12	89				
Court House	11					
K-12 Schools	10	20		12 to 19	8 to 16	
Houses of Worship	7	15				
Retail/Shopping Centers	5	32	20			
Unrefrigerated Warehouses	3	8				

Summary of Hospital Water Use Coefficients from Various Studies

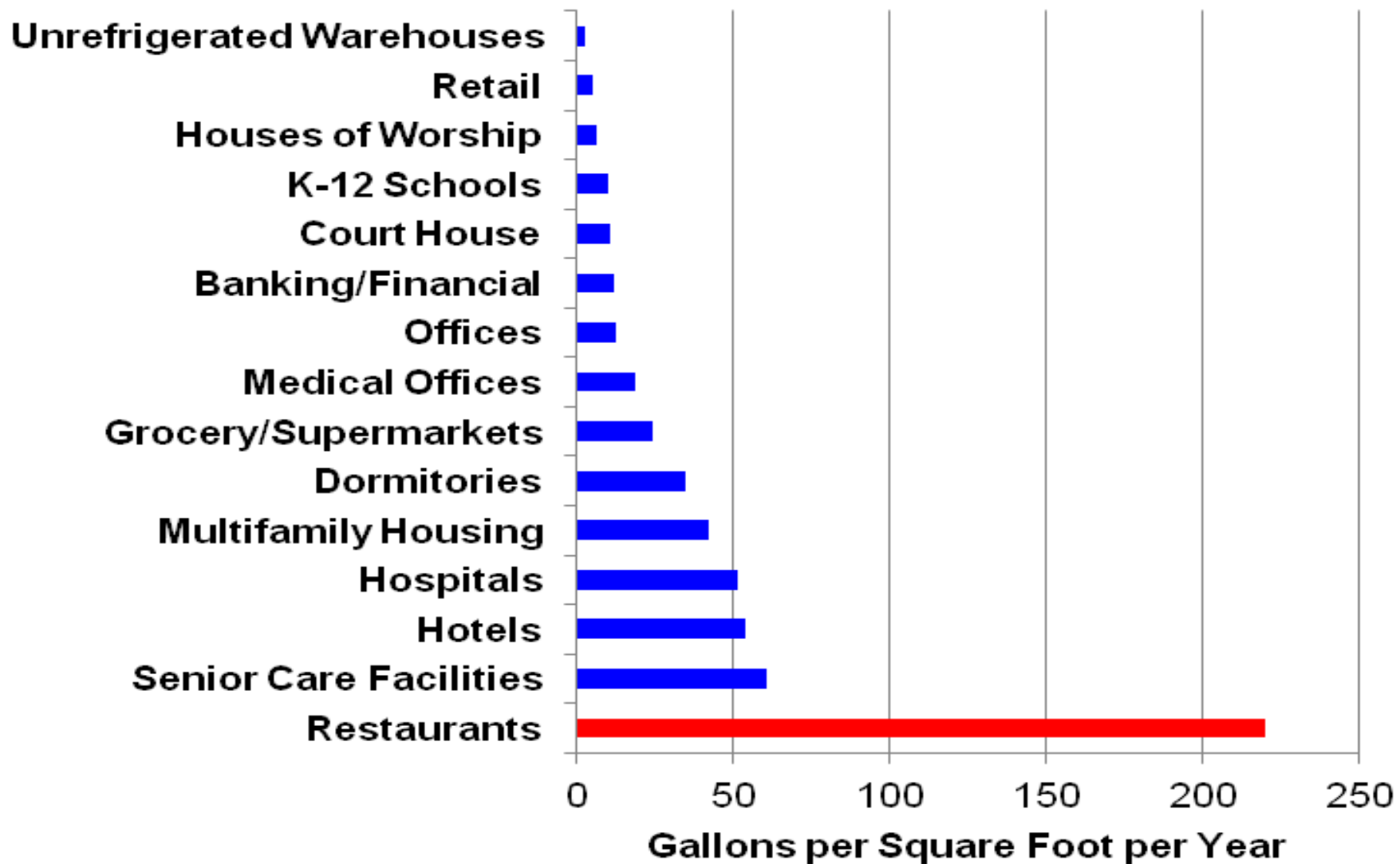
Study	Gal/Bed/Day	Gal/Sq. Ft/Yr.	
		Average	Best
Federal Facilities Average		125	
Univ. of Florida Study		31	
United Kingdom -Large Teaching		41	34
UK Small Acute or Long Stay		29	22
UK Small Acute or Long Stay With Laundry		39	31
North Carolina Rule of Thumb	300		
ASHE 2002 Study	471		
Energy Star Portfolio Mgr.	315		
Victoria Public Health Service - Australia		39	17
Health Estate Journal - United Kingdom		87	
US Energy Information Adm. 2007 study	395	68	
City of Austin (9 largest medical Facilities)	335	58	18

Summary of Restaurant Water Use Coefficients from Various Studies

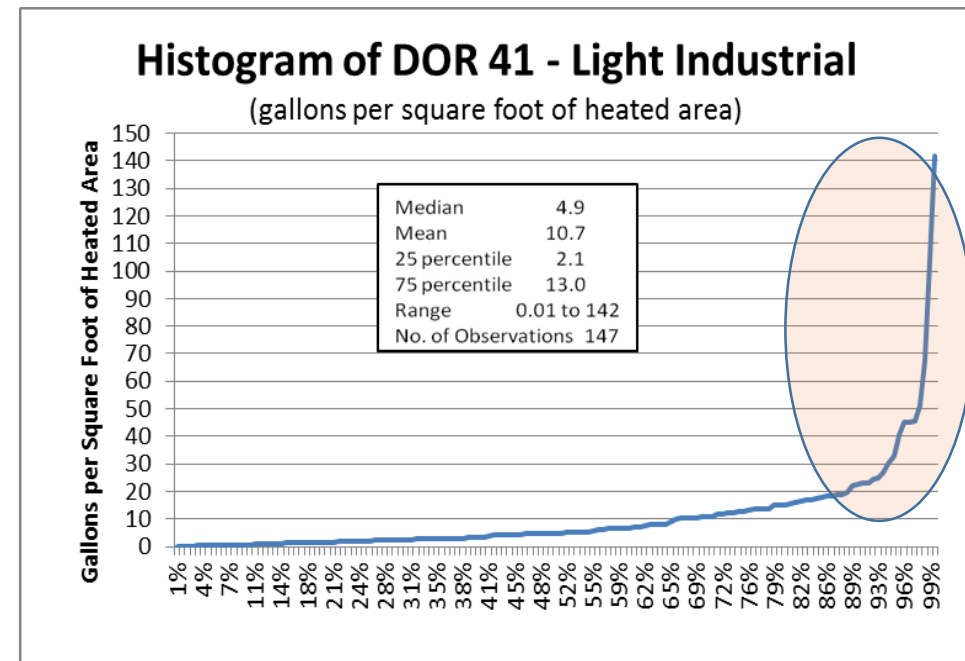
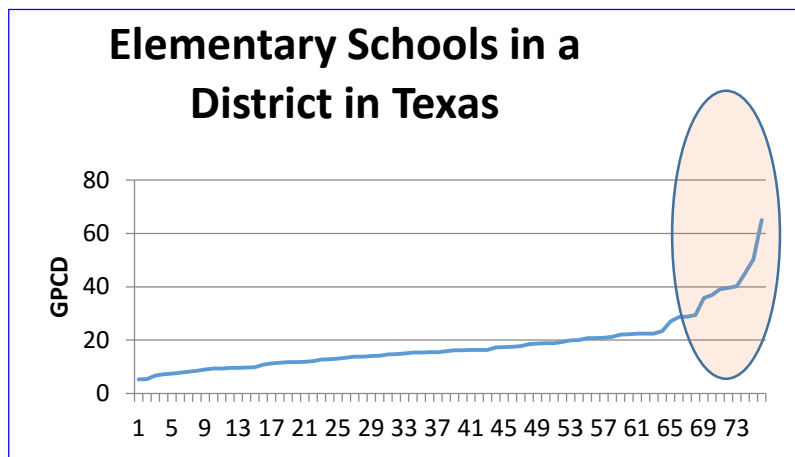
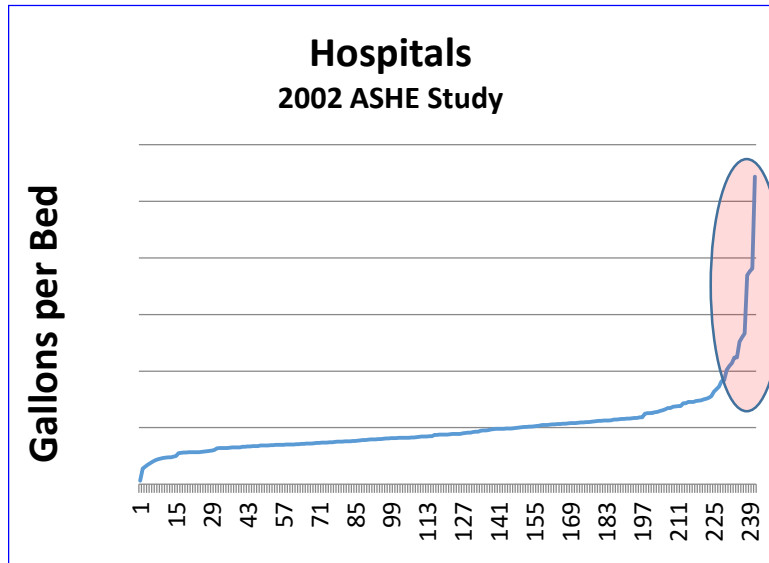
Source of Information	Best Gal./Meal	Avg. Gal./Meal	Gal./ sq. ft./ Year	Best Gal./ Seat/ Day	Avg. Gal./ Seat/ Day
Florida (Univ. of Fl.) Restaurant			270		
Florida (Univ. of Fl.) Fast Food			240		
Colorado Study (Brendle Group)			192	29	53
USA (2000 AWWARF)	9 to 12		130 to 331	20 to 30	
Bolder Colorado			125		49
Danamark.com (Canada)	8 to 9				
U of Kansas (M. Vanschenkhof)		12.8	266		
South Australia study and Sydney Water		9 to 12			
North Carolina					20 to 40
Austin Study (Full Svc.)			173		31
Austin Study (Fast Food)			257		39
Phoenix (Full Svc. 2012)			195		
Phoenix (Fast Food, 2012)			230		

Water Use Intensity

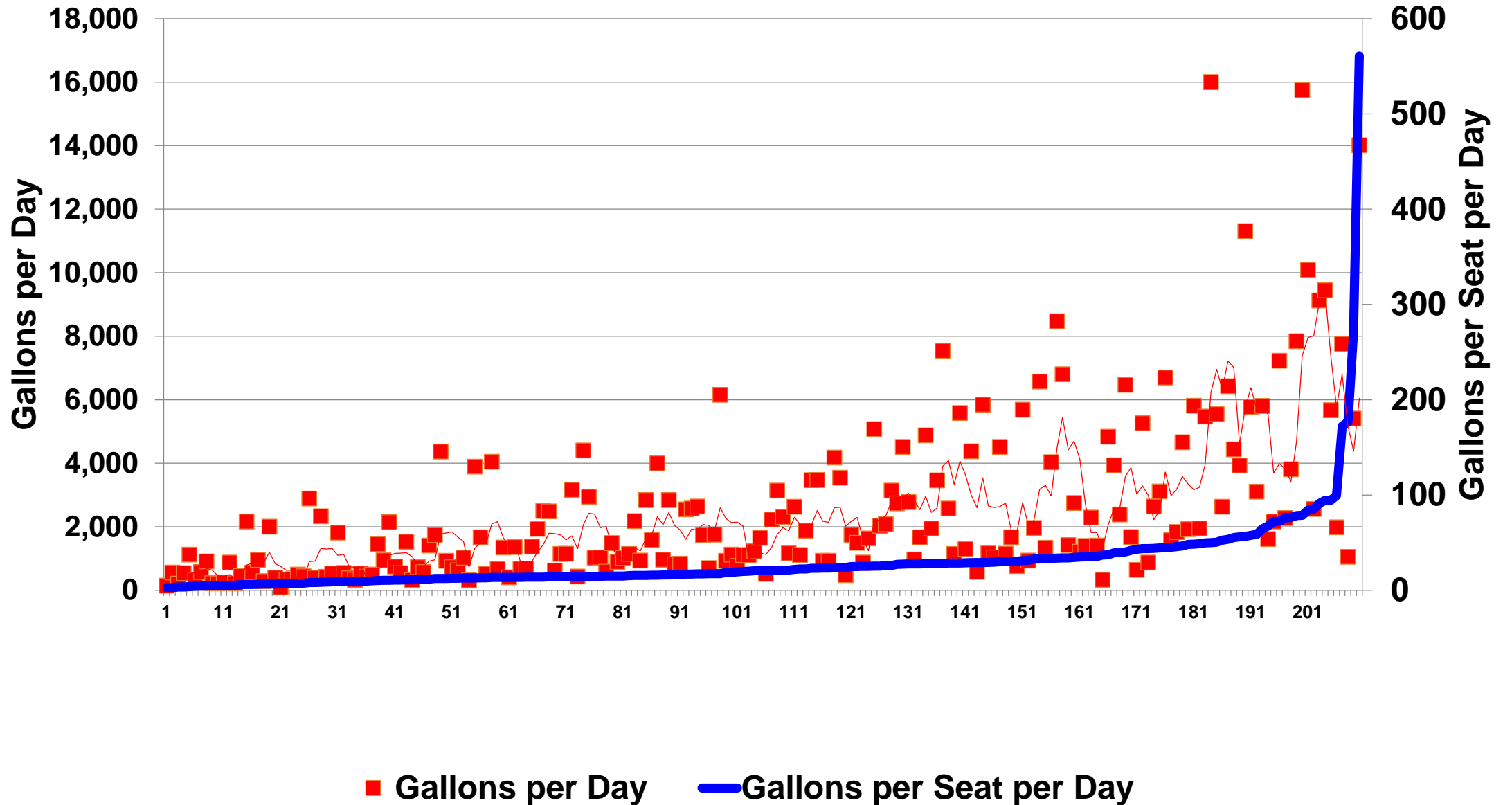
Blue - EPA EnergyStar® Data Trends, Red - Average of Eight Studies



Do You see a Pattern Here?

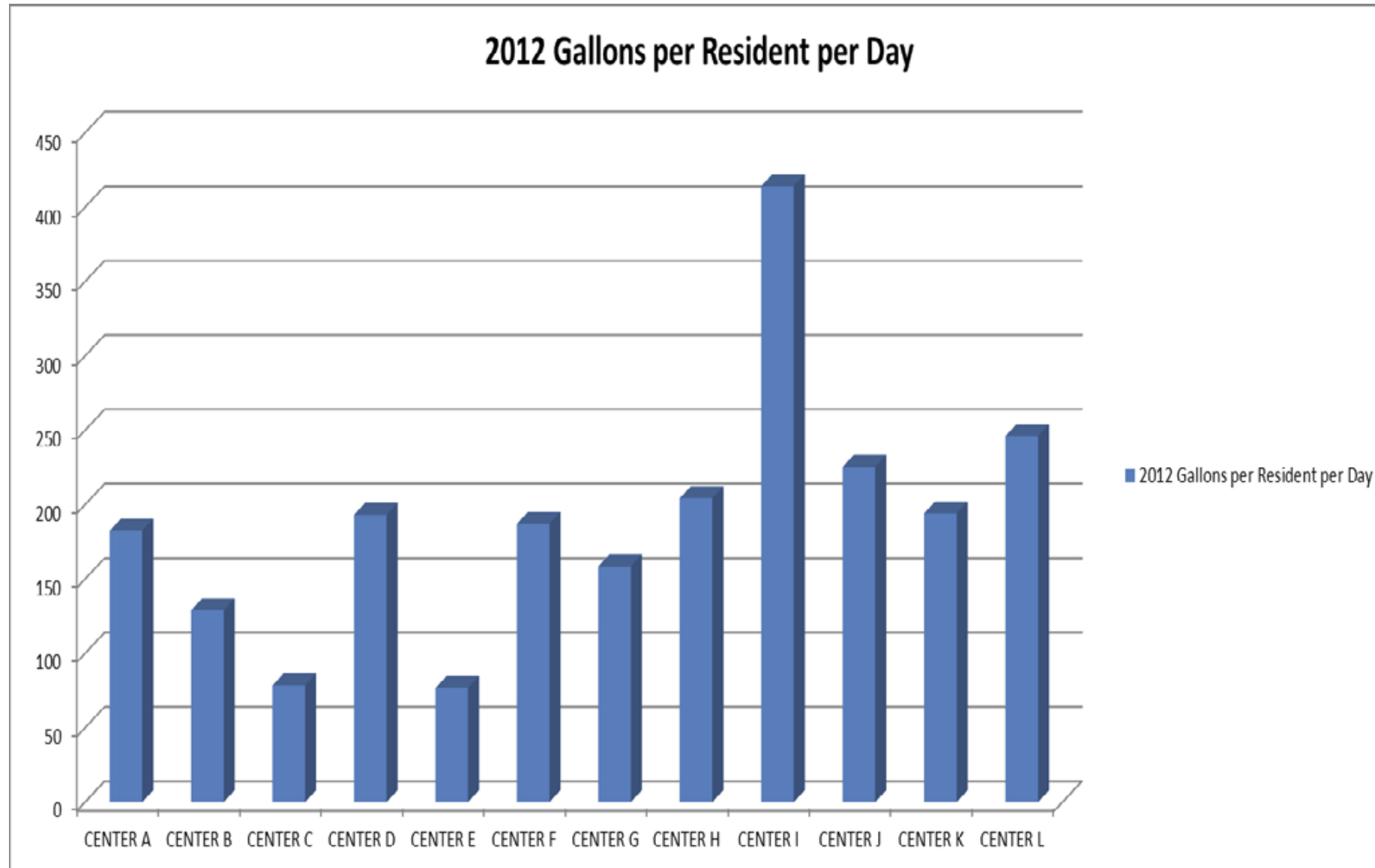


Analysis of 211 Austin Full Service Restaurants

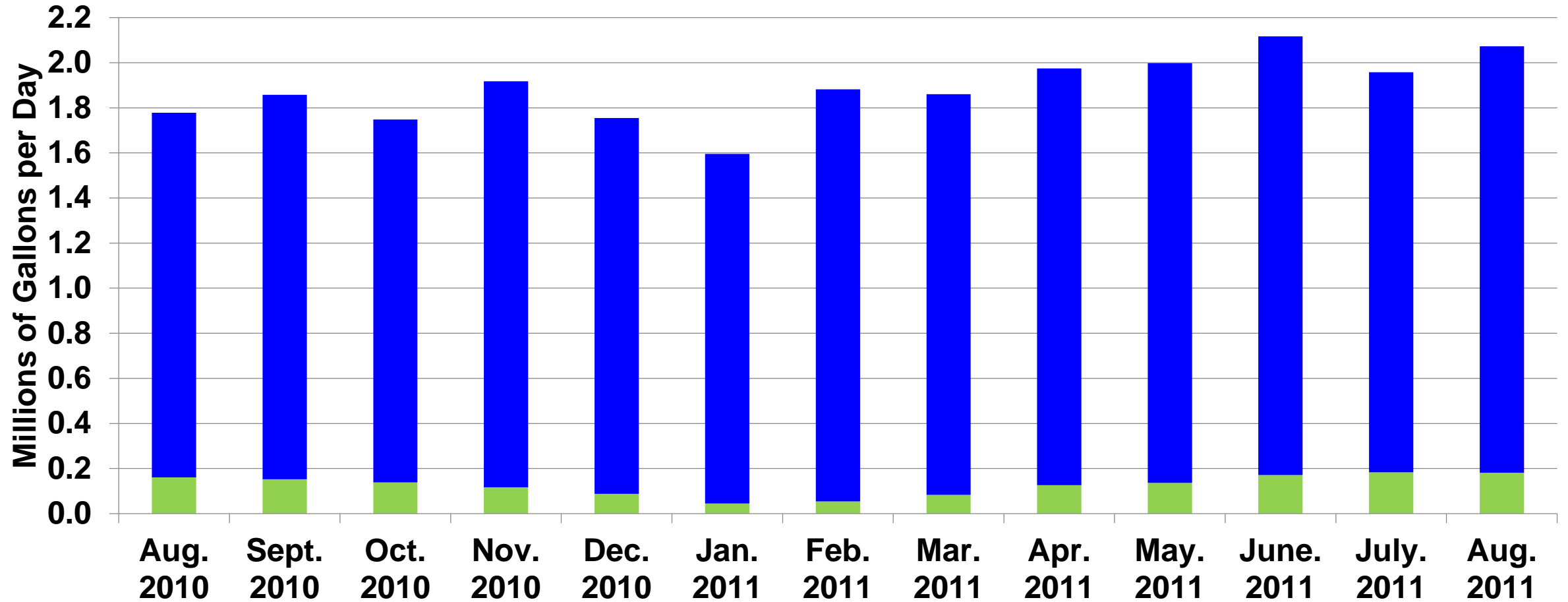


Senior Living Facilities in Phoenix

From a special study – Phoenix Medical Facilities 2014

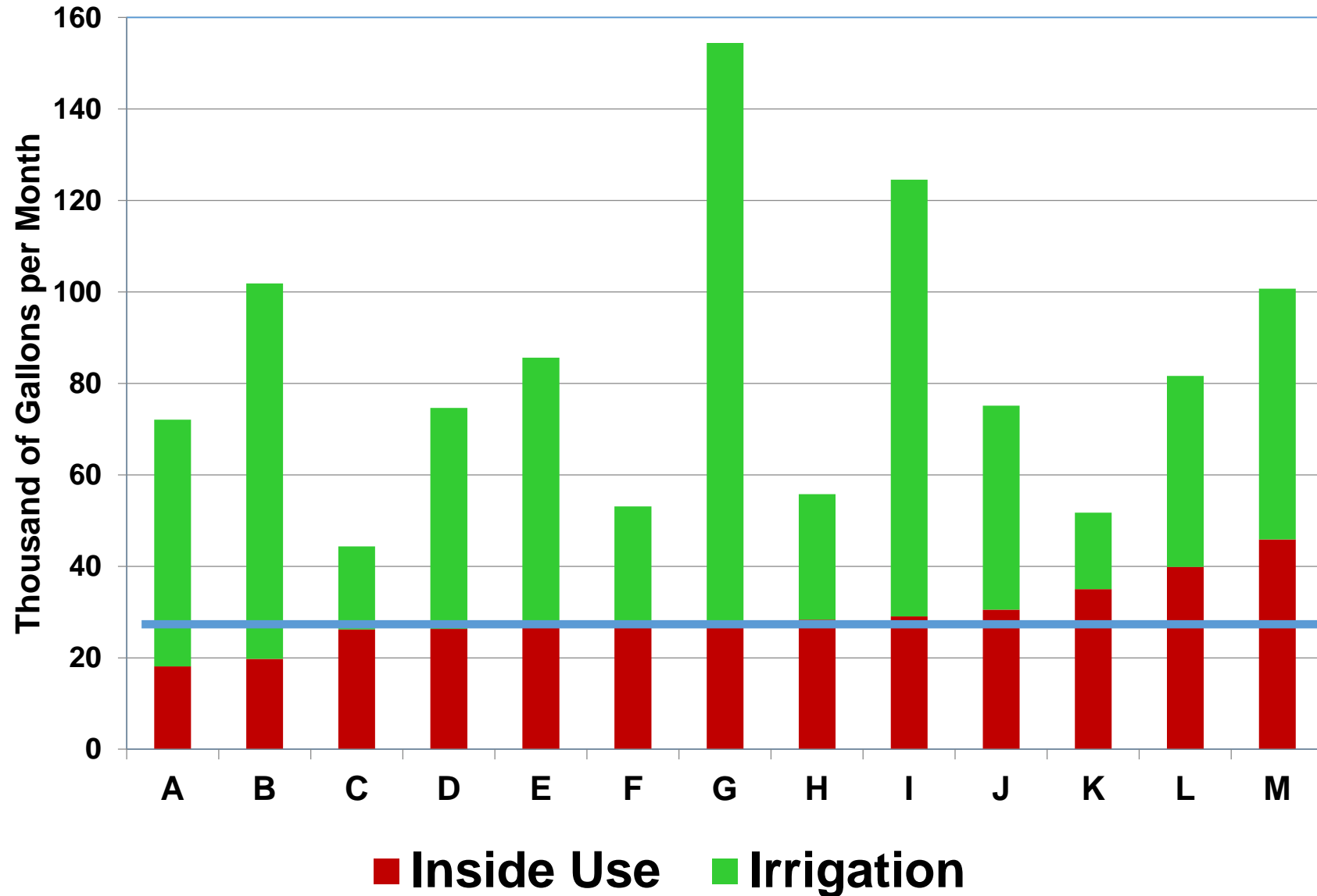


Restaurant Total Water Use in Austin, Texas from August 2010 through August 2011

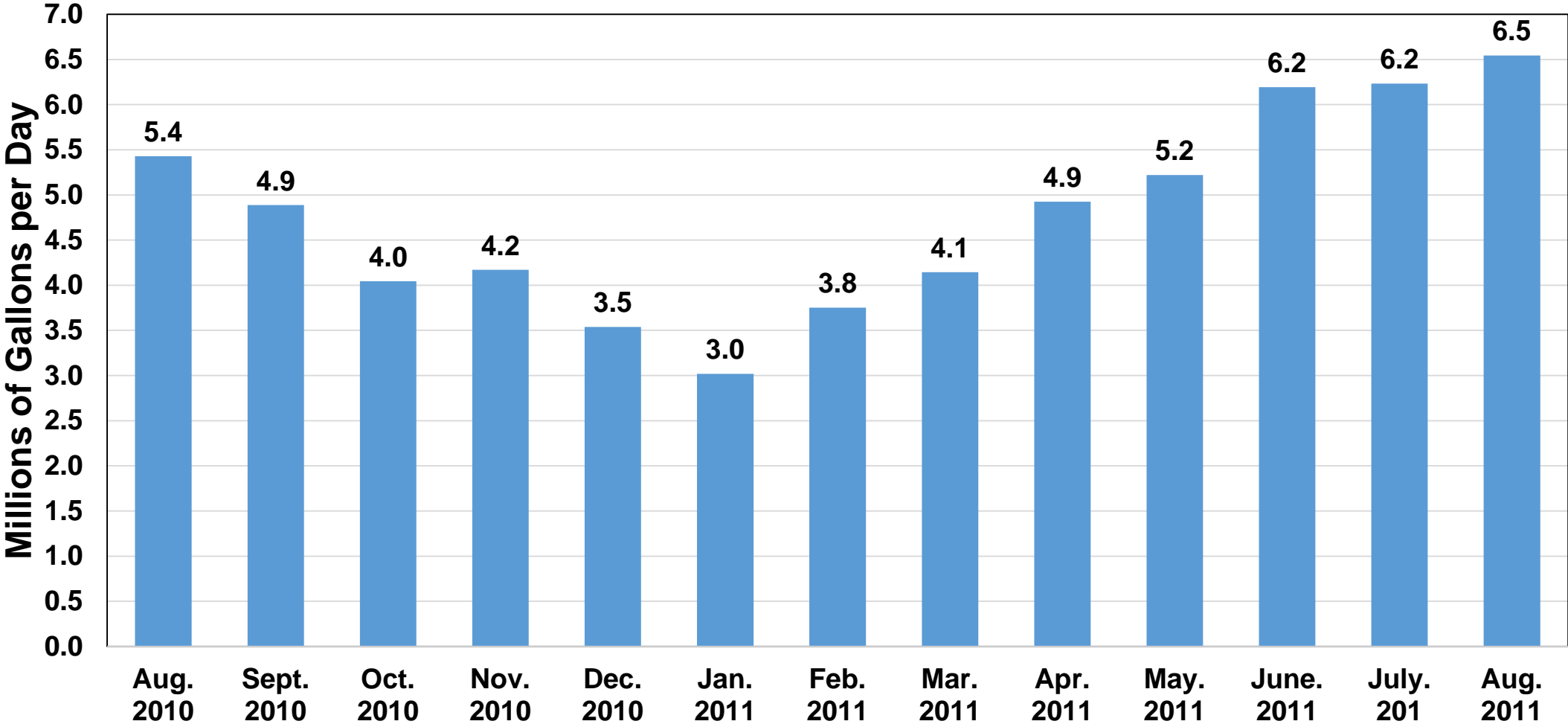


■ Separate Irrigation Use ■ Restaurant Use

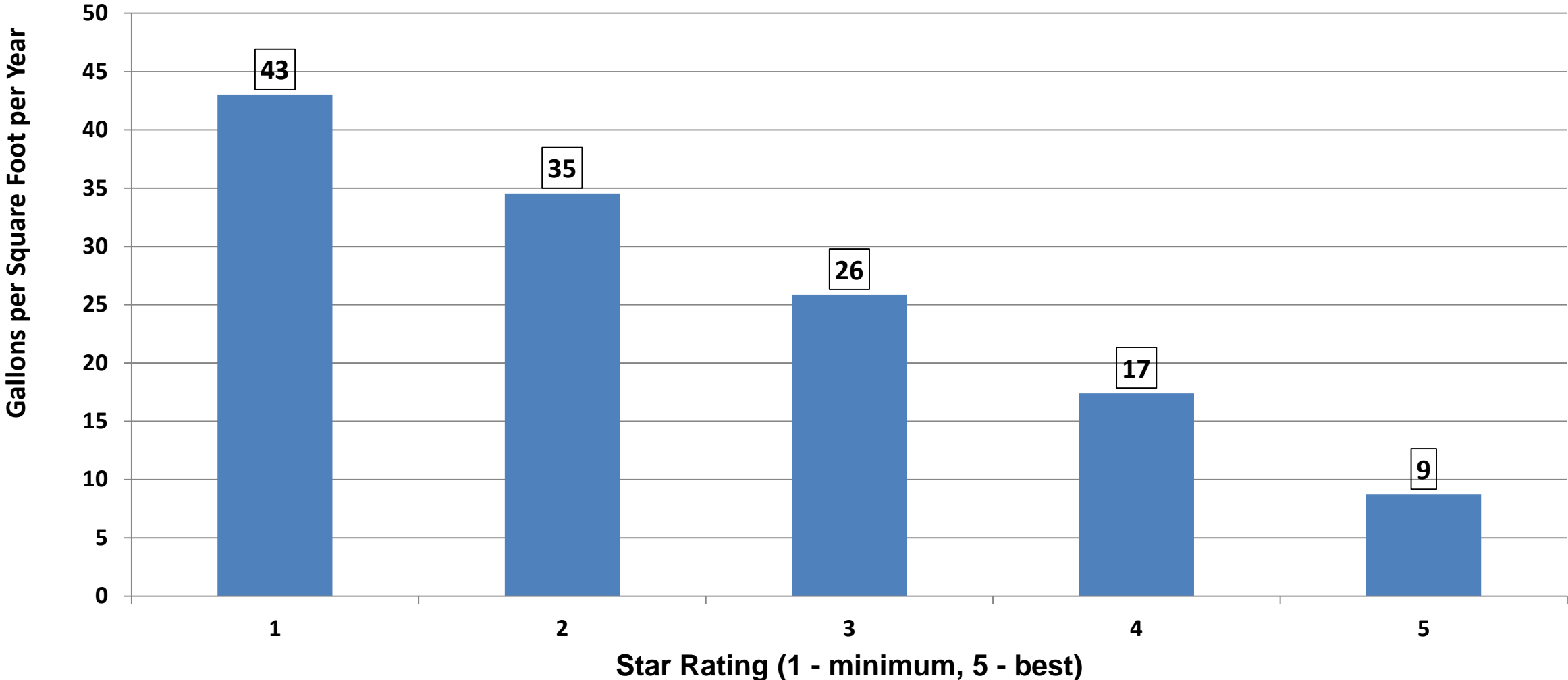
Example of Water Use 13 Almost Identical Fast Food Restaurants in the Same Chain



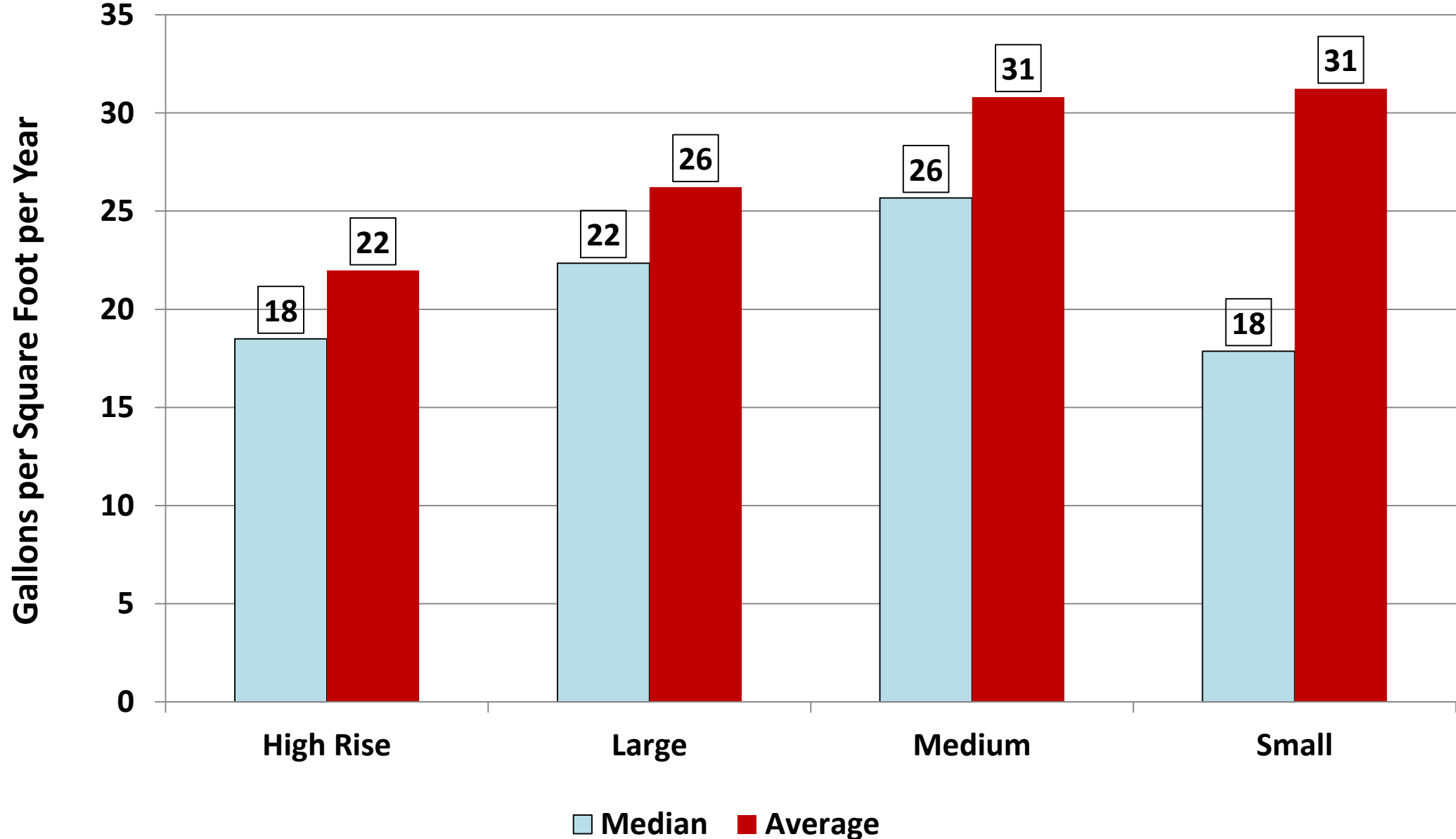
Office Water Use in Austin from August 2010 through August 2011



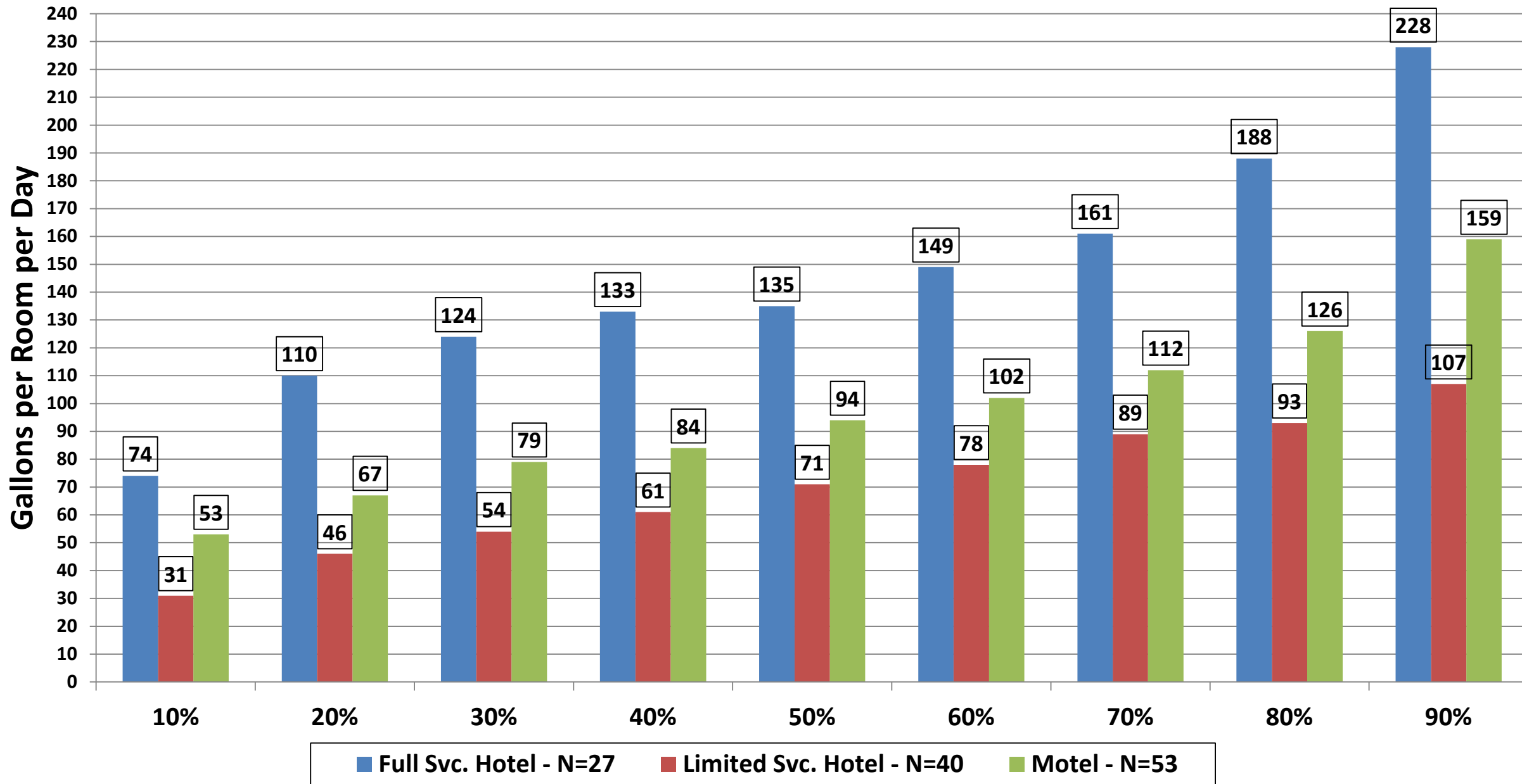
The National Australian Built Environmental Ratings Scheme (NABERS) for Offices



Water Use Benchmarks for Office Buildings in Austin Texas – FY 2011

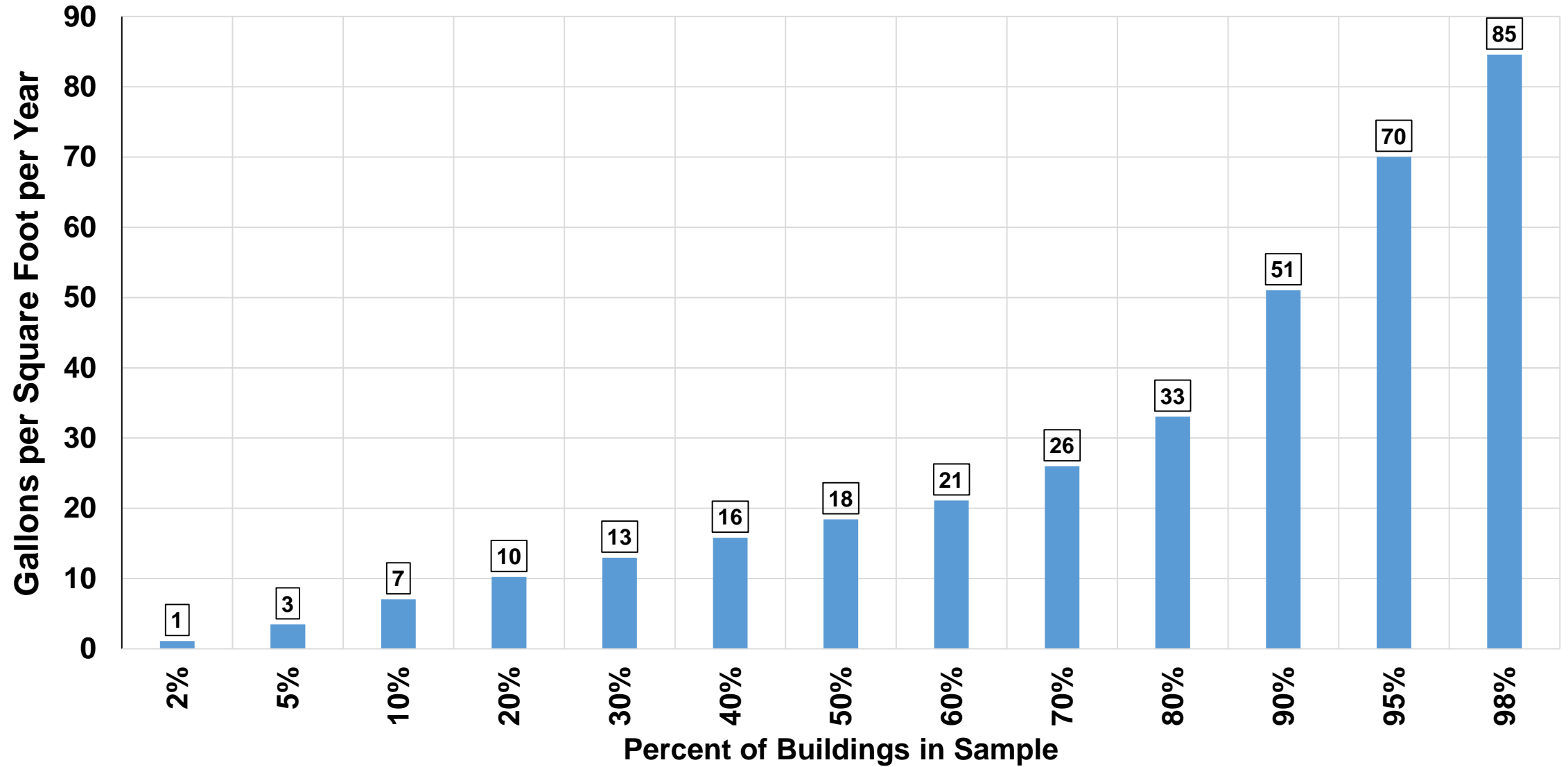


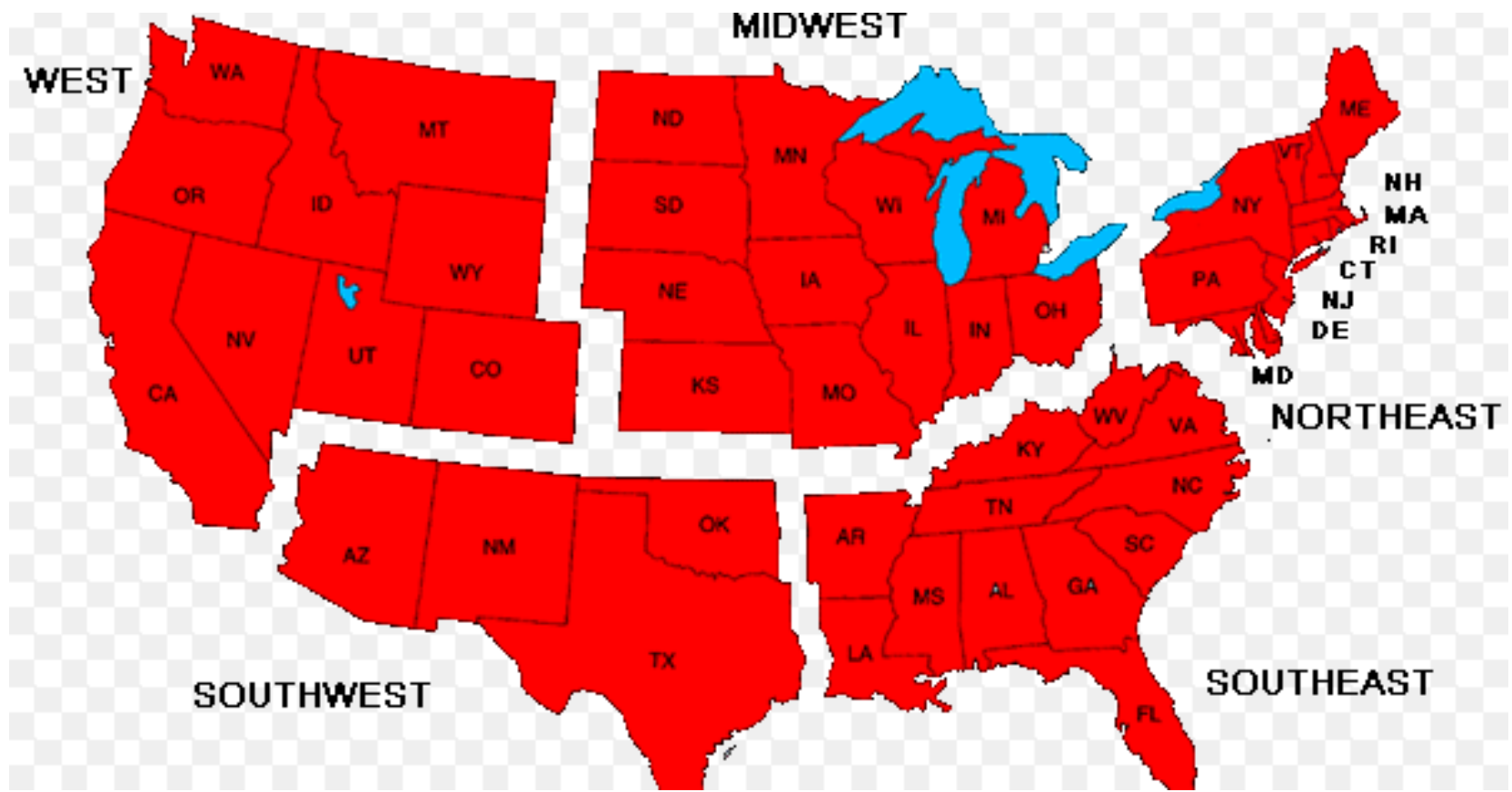
Analysis of Gallons per Room per Day for Hotels in Austin, Texas FY 2011



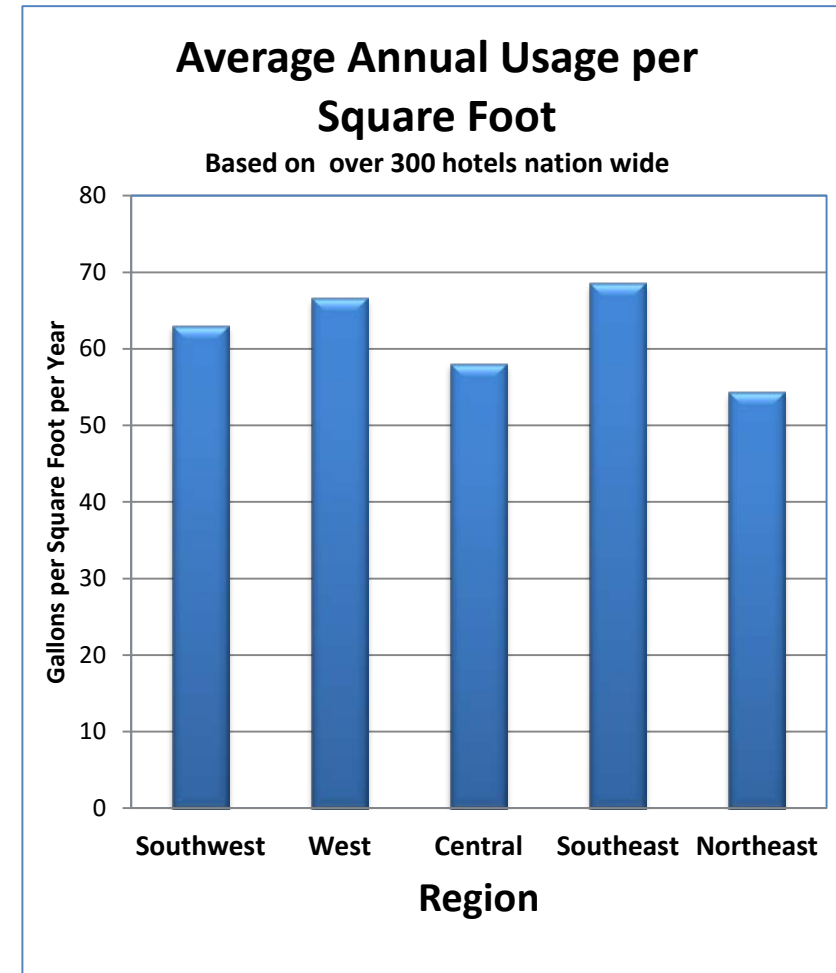
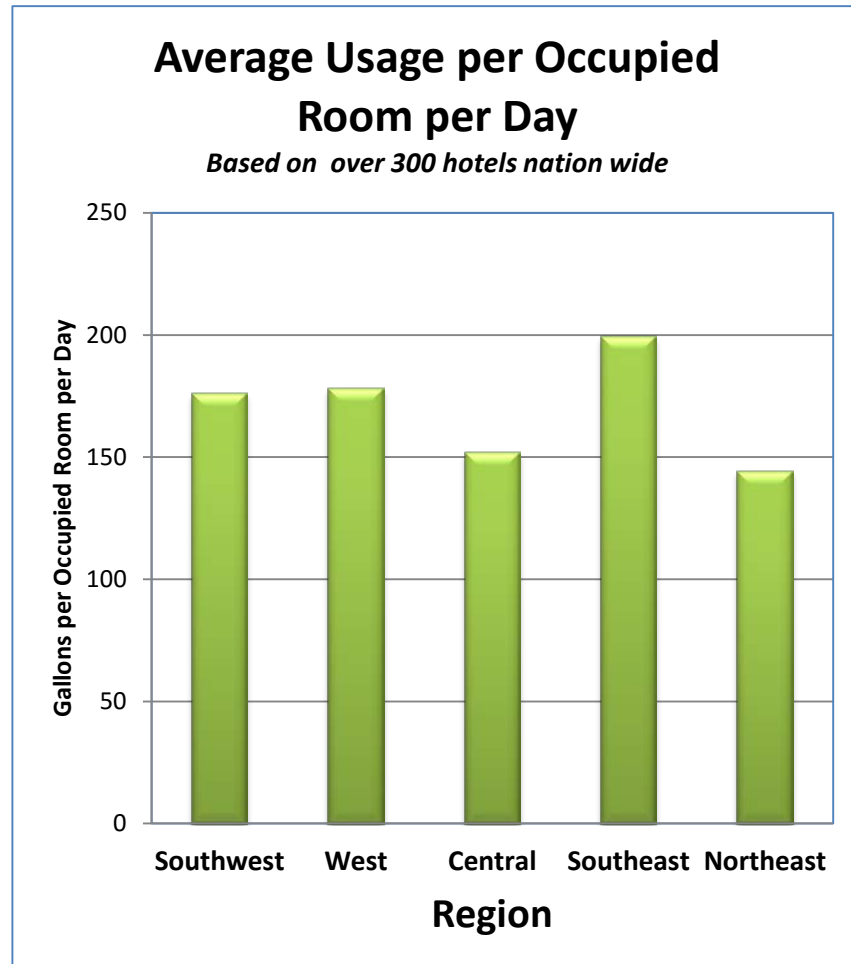
New York City Office Building Use - 2013

538 Buildings in Sample

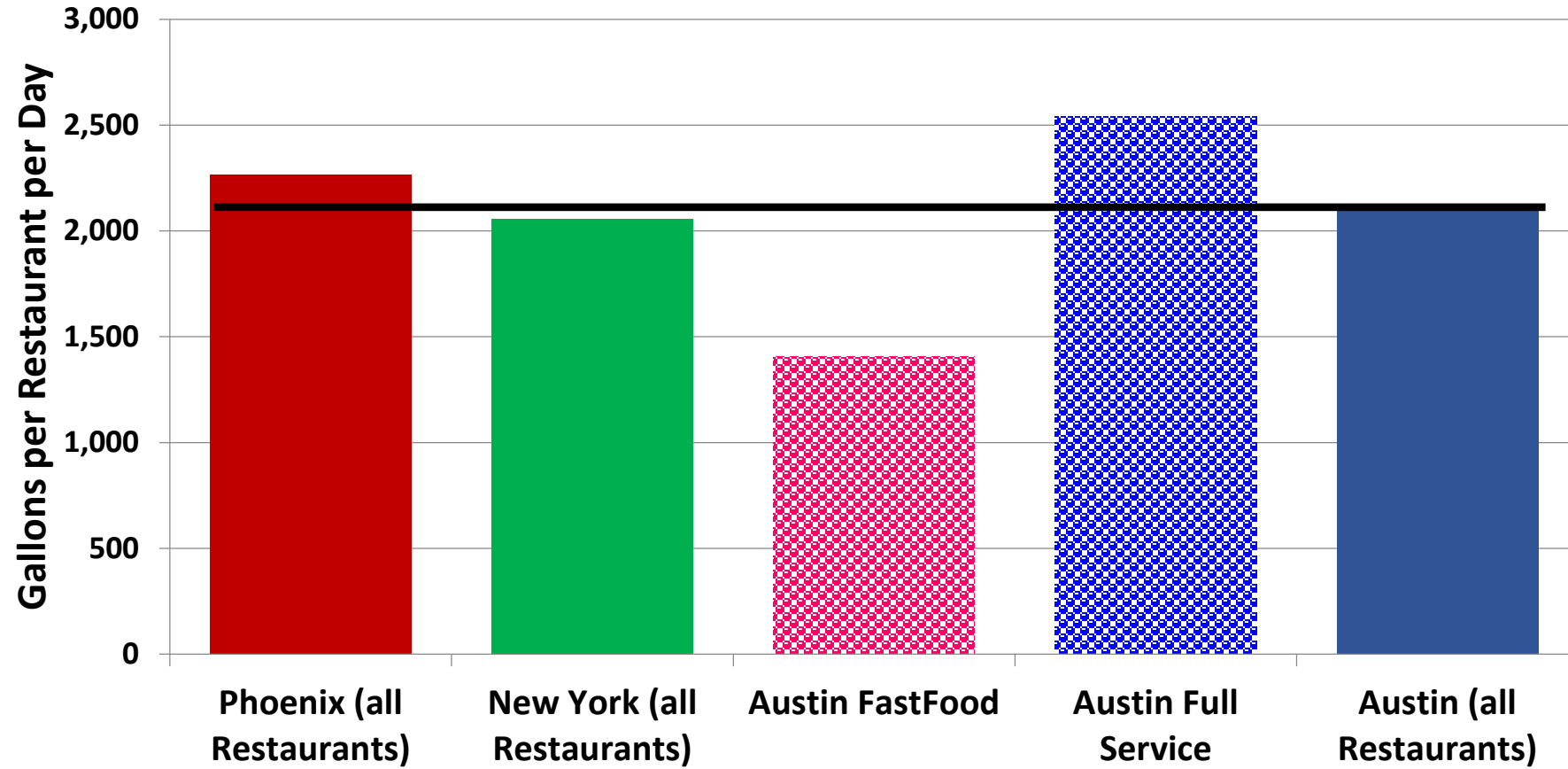




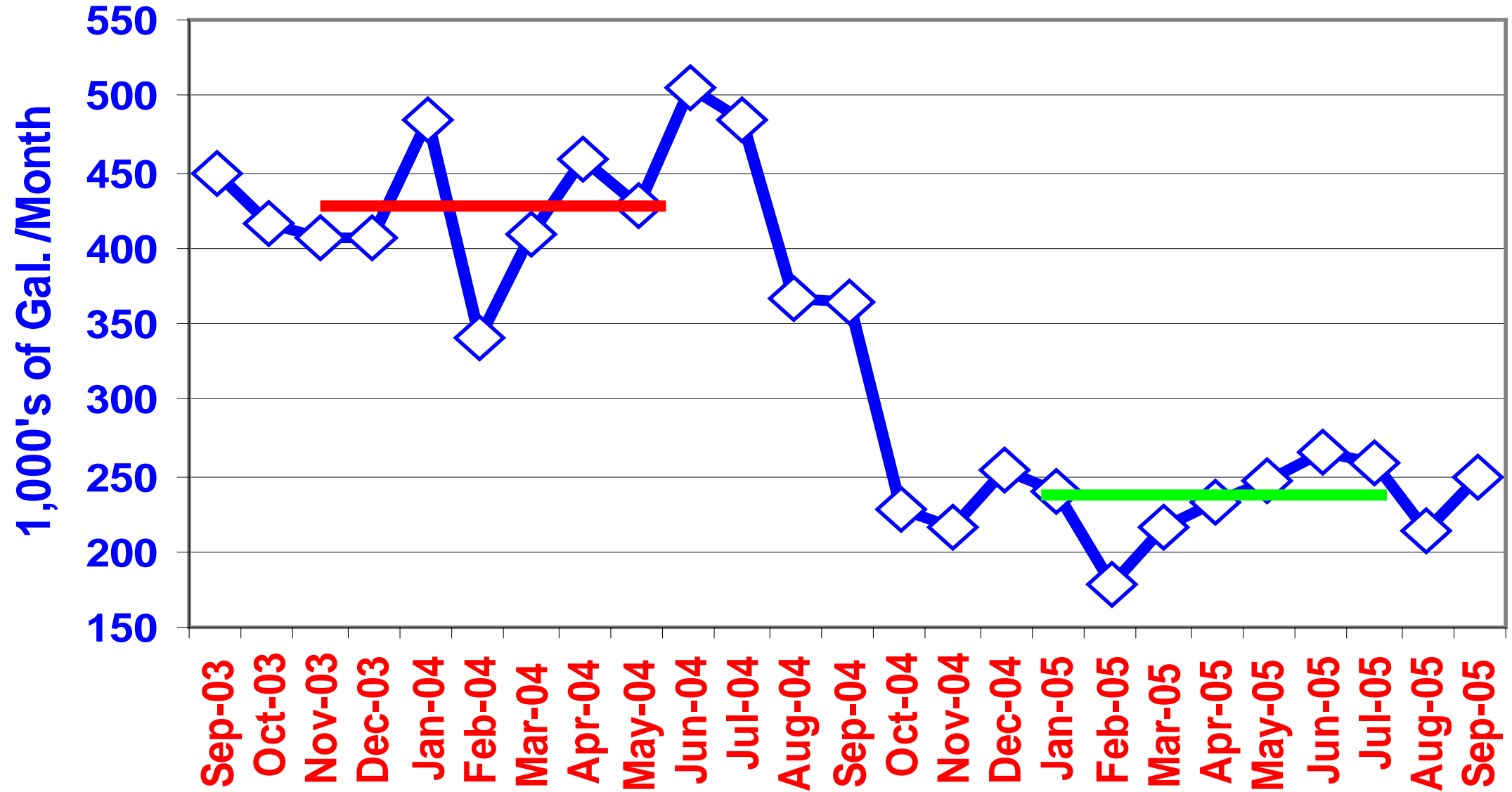
Regional Comparisons



Average Daily Water Use for Restaurants in Different Cities

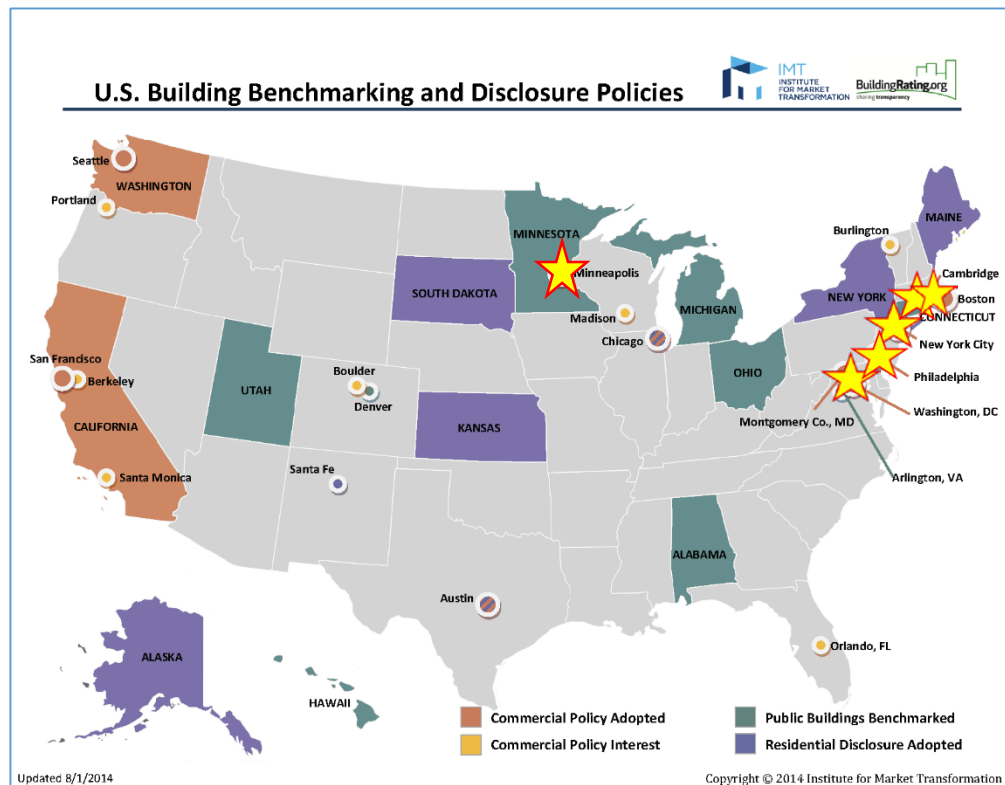


A Large Chinese Buffet Restaurant



Benchmarking Energy and Water Use In Commercial Buildings

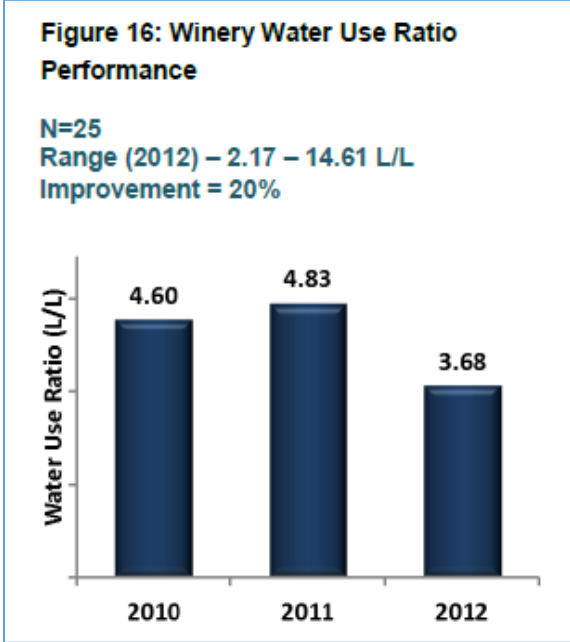
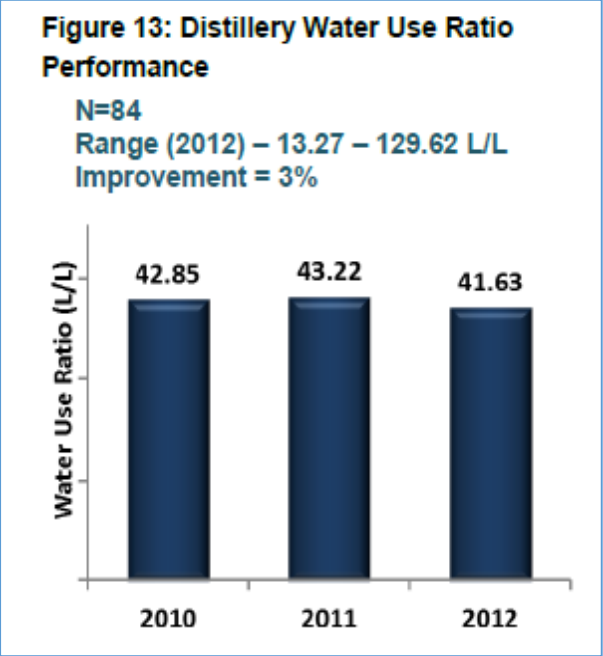
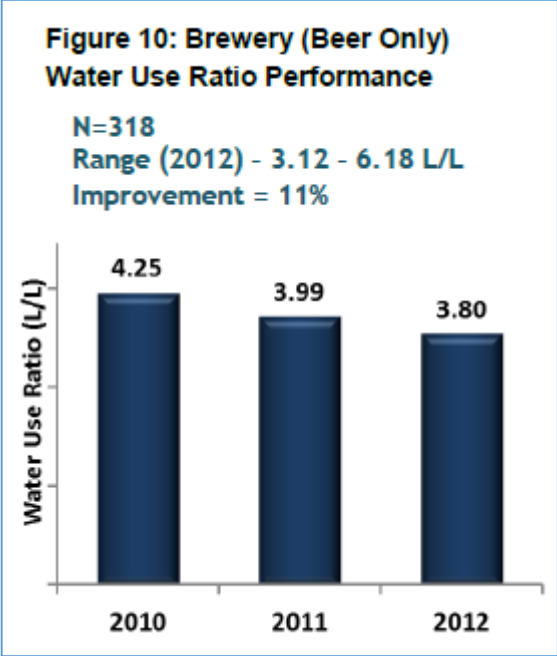
★ The Star indicates benchmarking water use.



SB 700 requires that the **Texas** State Energy Conservation Office (SECO) to benchmark energy and **water** use in State Facilities and State supported Institutions of Higher Education.

Beverage Industry Environmental Roundtable

BIER



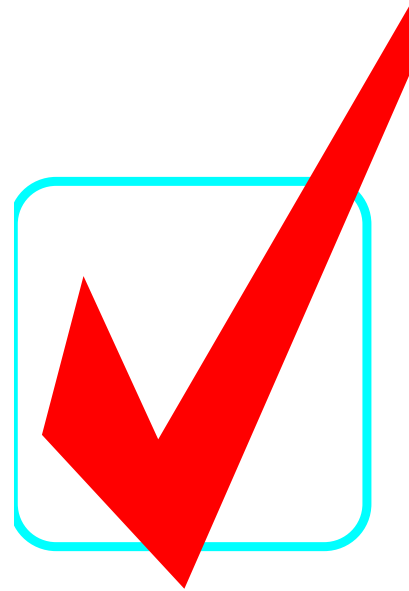
Conclusion

- The numbers can help determine the effectiveness of your program;
- The numbers can help identify area in the ICI community that off great potential;
- The numbers can help identify what areas within a facility offer the greatest potential for savings;
- The numbers can tell how much of the water you sell is used by which sector; and
- The numbers can help identify specific entities that may offer the largest potential.

**But you have to put the
numbers together!**

*Are you ready for this
avalanche of **BIG DATA**, and
are you capable of analyzing
the information?*

The



End

Using Water Use Metrics and Benchmarking to Target ICI Customers



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Presented at WaterSmart Innovations 2015