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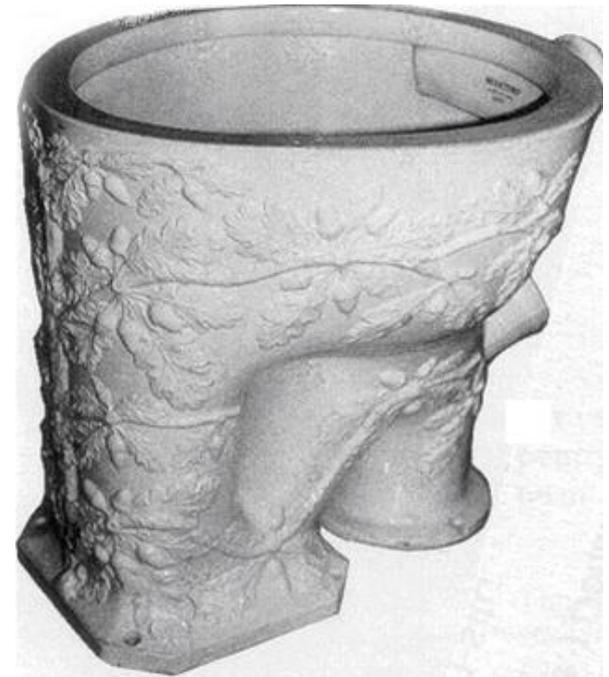
A River of Energy Solutions

Evolution of Indoor Plumbing

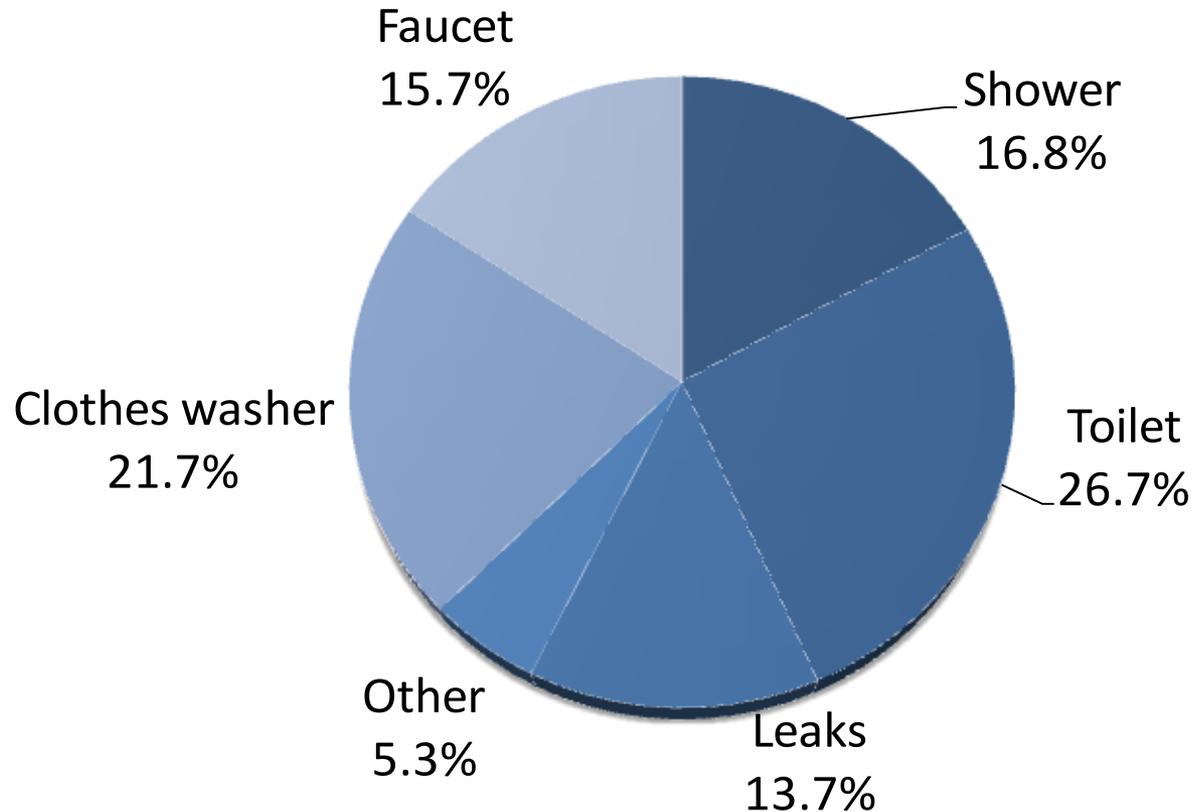
Tim Smith CPD, FASPE, Engineered Building Solutions LLC
Consultant to Sloan Valve Company

A Very Short History

- 1596 First Toilet Invented
- 1815 The Pottery Toilet is Invented
- 1883 First One-Piece Ceramic Pedestal Toilet Invented



Indoor Domestic Water Use



Thomas Jefferson's Monticello

First American Home with Indoor Plumbing



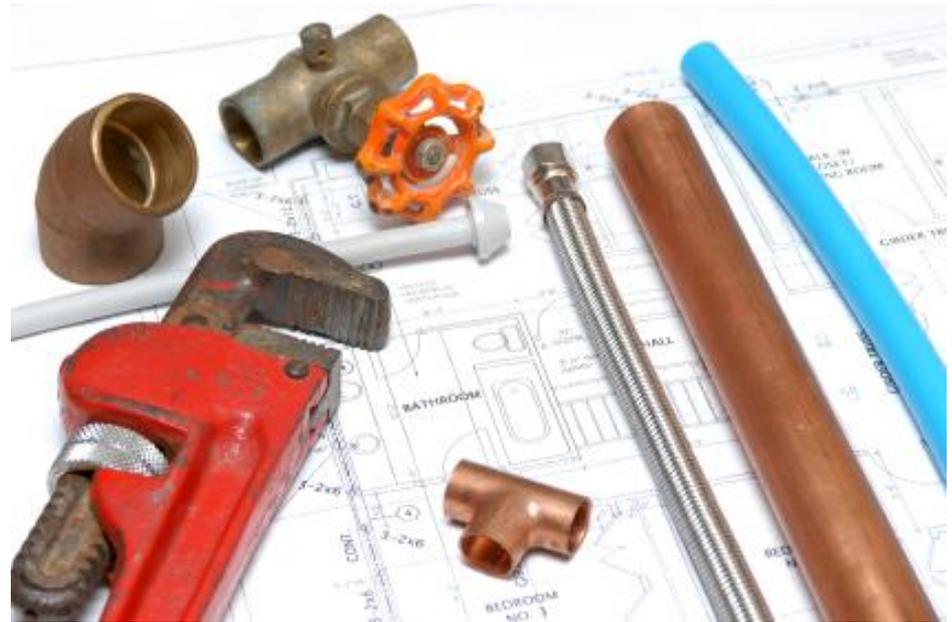
Evolution of the Modern Day Plumbing Fixture

- Early 20th Century the pedestal vitreous china plumbing fixture evolves.
- By the 20th Century the china urinal is introduced which soon leads to the introduction of wall mounted lavatories, urinals and water closets



Advancements in Plumbing Fixture Technology

- Residential vs. Commercial
- Gravity vs. Pressure Assisted vs. Flush Valves
- Vacuum Technology
- High Efficiency Technology (HELF, HEU, & HET)



An HET is a fixture with an average flush volume of 1.28 gpf or less, and must meet the performance requirements of ASME 19.2/CSA B45.1 and pass the 350 grams MaP.

Dual-flush devices (1.6/1.1 gpf) are considered HET.

That's 20% less than most toilets on the market today.

The current toilet standard is 1.6 gpf.



Pressure Assist Toilets

Air compressed as inner tank refills, Compressed air increases flush velocity

1.6 gpf, 1.28 gpf and
1.0 gpf products



An HEU is a urinal with a maximum flush volume of 0.5 gpf or less, and must meet the performance requirements of ASME 19.2/CSA B45.1.

That's 50% less than today's standard! The current urinal standard is 1.0 gpf.



An HELF is a lavatory faucet with a maximum flow rate of 1.5 gpm and a minimum flow rate of 0.8 gpm, and must meet the performance requirements of ASME 112.18.1/CSA B45.0.

The current lavatory faucet standard is 2.2 gpm.

HELF

HIGH-EFFICIENCY LAVATORY FAUCET



Saving water and energy Low-flow showerheads can reduce flow rates from around 5 gpm to 2 gpm or less, and are inexpensive to install.

Hot water use for an average shower can be reduced from around 50 gallons to 20 gallons or less.

There is a wide variety of low-flow showerheads available, including the popular pulsating or "massage" type.

Some of these showerheads incorporate a valve or pushbutton that interrupts the water flow while "soaping up", saving even more.

More Ways to Save High Efficiency Showerheads



Why is Saving Water Important?

It is predicted that by 2015 drinking water access could be a major source of world conflict (U.S. Central Intelligence Agency).

Water is our next utility crisis. According to the EPA, our limited supply of water and growing demand is “the biggest environmental issue that we face in the 21st Century.”

At least 36 states are anticipating local, regional, or statewide water shortages by 2013, even under non-drought conditions (Source: EPA).



Reducing Water Use – Legislative

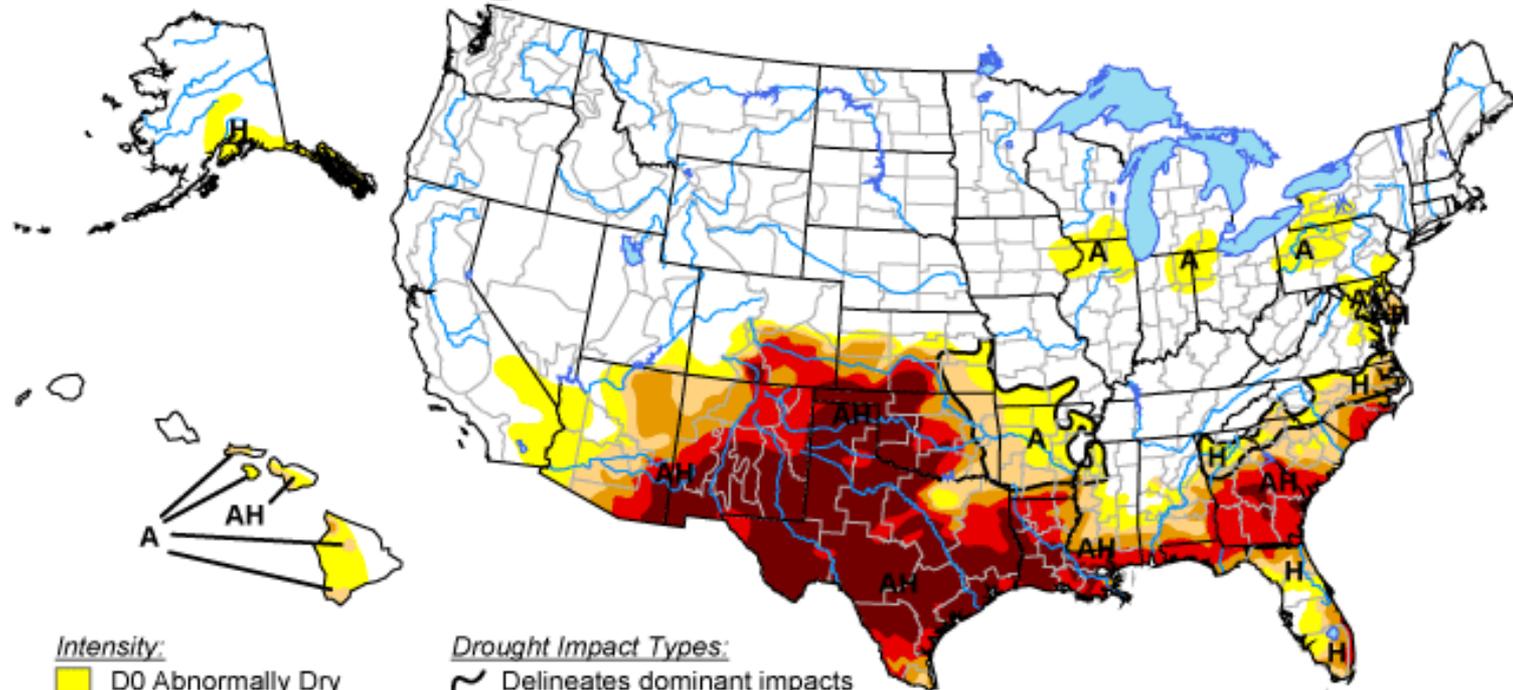
Water shortages in the United States are prompting legislation and development of water conservation programs on a larger scale.

Arizona	City of Surprise Ordinance #08-22 Maximum Allowable Water Consumption Flow Rates
California	California Green Building Code
Colorado	Boulder County Build Smart; Fort Collins Water Conservation Ordinance draft
Florida	Miami Dade Ordinance 08-14 Relating to Water Efficiency Standards
Georgia	Dekalb County Inefficient Plumbing Fixtures Replacement Ordinance
Hawaii	Senate Bill SB556 – Relating to Low-Flush Toilet
North Carolina	Recommendations for Water Efficiency Standards
New Jersey	House Bill A1628 - Permits water supply service and sewerage service sub-metering in multi-family dwellings to promote water conservation
Texas	House Bill 2667 - Relating to Performance Standards for Plumbing Fixtures Sold in this State; Dallas Green Building Ordinance
Washington	Senate Bill SB 2047 - Water Efficiency Appliances

U.S. Drought Monitor

July 19, 2011

Valid 8 a.m. EDT



Intensity:

-  D0 Abnormally Dry
-  D1 Drought - Moderate
-  D2 Drought - Severe
-  D3 Drought - Extreme
-  D4 Drought - Exceptional

Drought Impact Types:

-  Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

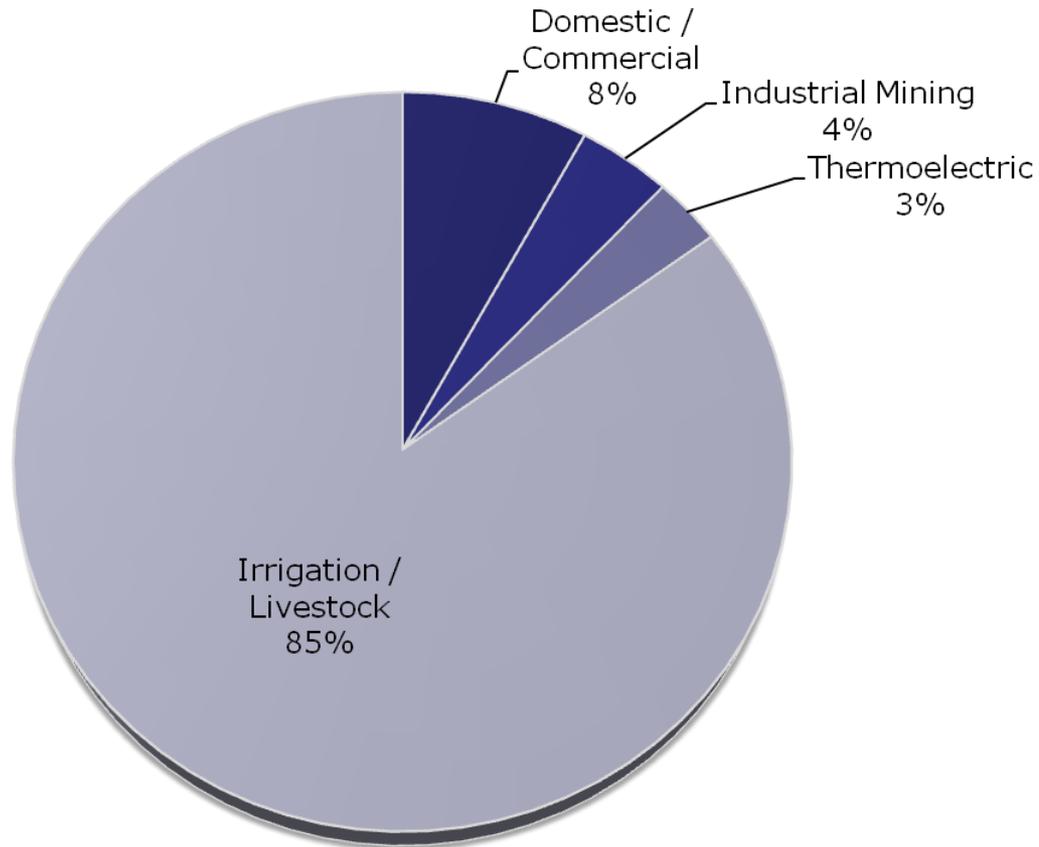
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>



Released Thursday, July 21, 2011
Author: Matthew Rosencrans, NOAA/NWS/NCEP/CPC

U.S. Total Water Consumption



Standards

- Federal initiation – energy policy act (EPAAct) of 2005
- Green Building Council – LEED
- Enforcement comes through city and state ordinances and codes that adopt the various water conserving standards.



EPAct Water Use Standards

- Toilets – 1.6 gpf
- Urinals – 1.0 gpf
- Showerheads – 2.5 gpm @ 80 psi (or 2.2 gpm @ 60 psi)
- Commercial faucets – 0.5 gpm @ 80 psi
- Metering faucets – 0.25 gallon per cycle @ 80 psi



EPA Act Water Use Standards

National Efficiency BASELINES

Commercial Fixtures, Fittings and Appliances	Flow Requirement
Commercial Toilets	1.6 gpf, except blow-out fixtures: 3.5-gpf
Commercial Urinals	1.0 gpf
Commercial Lavatory (restroom) Faucets	2.2-gpm at 60 psi - Private applications only (hotel-motel guest rooms, hospital patient rooms) 0.5 gpm at 60 psi, all others except private applications 0.25 gallons per cycle for metering faucets
Commercial prerinse spray valves (for food service applications)	Flow rate less than or equal to 1.6 gpm (no pressure specified, no performance requirement)

EPA Act Water Use Standards

National Efficiency BASELINES

Residential Fixtures, Fittings and Appliances	Flow Requirement
Residential Toilets	1.6 gpf
Residential Lavatory (restroom) Faucets	2.2 gpm at 60 psi
Residential Kitchen Faucets	2.2 gpm at 60 psi
Residential Showerheads	2.5 gpm at 80 psi per shower stall

Drainline carry

- If you don't have enough energy, you can't carry the waste.
- Factors of drain line carry
 - Cross sectional of pipe
 - Coefficient of roughness
 - Flow rate inside the pipe
 - Pitch of pipe
- American Society of Plumbing Engineers Research Foundation (ASPERF)



Thank You!

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Questions? Email tsmith@engbldg.com