

ICI Programs in Texas

Bill Hoffman
H.W. (Bill) Hoffman & Associates, LLC
&
Water Management, Inc.

512-280-0199
billhoffmantx@earthlink.net

What is ICI?

Industrial

Commercial

Institutional

Why Look at ICI?

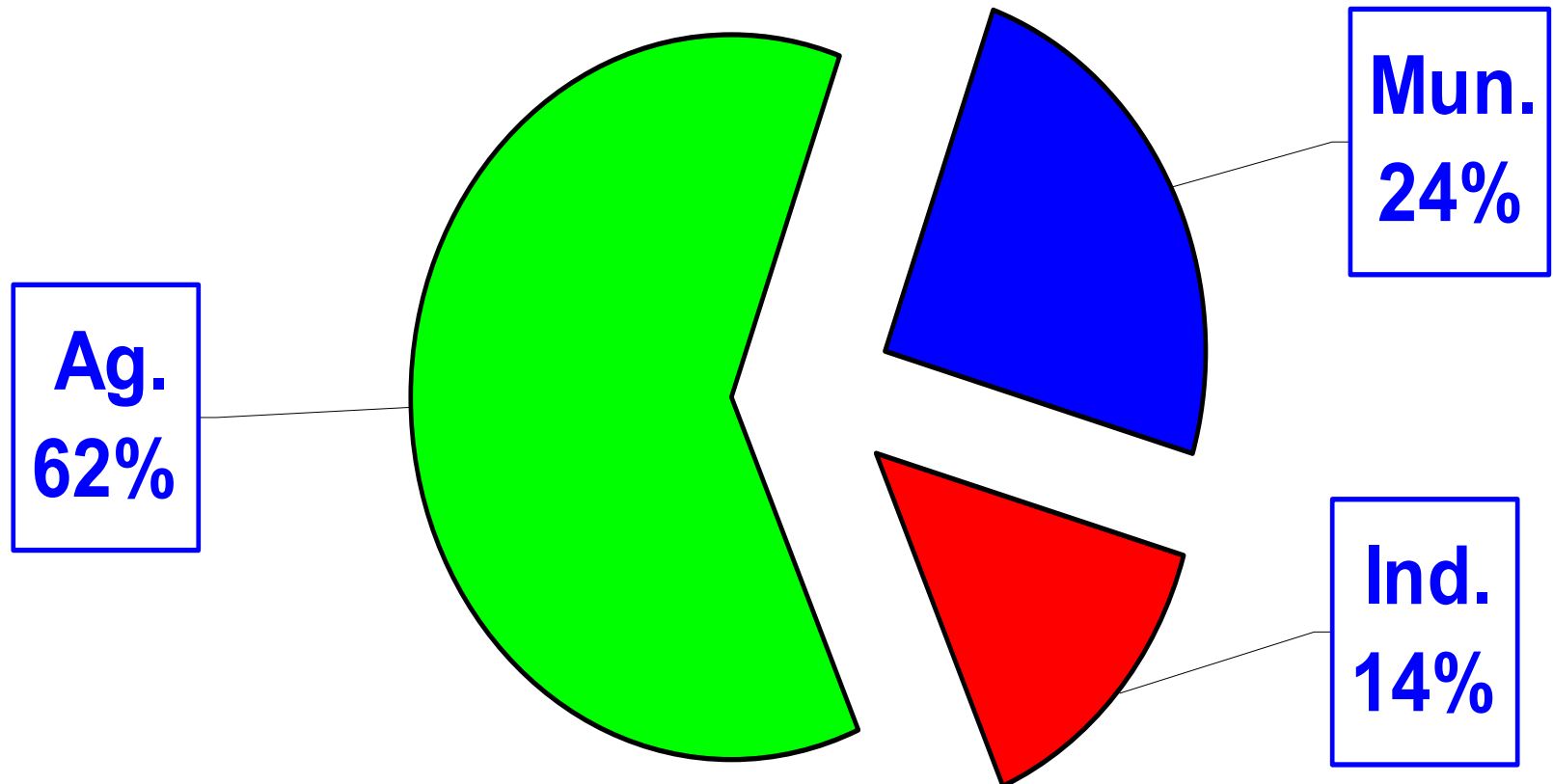
ICI and Water Use

- **Less than 5% of connections**
- **Over 25% of use**
- **Biggest band for the buck**
- **Knowledgeable people**
- **Buy back capacity**

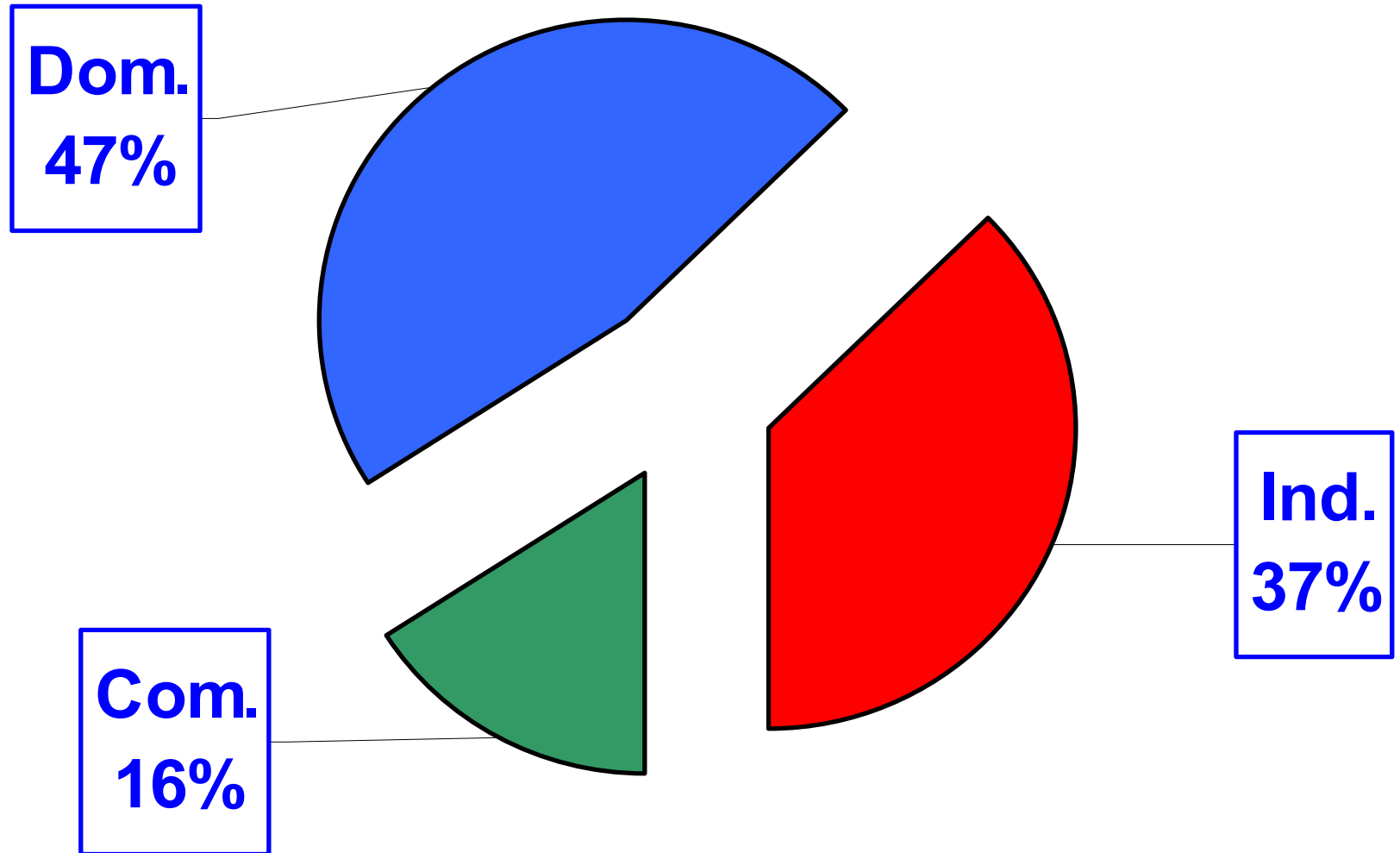
Targeting Use

Water Use in Texas in 2000

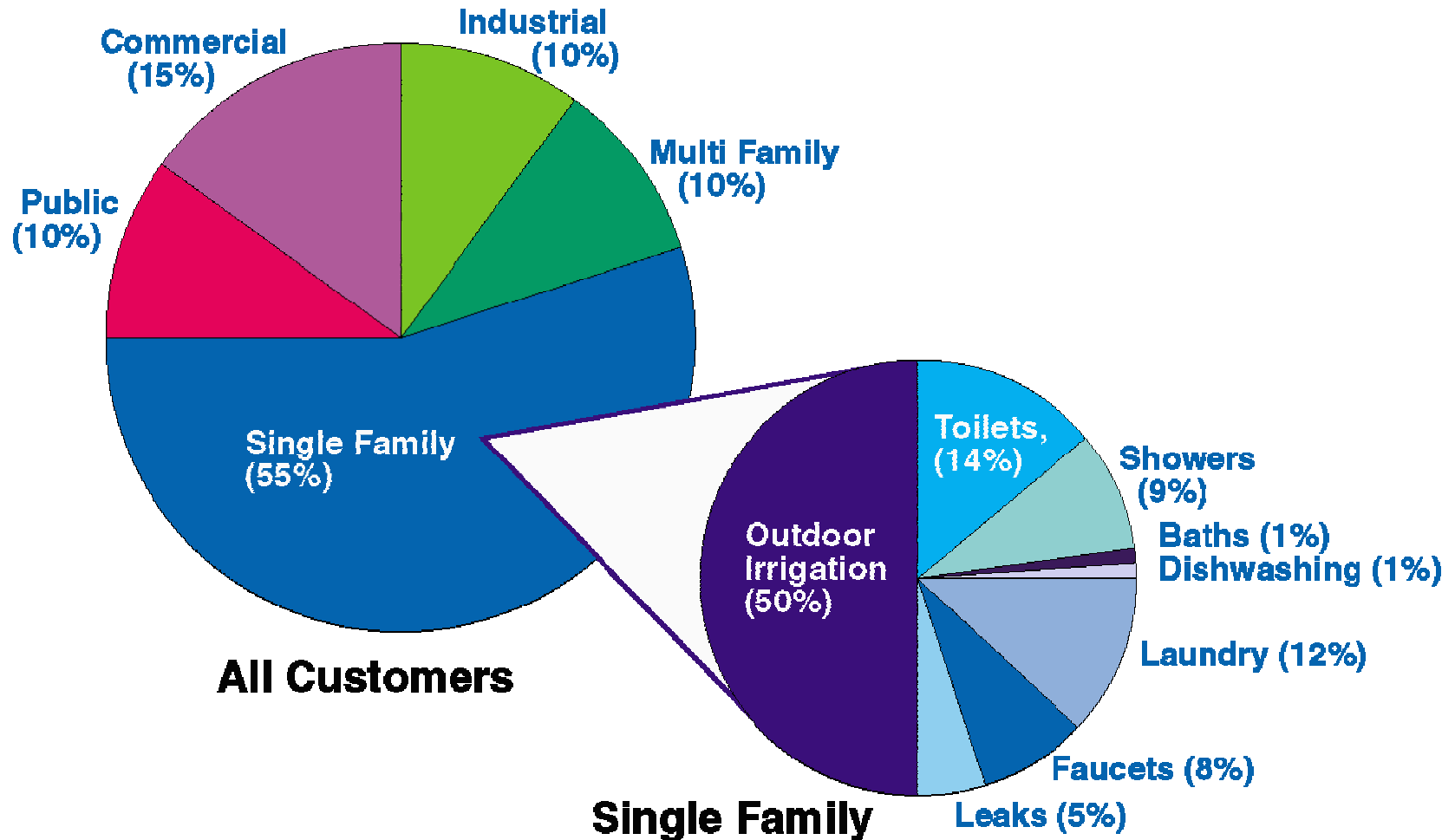
16.98 Million Ac-Ft./Yr.



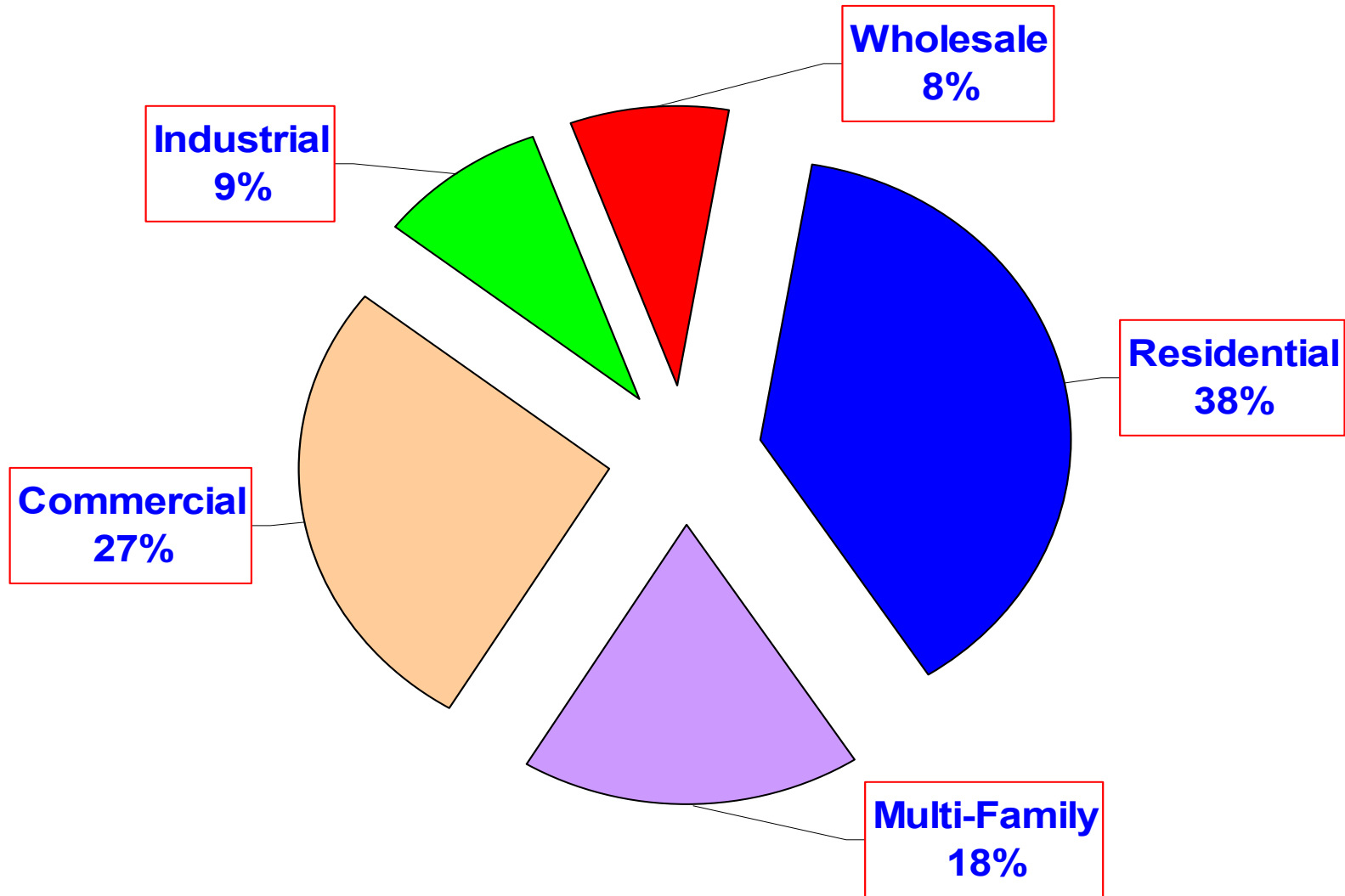
Non-Ag. Use in Texas in 2000



Urban Water Uses (California)



Water Use in Austin, Texas



Austin Water Use (10-99 to 9-02)

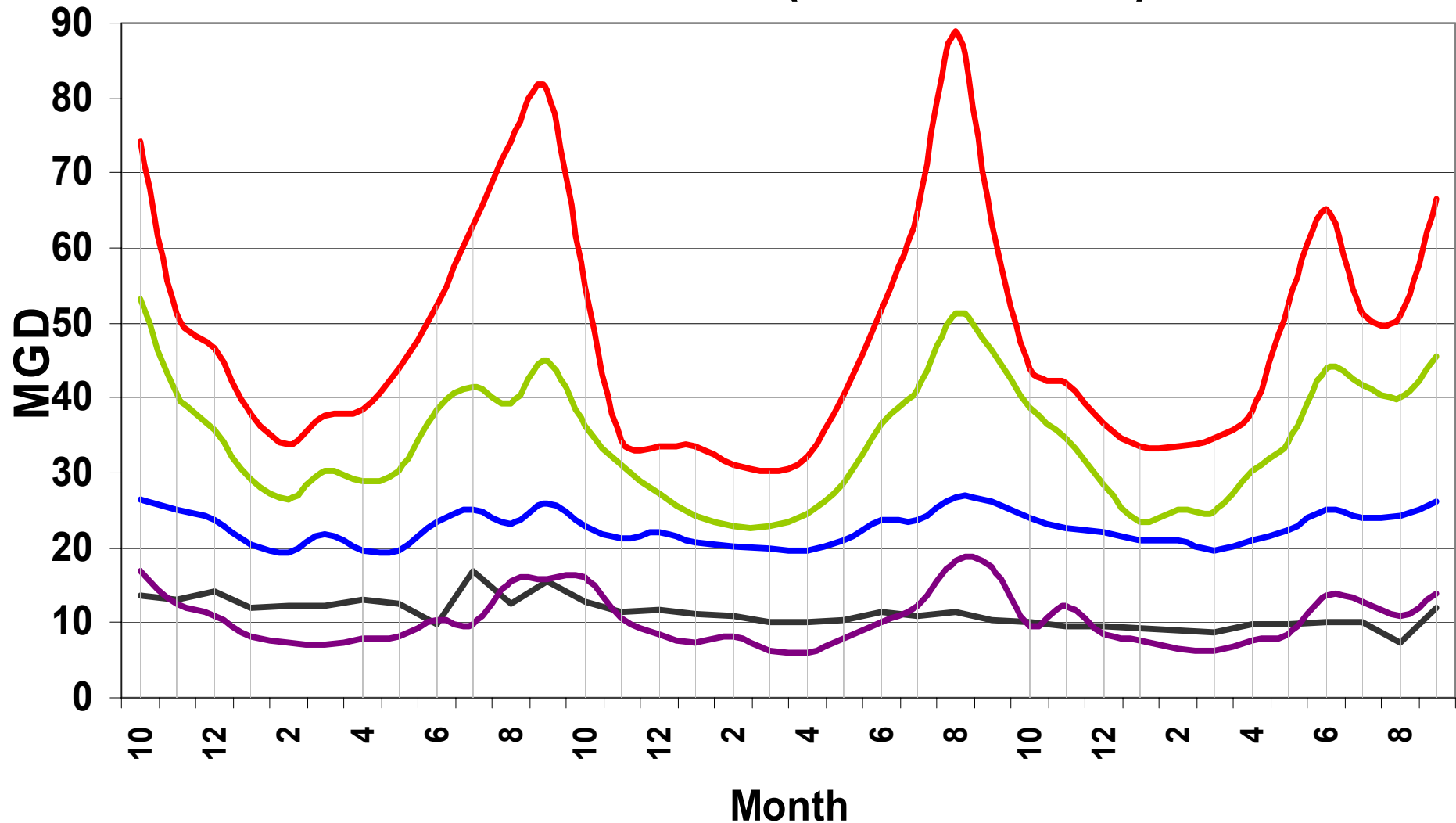
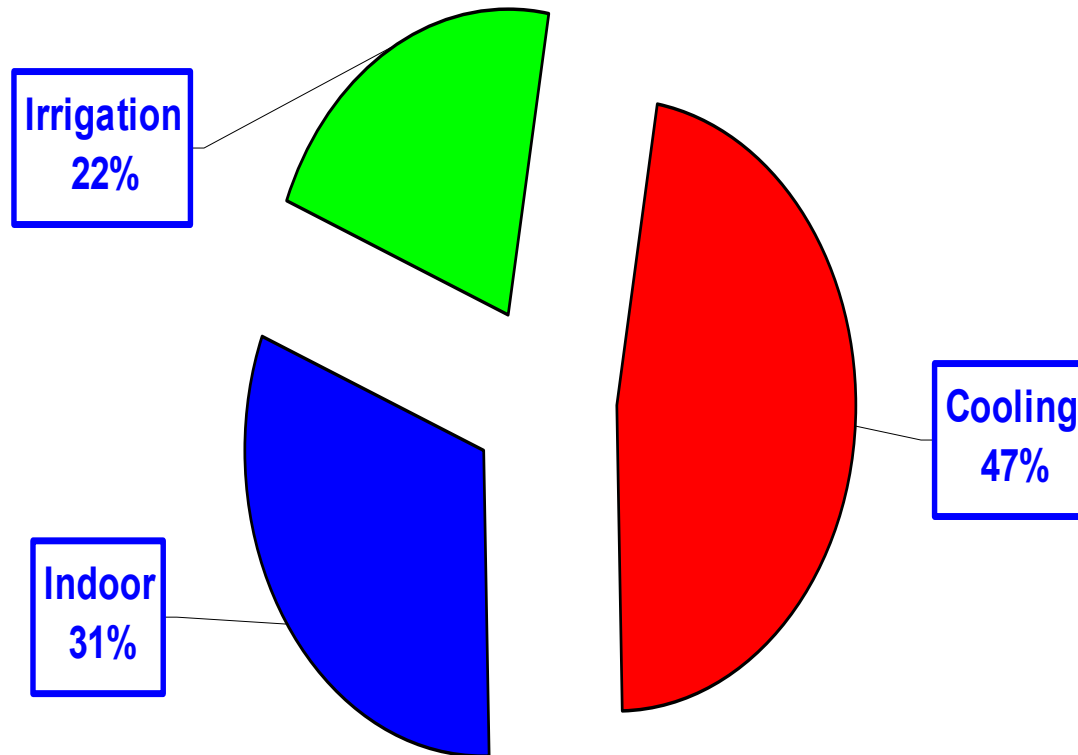
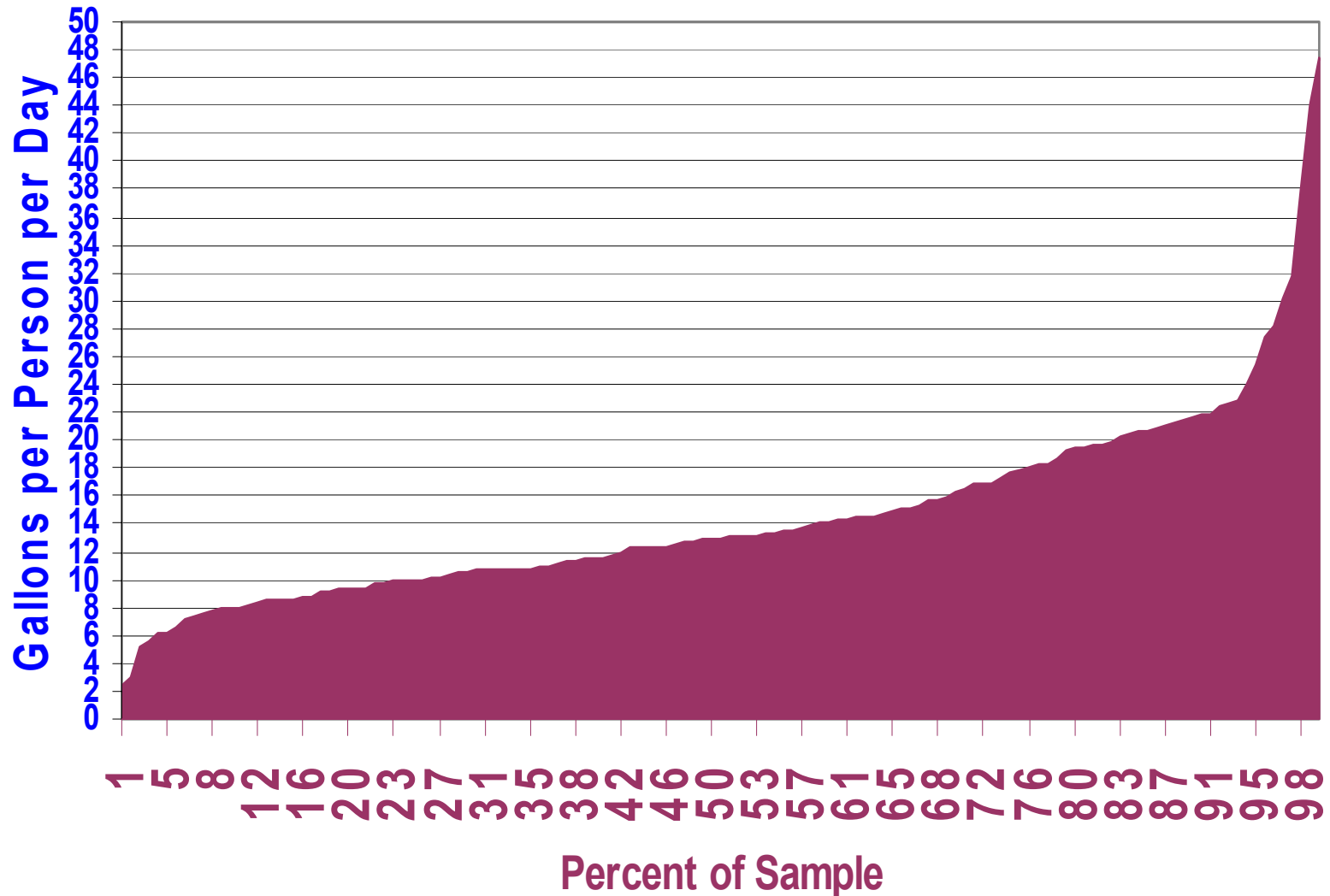


Figure 1. Annual Water Use
for a 10 Story Office Building in Austin, Texas



Elementary School Water Use

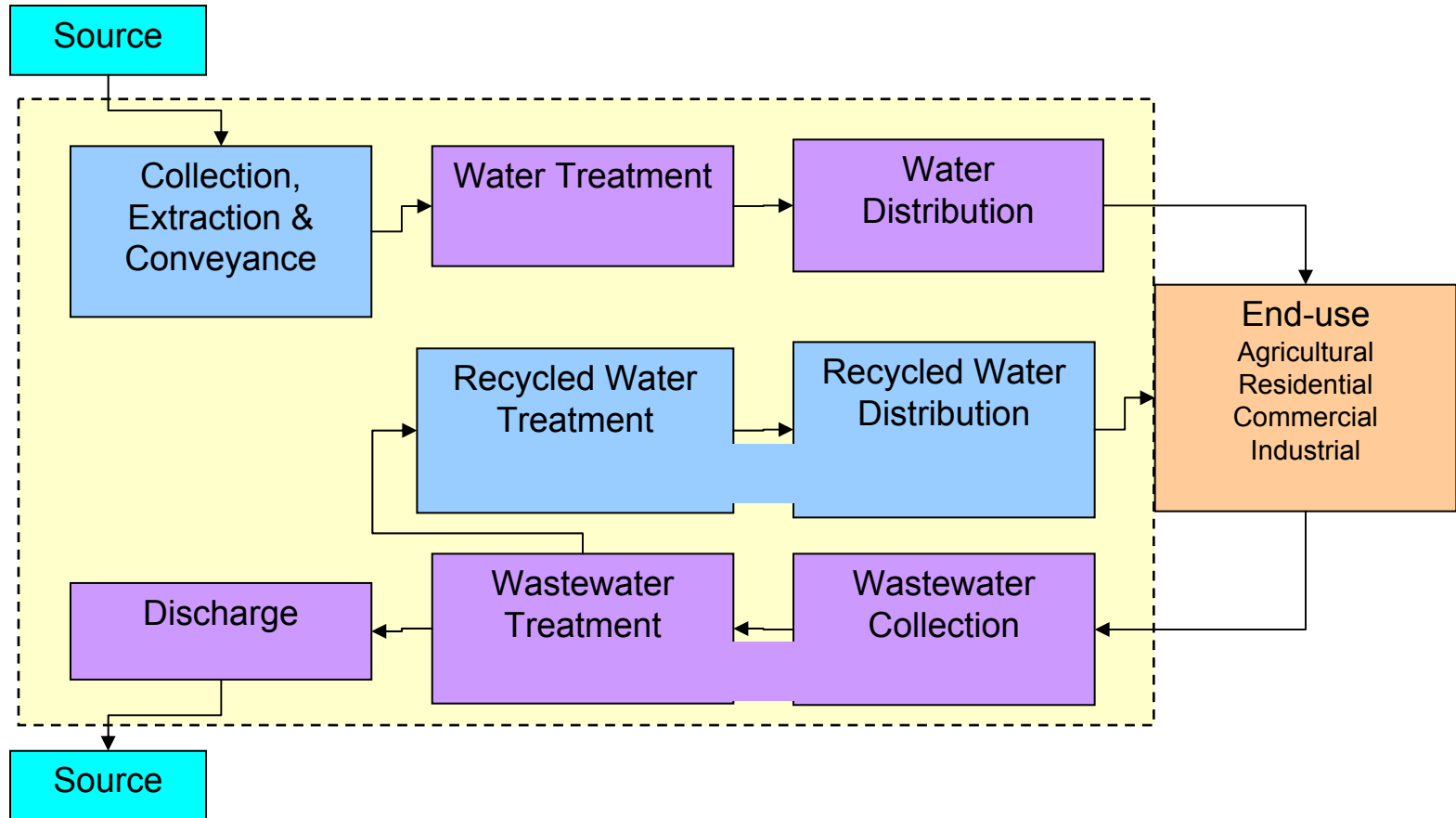
Based on 133 campuses in Texas



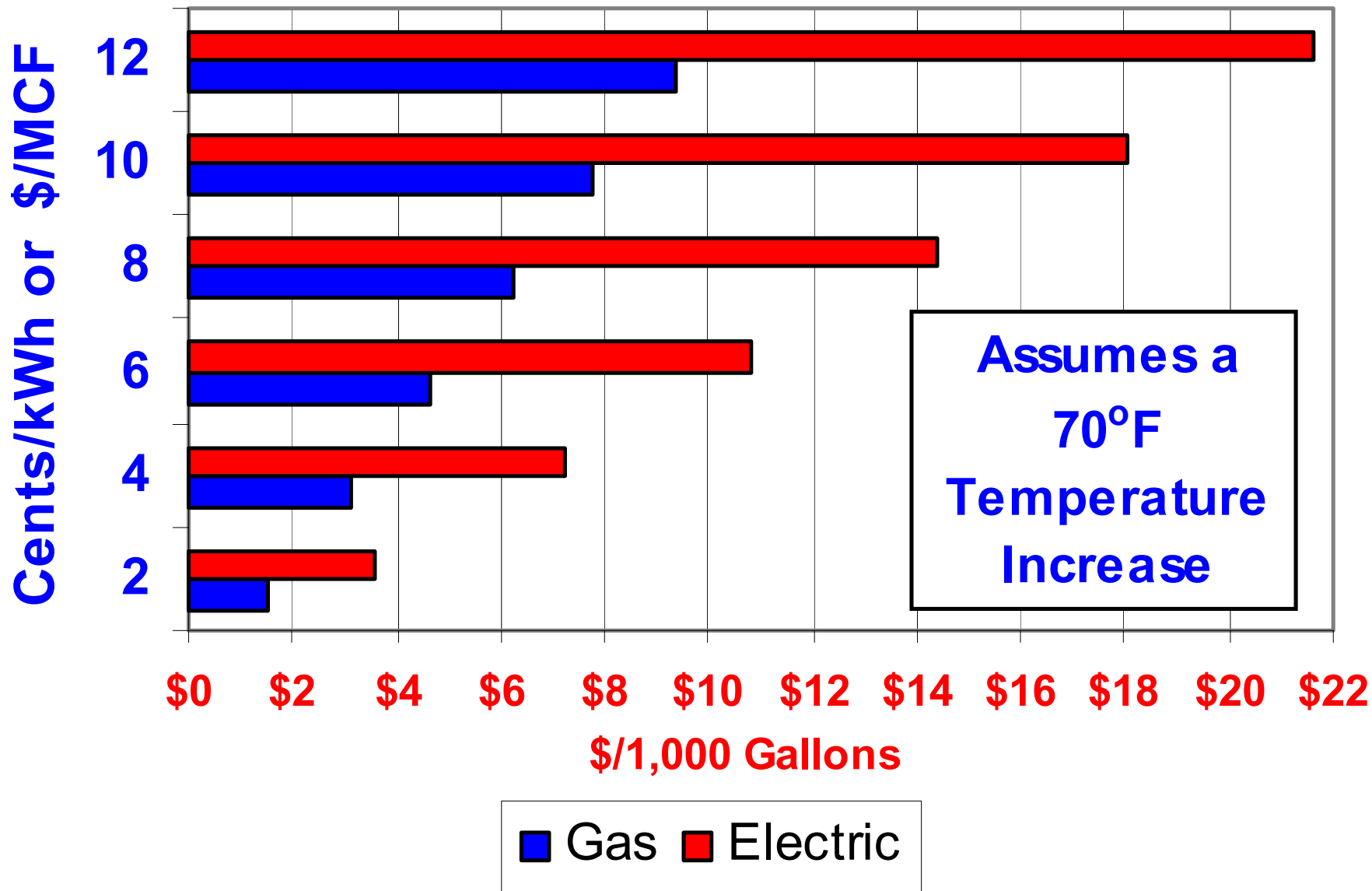
And then there is energy

- 8% of all energy used in USA for water/wastewater (US EPA)
- In a typical city, 1/3 to 2/3 of all electricity used by that city's municipal government operations is for water and wastewater

Embedded Energy



Energy Costs for Heating Water



Even Traffic Lights Can Save Water



Old 135 Watt Light



New LED 15 Watt Light

Question - What is the difference between these two traffic lights?

Answer – 1.2 gallons per day savings in water evaporated at the power plant and 90% more energy efficient.

**And Finally
We Get to Water**

**ICI Requires a
Knowledge of Different
Businesses and
Technology**

Examples

- Schools
- Office Buildings
- Grocery Stores
- Hotels
- Convince Stores
- City Facilities
- Laundries
- Pools
- Golf Courses
- Industries

Technology Potpourri

- 1. Outdoor Use***
- 2. Alternate Sources of Water***
- 3. Food Service***
- 4. Medical – Laboratory***
- 5. Cooling Towers and Boilers***
- 6. Laundries***
- 7. Commercial Bathrooms***
- 8. Other Process Uses***

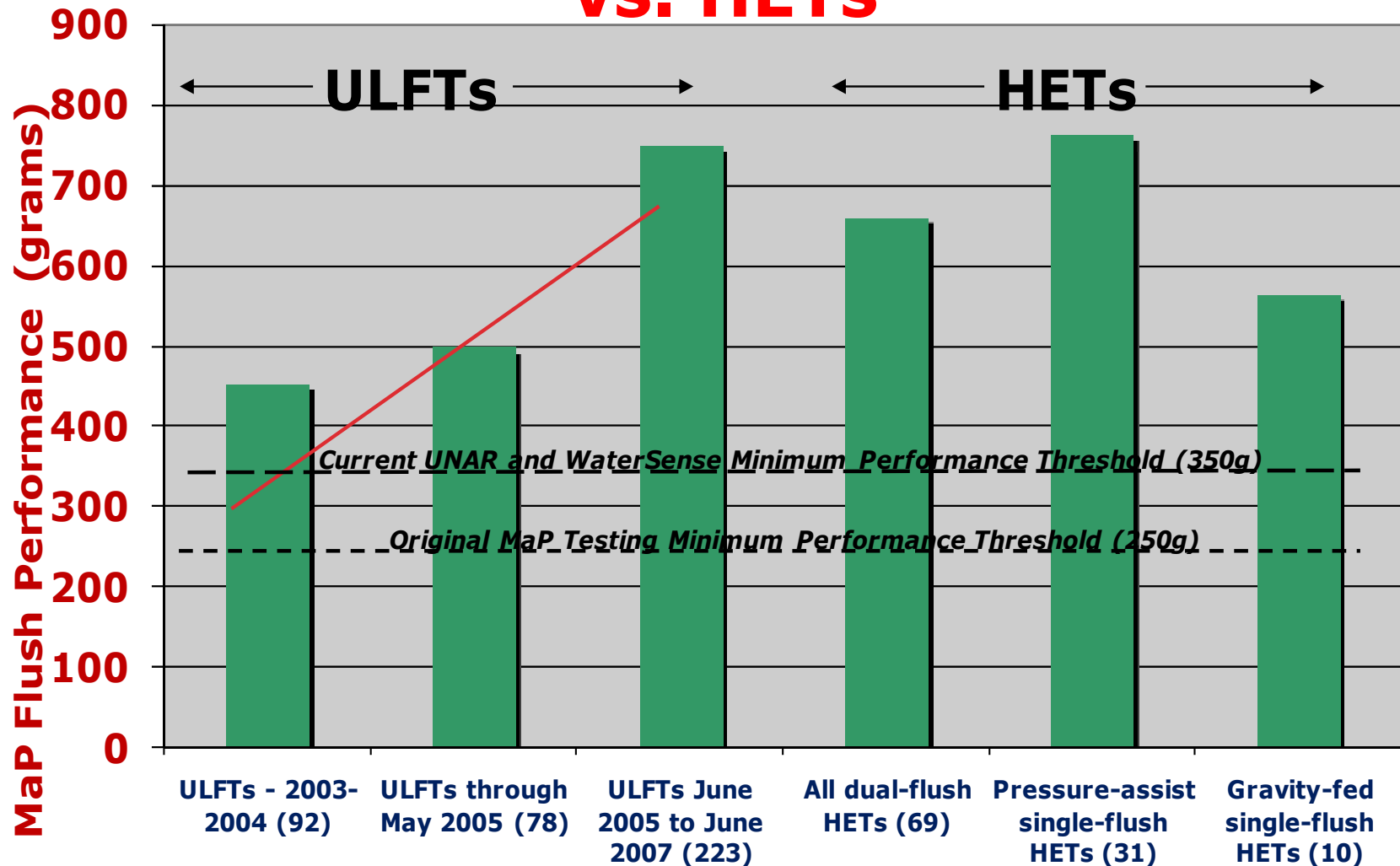
Public Restrooms

- **Toilets** (flush valve)
 - **Faucets**
 - **Showers**
 - **Urinals**
 - **Mop Sinks**
 - **Bidets**
- **Trap Primers**



***Talk
about
Public!
Toilets***

MaP Flush Performance - ULFTs vs. HETs



By Koeller and Veritec, June 1, 2007







Sloan Uppercut



Sloan Crown Valve



***Kohler's
1.28 GPF
Toilet***

Clark Sorensen
NATURE'S CALL





***Wash
Down***



***Blow
Out***



Waterless

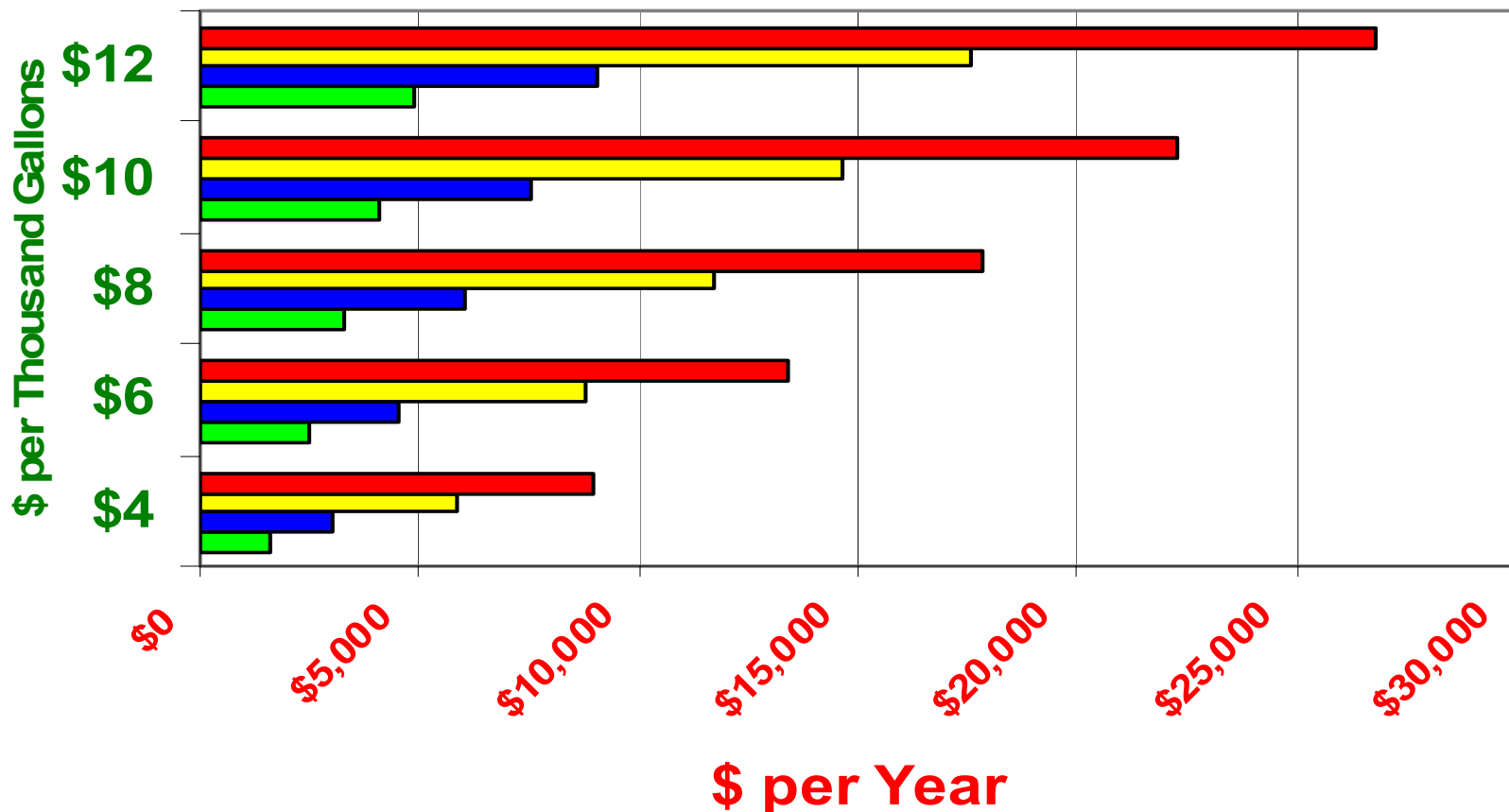
Zurn Water Saving Urinal System

**One
eighth of
a gallon
per
flush!**



Figure 1. Annual Plumbing Fixture Cost

for a Building with 500 Employees open 255 days/Year



■ Current Lowest ■ Code* ■ 1980's ■ Before 1980's



*What does
this mean to
you in
dollars &
cents?*

Water & Wastewater Alone - \$850 per year

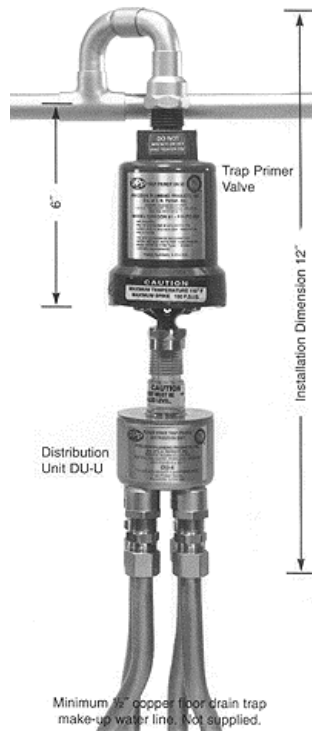
Hot Water (Gas) - \$1,380 per year

Hot Water (Electric) - \$2,000 per year

Types of Trap Primers

- **Constant Flow Systems**
- **Time Delay Solenoid**
- **Flush Valve Primers**
- **P-Trap Primers**

Floor Drain Trap Primers





"Comfortable Living
specialists"

F250



AIM
AIM

497-8342

**ELECTRICAL &
PLUMBING SERVICES**

Landscape Design Concepts

- Soil preparation and depth
- Shape land to hold water
- Chose appropriate plant material
- Proper irrigation system design
- Capture on-site sources of water
- Symbiosis between landscape and stormwater control
- ***KEEP IT WHERE IT FALLS***



Shape land to hold water



Landscape

It Must Hold Water First!

- Soil Depth
- Shaping of Land
- Draining of Impervious Areas

LID — Keep it where it falls!

Irrigation Controllers





Irrigation Association

- <http://www.irrigation.org/swat/industry/home-developers/resources.asp>
- <http://www.epa.gov/watersense/>

Pools, Hot Tubs & Fountains

- **Must be recirculating**
- **Filtration Systems –**
 - Cartridge
 - Diatomaceous earth and perlite
 - Sand
- **Discharge to landscape**
- **Meter refill line**



ONLY IN TEXAS!

Food Service Operations

- **Refrigeration**
- **Ice machines**
- **Garbage grinders**
- **Pre-rinse spray nozzles**
- **Dishwashers**
- **Pot Soakers**
- **Steamers**

Food Service Operations

Cont.

- **Steam Tables**
- **Clean-up**
- **Thawing food**
- **Steam kettles**
- **Floor Wash
Hoses**
- **Utility Sinks**
- **Hand washing
Sinks**
- **Confectionary
Sinks**
- **Outdoor Area
Washing**

Pre-Rinse Spray Valves



More water
Less
pressure



Forceful
Spray

Old Spray Valve

- ❖ 4-6 GPM
- ❖ 8-12 Cents/Min.

New Spray Valve

- ❖ 1.6 GPM
- ❖ 3.2 Cents/Min.



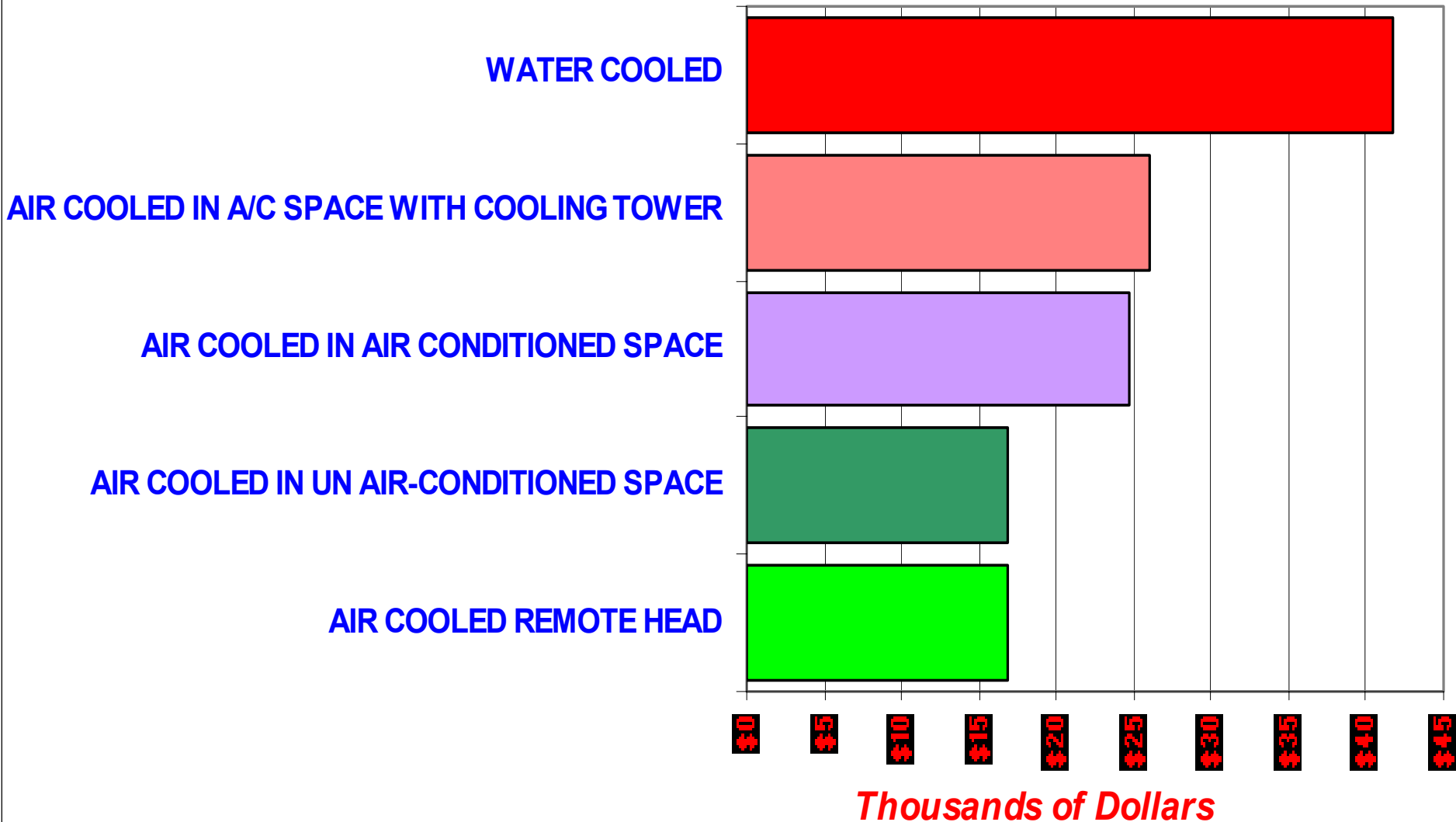
Air cooled ice machine

Water cooled ice machine
(no louvers)

[Jump to first page](#)



Life Cycle Cost for 800 Pounds of Ice a Day Over 8.5 Year Life of Unit







- **90% less water**
- **Big energy savings**
- **No water hookup**
- **No sewer hookup**
- **No vent**

Garbage Disposals vs. Strainers

- **Water Use**
 - Grinders from 2 to 12 gpm
 - Scrap baskets 0.0 gpm
- **Horse Power**
 - Grinders from 1 to 10 hp
 - Scrap baskets 0.0 hp
- **Example**
 - 10 HP
 - 12 Gallons per minute or 720 gallons per hour



Laundry

- Residential Type Systems
- Coin Operated Washers
- Commercial System





**An
Example
of Water
Reuse at
a Hotel
Laundry.**

Medical & Laboratory

1. Autoclaves
2. Vacuum pumps
3. X-ray film dev.
4. Lab equipment cooling
5. Lab hoods
6. Medical equipment cooling
7. Sterile ware washing
8. Therapeutic baths
9. Food service
10. HVAC
11. Vaporizers
12. Laundry
13. Landscape
14. Plumbing fixtures
15. Pools
16. Scrubbers
17. Decorative fountains/ponds
18. Washdown of paved areas
19. ???



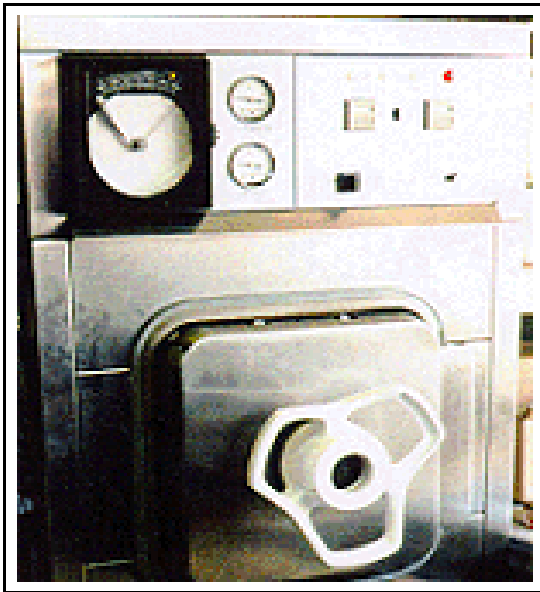
Ranvac



Acme Perfection Vac

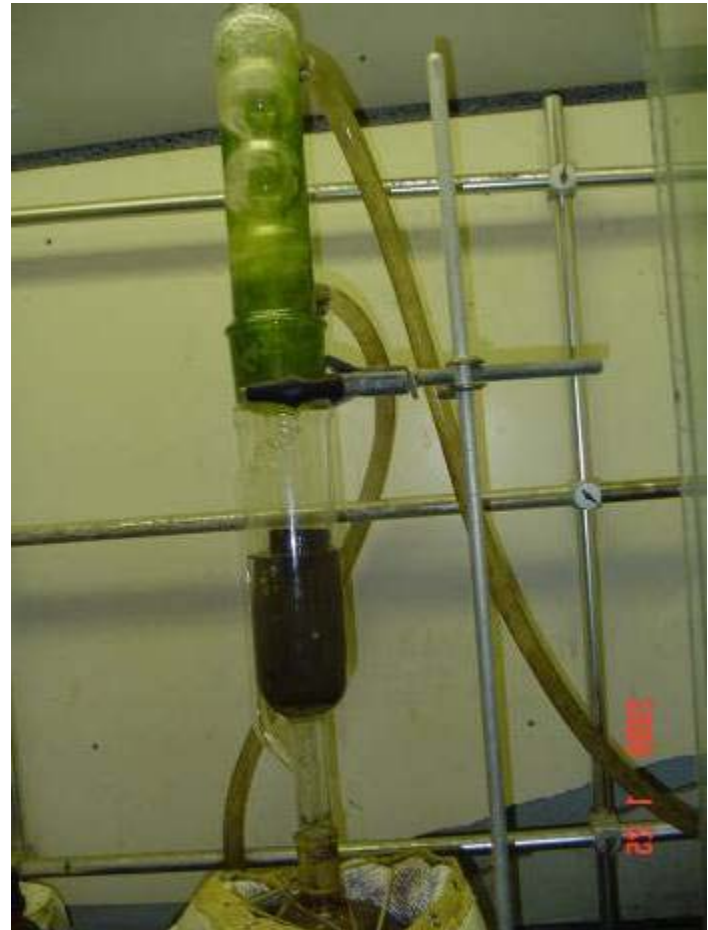


Air Tech



**Large
Hospital
Steam
Sterilizer**

Still Condenser (algae too) and cooling water at 2.5 gpm





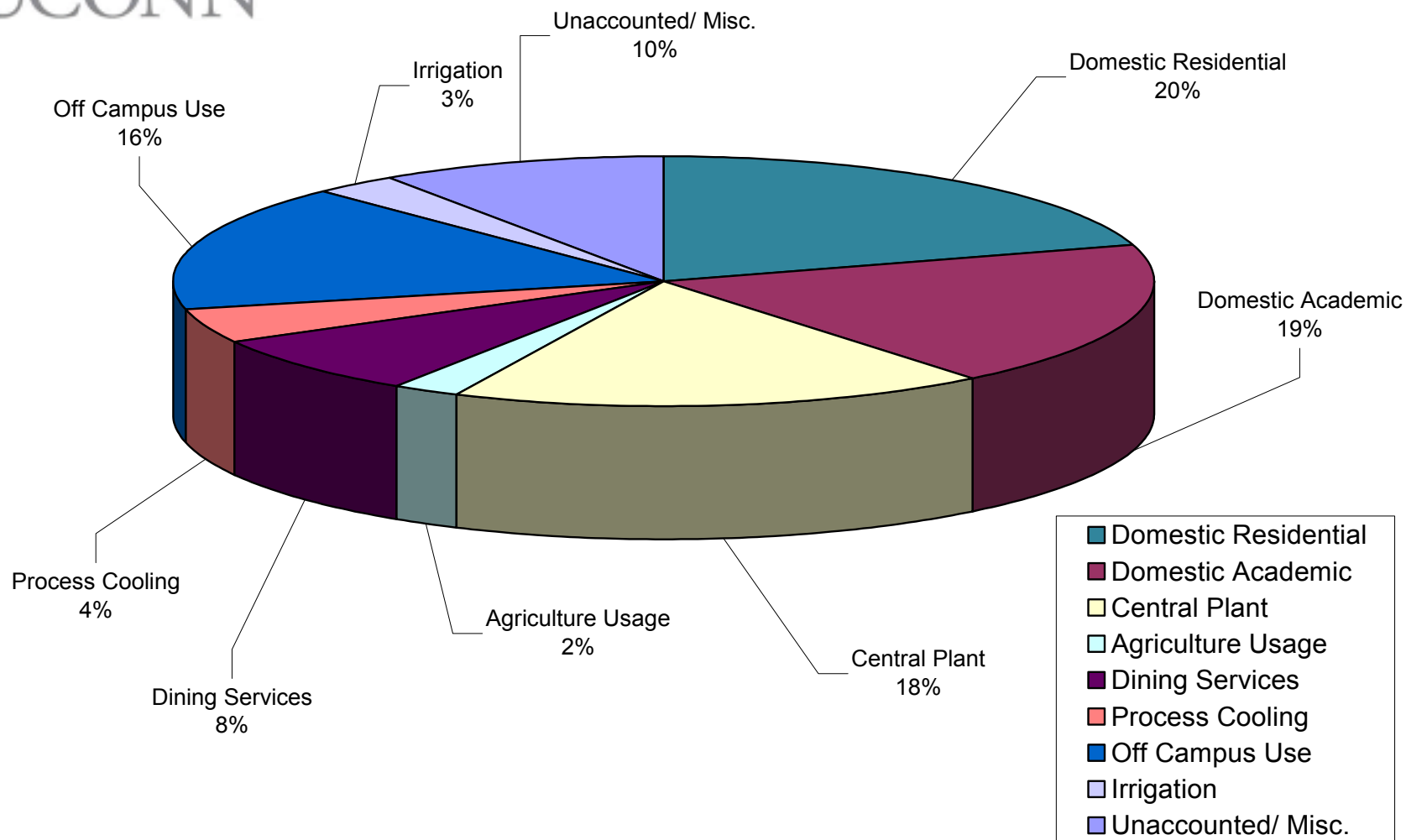
Berkeley Lab





UConn

Calculated Water Uses





WHAT STARTS HERE CHANGES THE WORLD

THE UNIVERSITY OF TEXAS AT AUSTIN



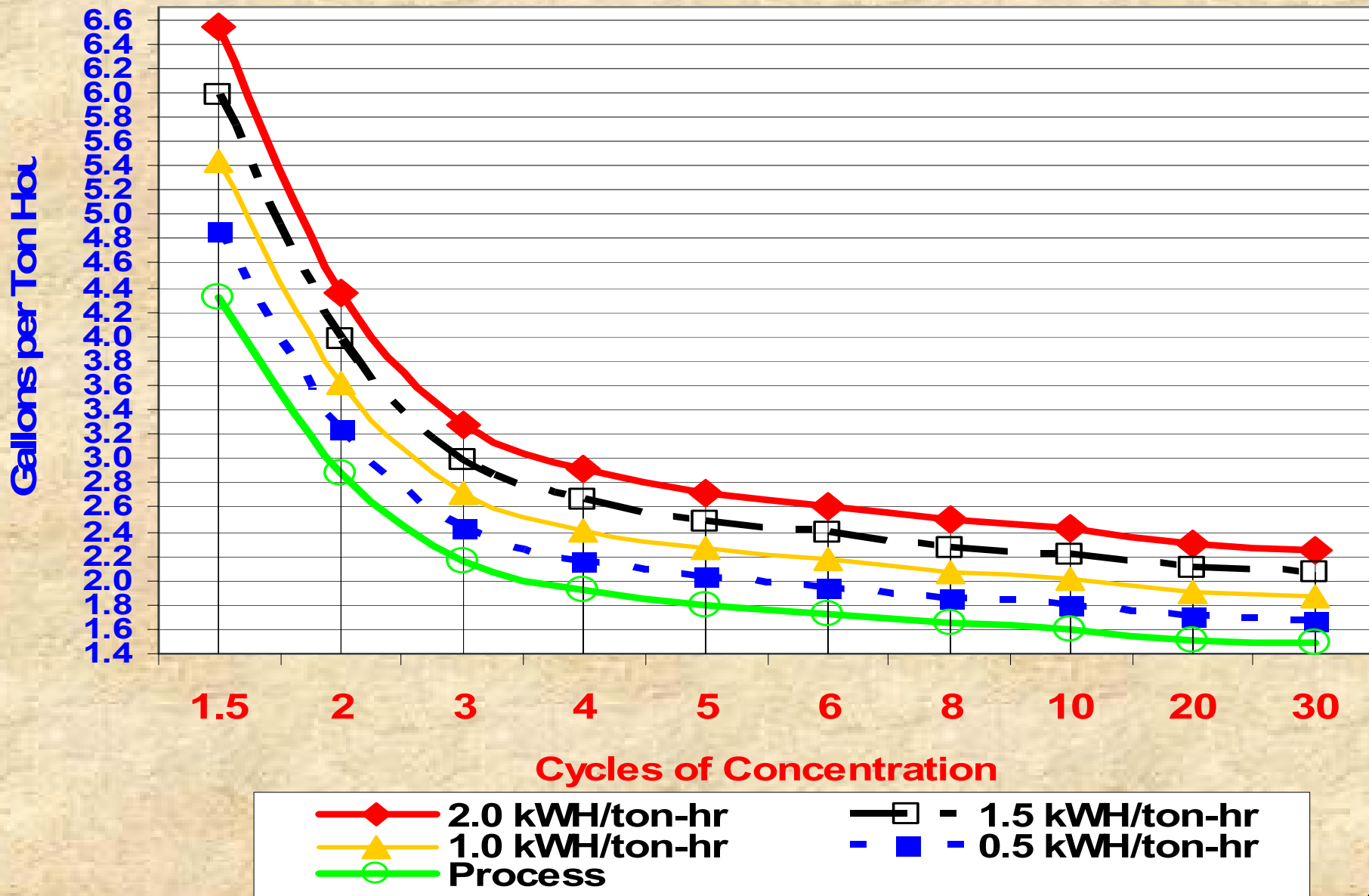
Cooling Towers



Cooling Towers

- Purpose – to remove unwanted energy from process fluids
- Major Use – HVAC systems
- Process Fluid in HVAC Systems - *water*

Cooling Tower Evaporation Water Requirements



Boilers and Water Heating Systems

- **Hot water conservation**
- **Metering**
- **Conductivity controls
on steam boilers**
- **Condensate return**

Alternate On-Site Sources of Water

- **Rainwater harvesting**
- **Stormwater harvesting**
- **Air conditioner condensate**
- **Swimming pool filter backwash water**
- **Reverse osmosis (RO) and nanofiltration (NF) reject water**
- **Gray water**
- **On-site treated wastewater systems**
- **Foundation drain water**
- **Others??????**

Where it can be used

- irrigation,
- green roofs,
- cooling tower makeup water,
- toilet and urinal flushing,
- makeup for an ornamental pond/fountain
- swimming pools,
- laundry,
- process use, and
- aquifer recharge and wetlands maintenance.

AMD Lantana Site

- **Largest known rainwater/AC condensate harvesting project**
- **Used for irrigation and cooling tower makeup**
- **1.3 Million Gallons**









WHAT STARTS HERE CHANGES THE WORLD

THE UNIVERSITY OF TEXAS AT AUSTIN



City Hall – Austin, Texas



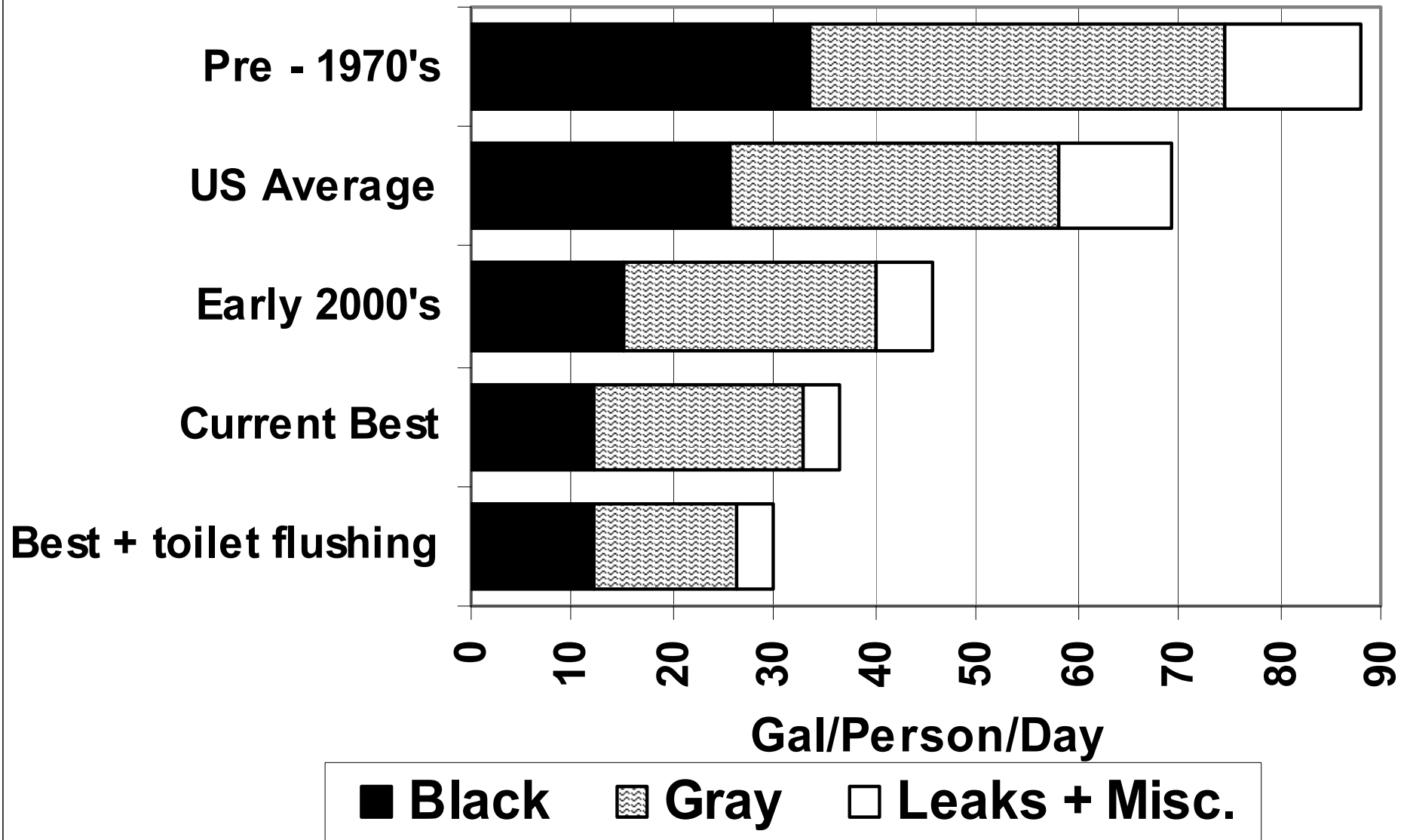


Cook+Fox Architect

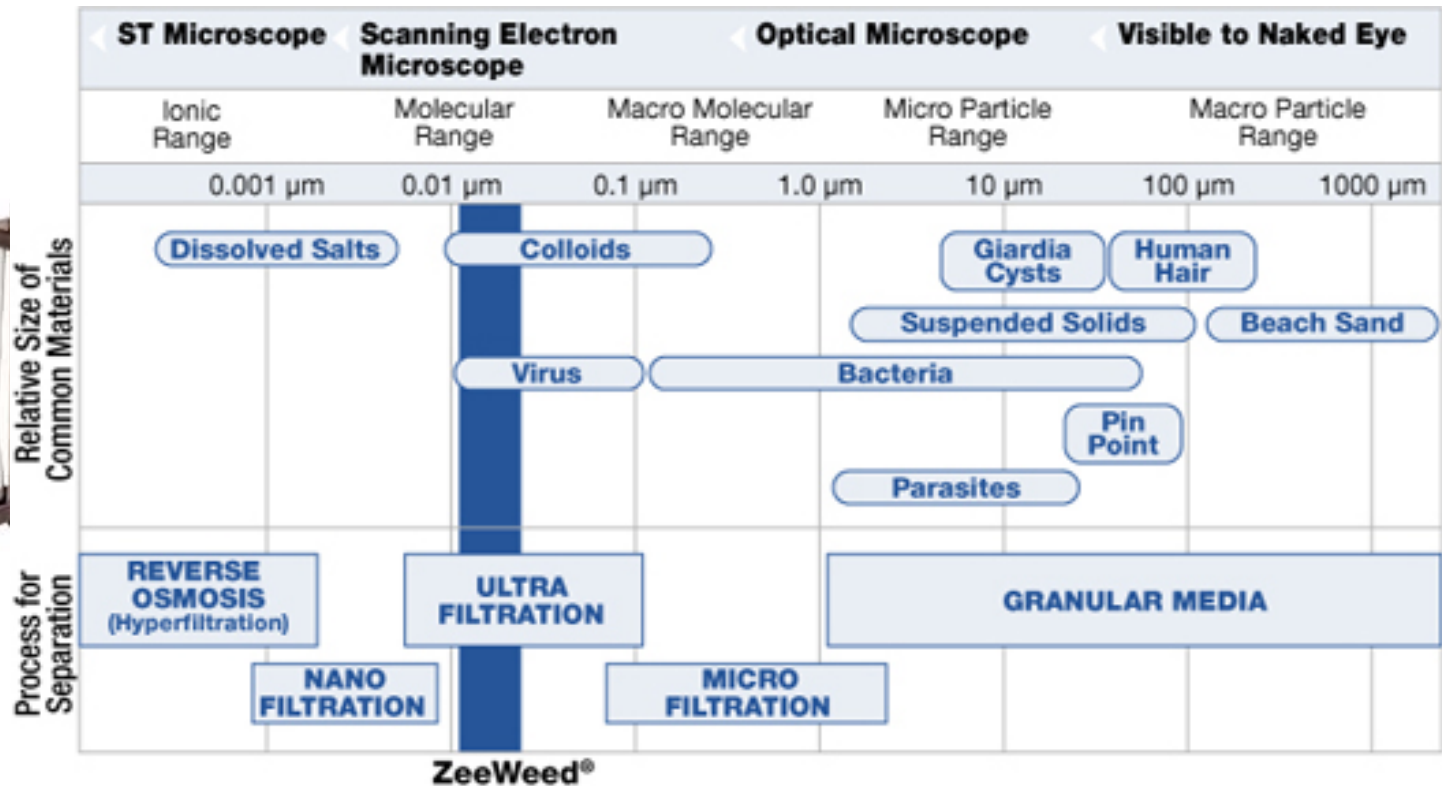
New Bank of America Tower in Manhattan

This LEED Platinum project collects rainwater, gray-water foundation drain water and A/C condensate water for reuse in toilet flushing and cooling tower makeup.

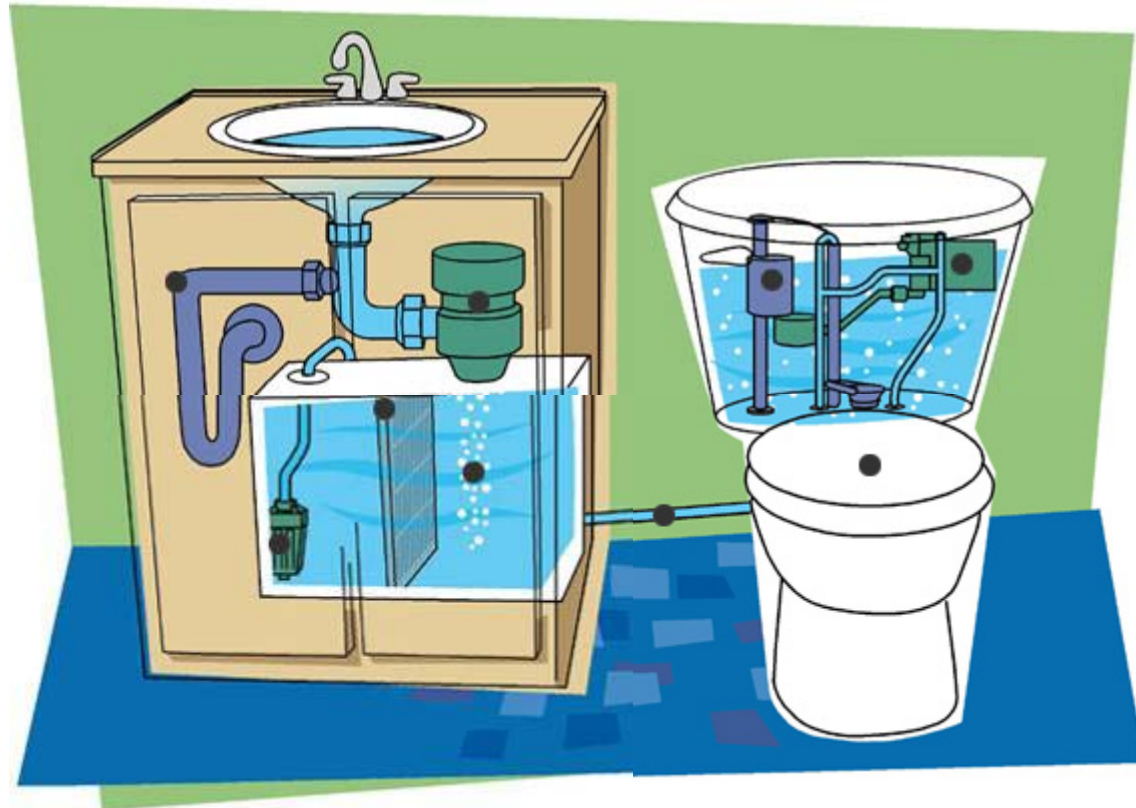
**Figure 2. Gray Water Production
in Single-Family Dwellings**



GE Zenon Technology



AQUS™ System



**In Texas, rainwater
harvesting and water
reuse systems are sales
tax exempt**

**Tax Code Section 151.355(1)
provides an exemption for the
recycling system if purchased.**

Property Tax Exemptions

Certain industrial and commercial water reuse and water conservation equipment and installations can be exempt from placement on the property tax roles.

Metering and Sub-metering

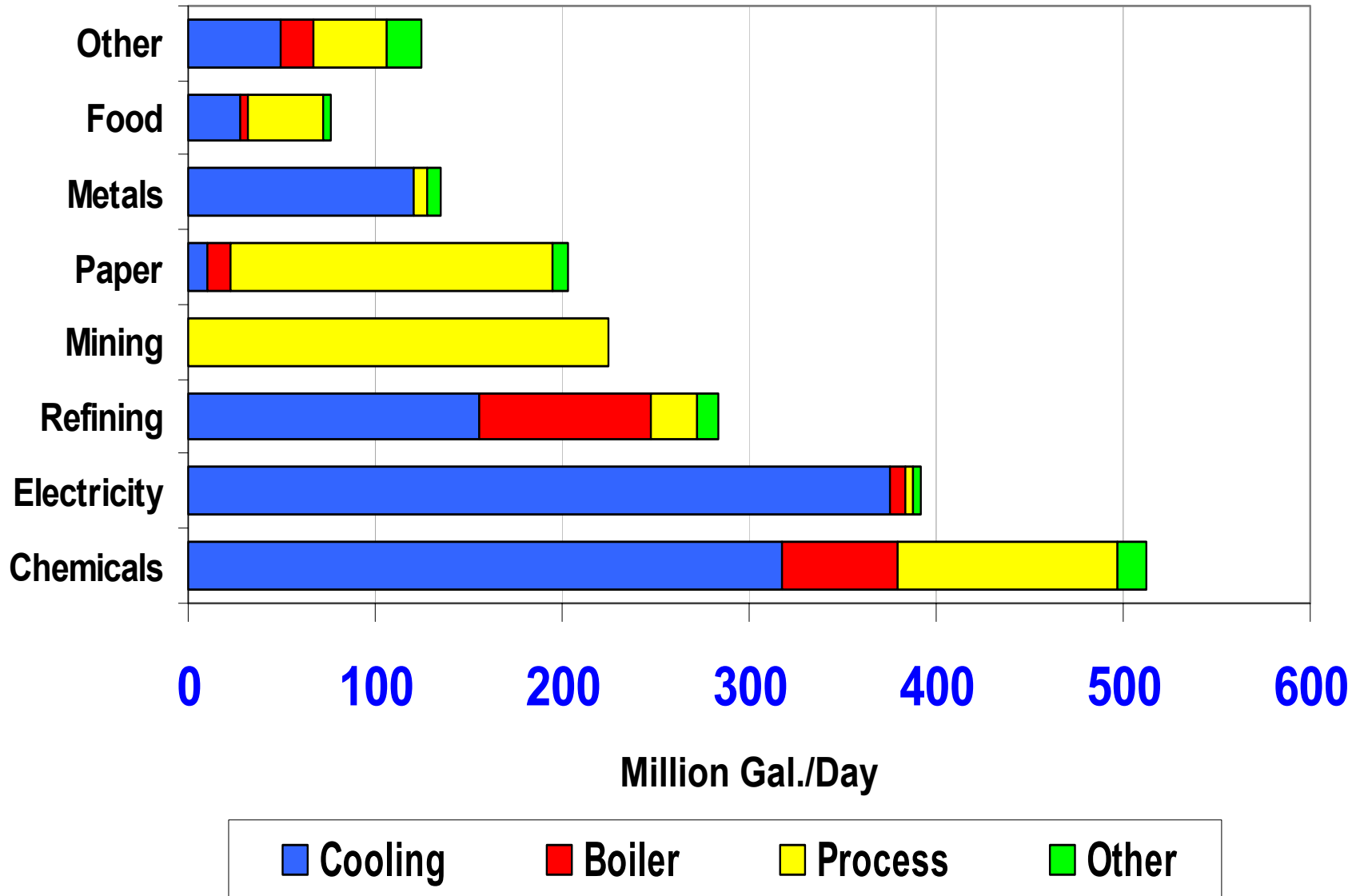
- It is your measurement of what is going on
- It provides your history
- It lets you know when there are problems
- It verifies equipment operations

What to Meter

- **Each building on campus**
- **Cooling towers (makeup and blowdown for credits)**
- **Boiler makeup and condensate return**
- **Pools, spas and fountains**
- **Irrigation systems**
- **Major water using processes**

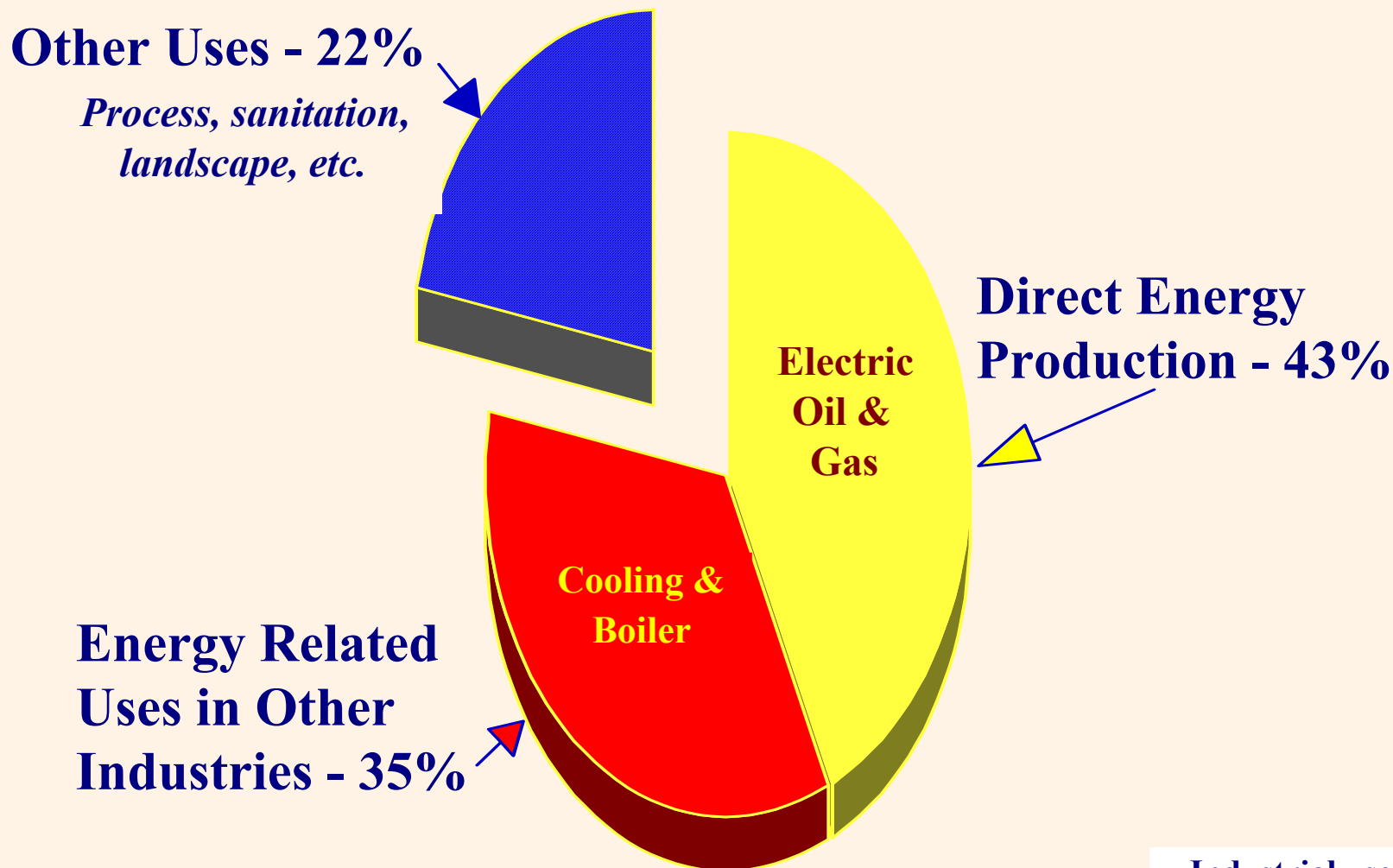
Industrial Water Use in Texas - 1997

(1.0 Million Gal./Day = 3,790 Cubic Meters/Day)



Industrial Water Use in Texas

Energy Related Water Use = 78%



Industrial use is 2.3 million acre-feet a year

Ranking of Possible Measures

Good

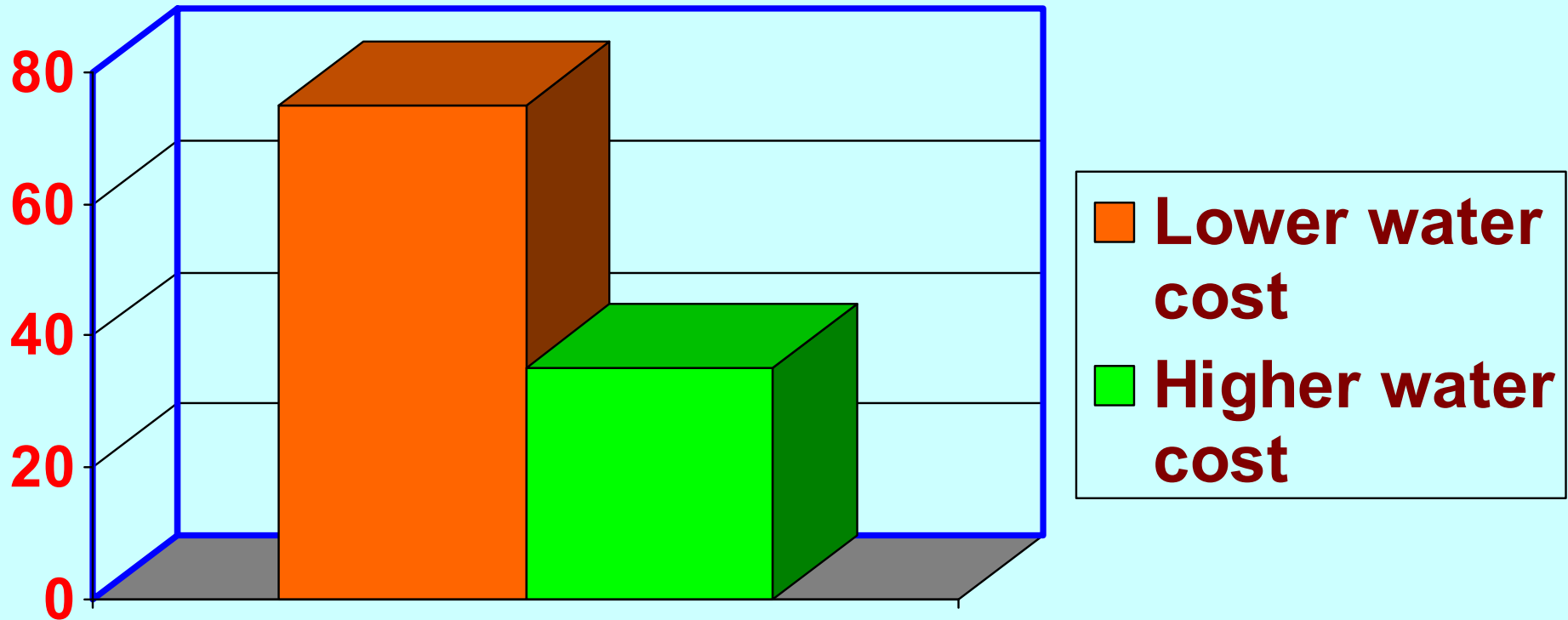


Best

1. Adjust equipment
2. Modify equipment or install water saving devices
3. Replace with more efficient equipment
4. Water reuse/recycle
5. Change to waterless process

Petroleum Refining Water Use in Texas

Gal./Barrel Refined



**The Cheapest Water
You Will Ever Have
Is The Water You
Already Have!**

**Where Can We Go
for Help?**

Tools Available

- **New Standards & Testing**
- **EPA – Water Sense and Energy Star**
- **Information and Publications**
- **Technical Organizations**
- **Water Efficiency Consulting Groups**
- **Financial Assistance & Tax Breaks**
- **Governmental Initiatives**

New Initiatives

1. **GREEN Building**
2. **EPA Water Sense & Energy Star**
3. **Alliance for Water Efficiency**
4. **CEE**
5. **National Energy Policy Act of 2005**
6. **MaP Testing**
7. **Help from the Private Sector**

New Executive Order

Reduce water use
at federal facilities
by 2% a year
through 2015

Enough to make you turn Green

- **US Green Building Council**

- <http://www.usgbc.org/>

- **Green Globes Initiative**

- <http://thegbi.org>

- **ASHRAE SPC 189 and 191**

- **Green Cleaning**

- <http://www.greenbiz.com>

- **Project Green Build**

- <http://www.projectgreenbuild.org>

- **Green Build**

- <http://www.greenbuild.co.uk>

- **Green Guide for Health Care**

- <http://www.gghc.org>

- **Build it Green**

- <http://www.builditgreen.org>

LEED Products.

- **New Construction**
- **Existing Buildings**
- **Core & Shell**
- **Commercial Interior**
- **Schools**
- **Health Care**
- **Retain**
- **Homes**
- **Neighborhood Dev.**

LEED Certification

- **New LEED areas**
 - New products including a 3.0 series
 - New areas being examined
- **Certification Requirements**
 - Many governmental agencies ranging from the Navy to many cities and local governments now require LEED or GBI certification

**High Performance
Green Building Codes –
ASHRAE/USGBC/IESNA Std 189**

**Efficient Use of Water in
Building
ASHRAE/USGBC/IESNA Std 191**

And More Green

- Over 90 cities now have programs
- New GBI initiatives out soon
- Many industries are working on standards
- Many industries such as hotel chains now require new development to be green

The Bandwagon Effect



Every Drop Counts!

- **Bathroom faucets**
- **Weather-based irrigation controllers**
- **Soil moisture sensors**
- **Drip irrigation**
- **Commercial toilets, faucets, laundries, etc.**
- **New initiatives being developed**

CEE Initiatives

- **Commercial Kitchens**

- Ice machines

- Steamers

- Dish washers

- Spray valves

Garbage disposers

Combination ovens

??

- **Clothes Washers**

- **Water & Wastewater - energy**

Other Opportunities

- **BOMA and other facility managers associations**
- **Hospitality organizations**
- **Trade Associations**
 - **Plumbers**
 - **HVAC (A/C and cooling towers)**
 - **Dental and Medical associations**
 - **Landscape associations**

Professional Help

Energy Related

- **State Energy Conservation Office Loans**
- **Coordinated Energy and Water Conservation Rebate Programs**
- **Energy Savings = Water Savings in Most Cases**

Help from the Private Sector

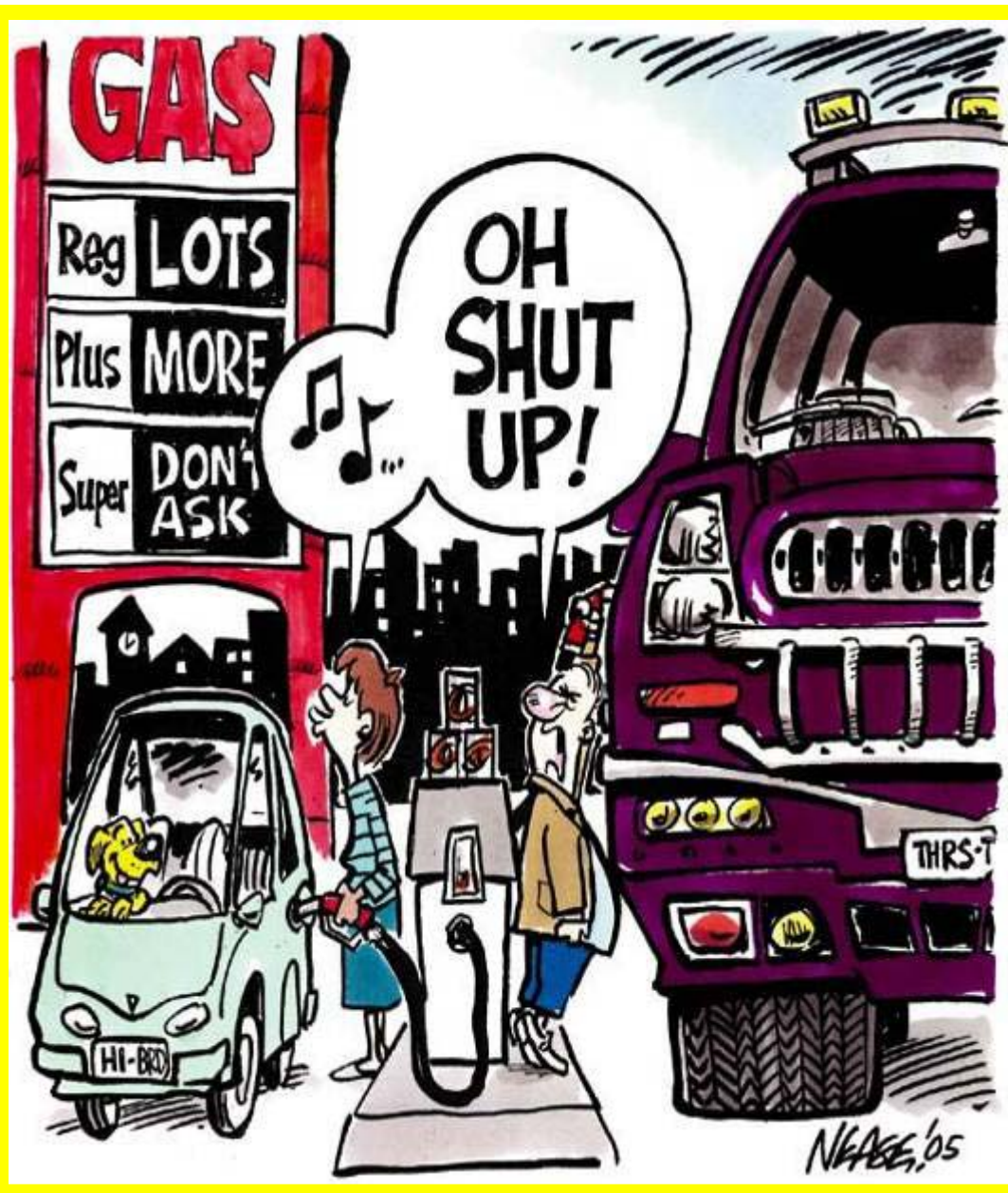
- **Performance Contracting**
- **Shared Savings**
- **Technical assistance**

Training and Program Help

- **Consulting to set up ICI program**
- **Training of employees**
- **Technical presentations to ICI water users**
- **Workshops**

Where is Higher Education?

- **Good existing research and educational programs on landscape and irrigation**
- **Some universities and school districts developing conservation programs**
- **Very limited research on urban water conservation**
- **No specific programs to research URBAN Water Conservation or to train water conservation professionals**



**So let's
not do the
same
thing to
our homes
with water
use!**

H.W. (Bill) Hoffman, P.E.

**H.W. (Bill) Hoffman & Associates, LLC
& Water Management
9013 Texas Sun Drive
Austin, Texas 78748**

Phone: 512-280-0199

Mobil: 512-294-7193

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