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A River of Energy Solutions

Saving Water 101 – Why and How?

Roy Sieber, ERG

Saving Water – Why do it?

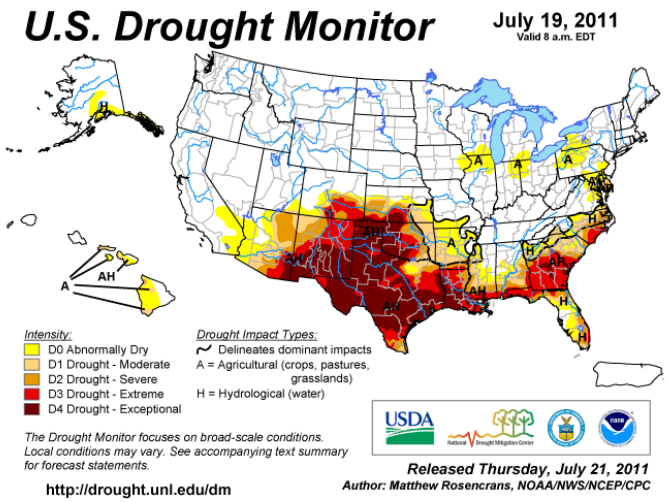
- It's a requirement!
  - EO 13423 , "Strengthening Federal Environmental, Energy, and Transportation Management." 24 January 2007
    - Establish FY 2007 water use baseline
      - Potable Water (drinking water quality)
      - Calculated as water use intensity, Gallons/Square Foot (gal/gsf)
    - Reduce water use intensity 2% per year, 2008 to 2015, for 16 % overall savings
    - Agency basis

Saving Water – Why do it?

- EO 13514, "Federal Leadership in Environmental, Energy, and Economic Performance." 5 October 2009.
  - Extend EO 13423 2% per year reduction in potable water use intensity (gallon/gsf) to FY 2020
    - Still use FY 2007 as baseline
    - 26% total reduction by 2020
  - Reduce industrial, landscaping, and agricultural water use 2% per year
    - FY 2010 baseline
    - 20% total reduction by 2020
    - Measured on a gallon basis
    - Does not include water already tracked as part of FY 2007 baseline

Saving Water – It's the right thing to do!

- Between 1950 and 2000, U.S. population doubled while the demand on public supply systems more than tripled.
- GAO: At least 36 states are anticipating water shortages by 2013.
- To preserve our water supply for future generations, we need to use water more efficiently.
- Save Money! Water and sewer fees average $5.80 per 1,000 gallons and are rising at well above the inflation rate



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Climate Change & Water

- Potential regional impacts on water resources:
  - Changing precipitation patterns and distribution
  - Shrinking snowpacks, glaciers, reservoirs
  - Increasing stormwater runoff, water quality hazards
  - Rising sea levels, saltwater intrusion

- "Of all the potential threats posed by climatic variability and change, those associated with water resources are arguably the most consequential for both society and the environment" USGS, 2010

Water and Energy Use Are Linked

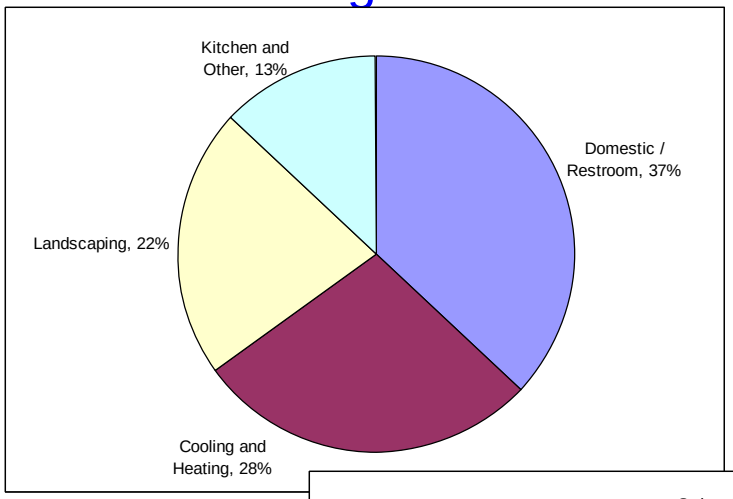
- Thermoelectric power generation accounts for 39% of all freshwater withdrawals and 3% of freshwater consumption in the US http://water.usgs.gov/watuse/pdf1995/html/
- On average it takes 3.3 kWh per 1,000 gallons to provide water and treat wastewater EPRI, 2002, Report 1006787
  - Not including energy to provide hot water, which requires significant additional energy

Getting Started

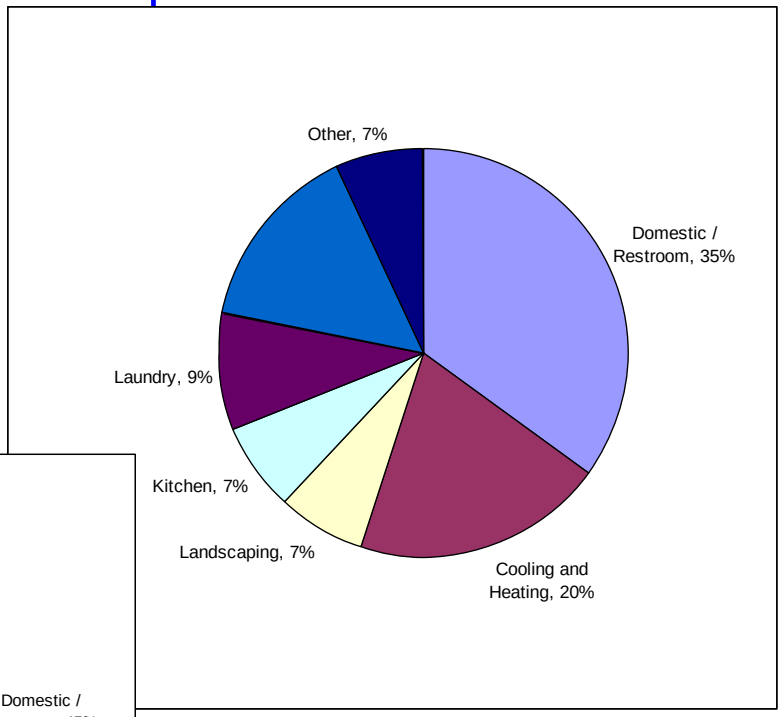
- Establish and evaluate your baseline data
  - Agency level: Focus on largest water using facilities
  - Facility level: Focus on largest water using activities
- Build a Team, communicate goals, assign responsibilities
  - HQ and regional engineering staff
  - Energy, Facility managers
  - Operational personnel
  - All employees

Your Mileage May Vary

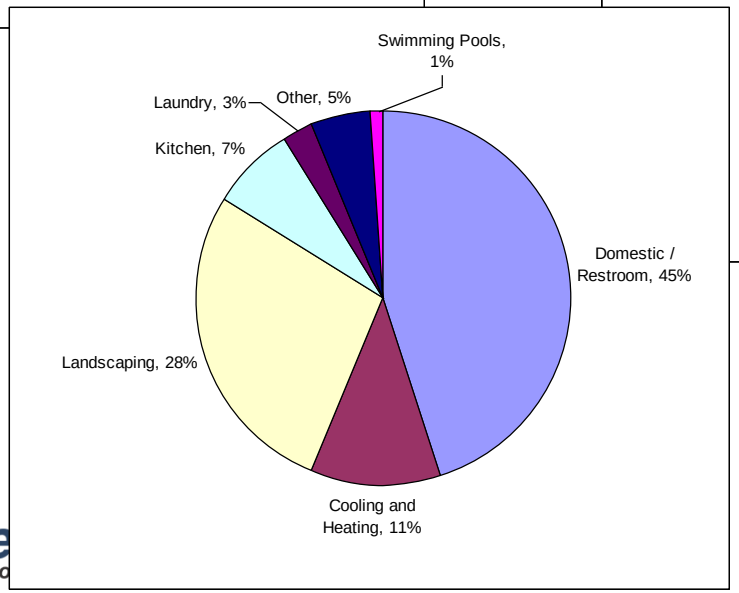
Office Buildings



Hospitals



Schools



Source: Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program, US EPA

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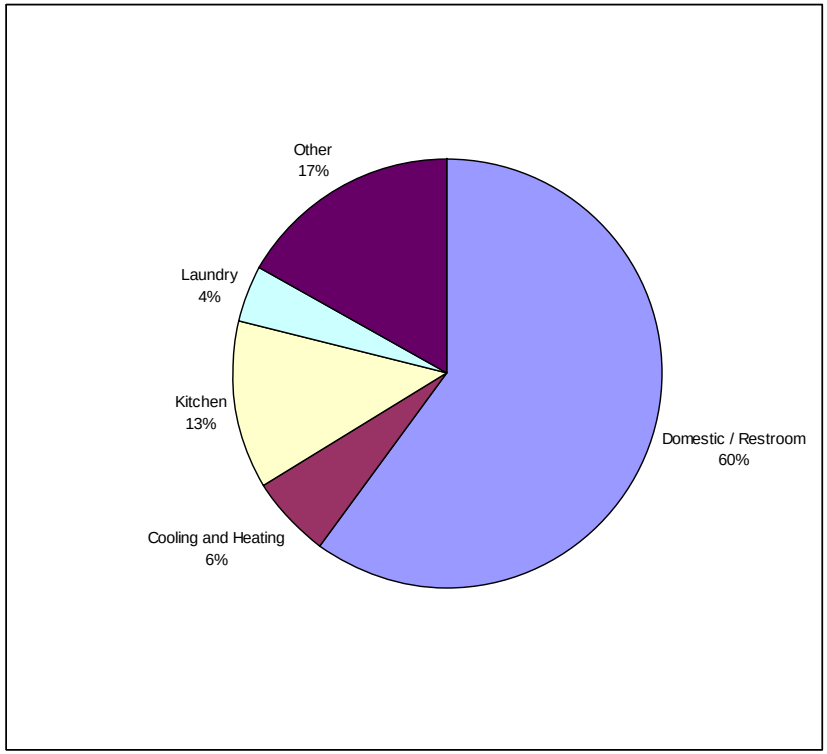
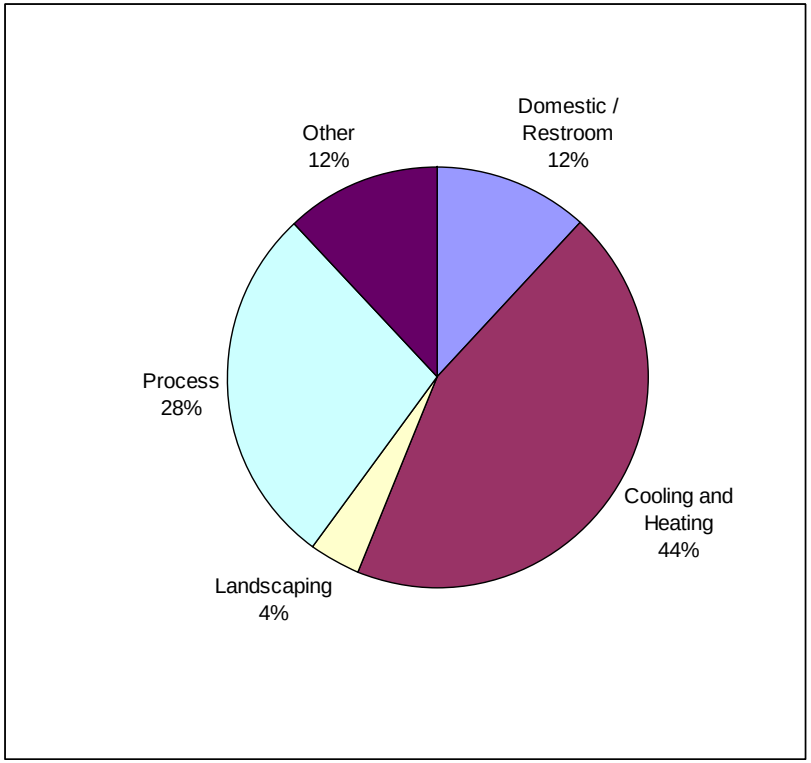
Water Use Varies by Facility Type

Prisons



Research Laboratories



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Use Existing Plans and Tools

- Strategic Sustainability Performance Plan
  - Established by every agency
  - June 2010 first submittal, updated annually
  - Goal 6: Water Use Efficiency and Management
- Facility Assessments under EISA 2007
  - Evaluate 25% of covered facilities each year
    - Identify and implement life cycle cost-effective measures
    - Can bundle measures into combined projects

Resources

- In house staff
- Local water utility
- Water Efficiency Consultants
- Energy Saving Performance Contracts (ESPCs)
- Utility Energy Service Contracts (UESCs)
- First stop for more information:

  http://www.fedcenter.gov/programs/water/

Keys to Successful Water Management

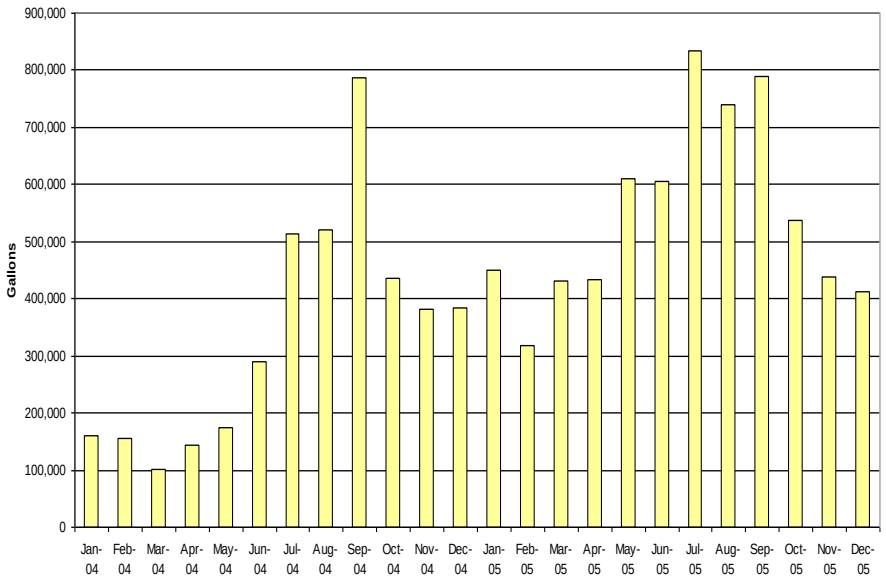
- Make sure existing systems are operating correctly
- Invest capital to replace old, inefficient equipment
- Routinely monitor performance to prevent backsliding and respond quickly to system upsets

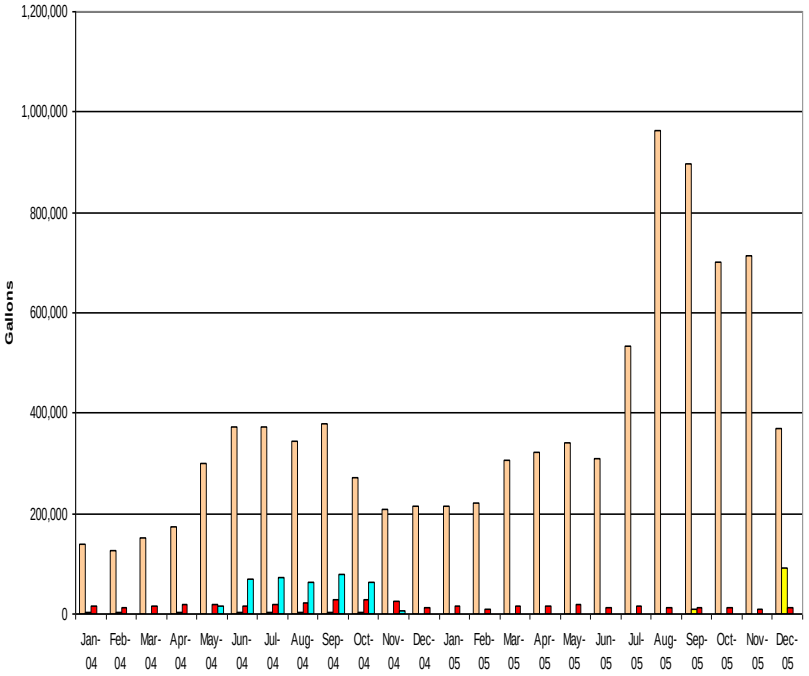
Seven Simple Saving Ideas

1. Look at your data – and act on it!
2. Pay attention to tempering water
3. Use irrigation water effectively
4. Make sure your cooling towers work properly
5. Eliminate single pass cooling
6. Consider alternate sources of water
7. Upgrade sanitary fixtures and fittings

Look at Your Data – and Act on It

- Make use of all the data you are collecting – it will tell you how your facilities are performing





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Pay Attention to Tempering Water

- Tempering water is used in many steam based systems to directly cool condensed water going to drain
  - Boiler blowdown
  - Flash tanks
  - Steam sterilizer discharge
- Does tempering water run all the time, even when not needed?

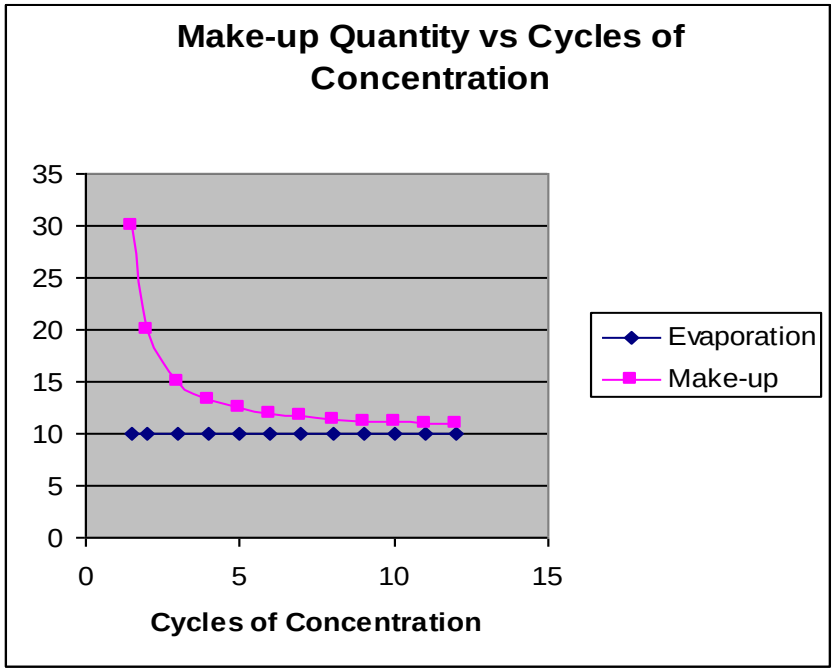
Use Irrigation Water Effectively

Some questions to consider:

- Do you need or want an irrigated landscape?
- Does your irrigation schedule match the water needs of your landscape?
  - By zone?
  - Throughout the growing season?
- Is irrigation water applied where it is needed, in a uniform manner?

Ensure that Cooling Towers Work Properly

Maintain control over tower to maximize cycles of concentration, given your make-up water quality



Does float valve cut off cleanly?

Constant overflow to drain?

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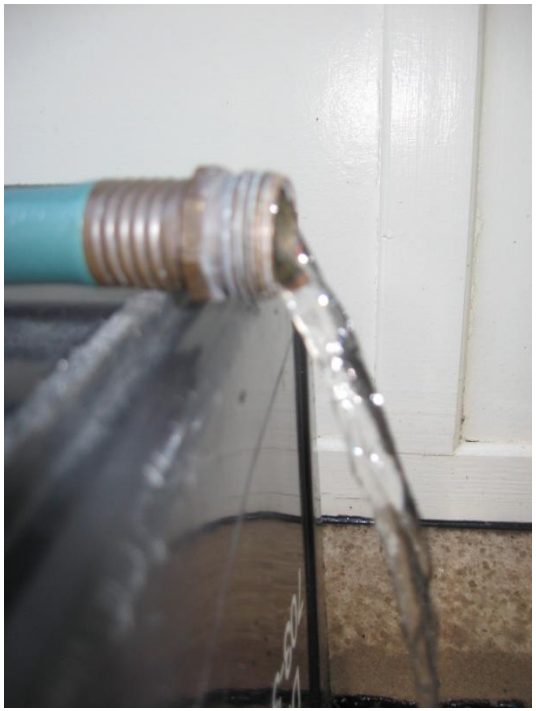
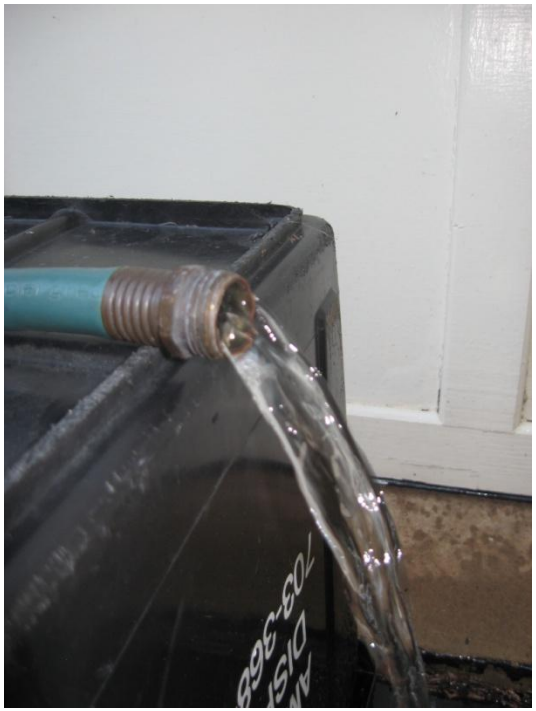
Eliminate Single Pass Cooling Water



1 gpm
500,000 gallons/year
$4,300/year *



2 gpm
1,000,000 gallons/year
$8,700/year*

6 gpm
3,000,000 gallons/year
$26,000/year *

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*at national average cost of $8.25 per 1,000 gallons

Consider Alternate Sources of Water

- Possible Sources
  - Air Handler Condensate ★
  - Rain Water
  - RO Reject
- Considerations
  - Storage (is it generated when you need it?)
  - Treatment (is it of sufficient quality for the planned use?)
  - Logistics (is it generated where you need it?)

Upgrade Sanitary Fixtures and Fittings

- Faucets – Use 0.5 gpm in public use restrooms (usually retrofit easily)
- Showerheads – Use WaterSense® labeled (2.0 gpm or less)
- Toilets
  - Tank type – Use WaterSense labeled (1.28 gpf)
  - Flush valve – Options:1.6 gpf, 1.28 gpf, Dual flush
- Urinals – Use WaterSense labeled (0.5 gpf or less)

Take Aways

- Assess how you use water at the facility and agency level – it will point you to savings
- Attentive O&M and appropriate investment are both needed to achieve and maintain savings

Questions?

For further information contact:

Roy Sieber

ERG

roy.sieber@erg.com

703-633-1614