



The Solutions Network

Rochester, New York

Sustainability: Beyond Energy Water Management Planning

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The Steps of Sound Water Management

Where are you coming from?

Find out the stakeholders and rules and regulations

Where are you at?

Assess current conditions and quantify water consumption

Where are you going?

Identify potential projects and set goals

What to do if...?

Develop proactive plan for contingencies

August 8-11, 2004

www.energy2004.ee.doe.gov



Executive Order 13123 Water Goals Basics

- ❖ Requires all Federal sites to:
 - Report bi-annually on potable water use in million gallons per year
 - Develop Site level Water Management Plan
 - Implement four Best Management Practices (BMP)

More information can be found at:

http://www.eere.energy.gov/femp/technologies/water_efficiency.cfm



FEMP Best Management Practices

Sites must implement at least four BMPs by 2010

- 1. Public Outreach and Education**
- 2. Distribution Audits and Leak Detection**
- 3. Water Efficient Irrigation**
- 4. Toilets and Urinals**
- 5. Showerheads and Faucets**
- 6. Boilers and Steam Systems**
- 7. Single Pass Cooling Systems**
- 8. Cooling Towers**
- 9. Misc. High Water Consuming Processes**
- 10. Water Reuse and Recycle**



Water Management Plan

Executive Order Requirements

- ❖ Develop or update facility water management plan
- ❖ Include in current planning process and operating plan
- ❖ Plan should include at a minimum:
 1. Facility Information
 2. Utility Information
 3. O&M Recommendations
 4. Emergency Response
 5. Comprehensive Planning Process



Getting Started on the Plan

- ❖ Set a study period
- ❖ Choose a consistent unit of measure
- ❖ Obtain sample audit worksheets – modify if necessary
- ❖ Gather Information:
 - Operating schedules
 - Staff and visitor numbers – gender breakout if possible
 - List of water using equipment
 - List of meters and location
 - Plumbing fixture information
 - Facility information – age, sqft
 - Irrigation information – schedule, equipment type
 - Water and sewer bills



Comprehensive Utility Information

- ❖ Rate schedules
- ❖ Copies of water/sewer bills for the past two years
- ❖ Financial or technical assistance available
- ❖ Contacts for the agency or office that pays the water/sewer bills
- ❖ Water production information (if applicable)

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Comprehensive Utility Information

What do we do with the information?

- ❖ Calculate the marginal cost of water and sewer charges
- ❖ Verify that schedule and fees are accurate and appropriate
- ❖ Identify opportunities for savings such as meter downsizing or sewer credits



Water Auditing

Goals of Auditing:

- ❖ Identify -- Quantify -- Verify
 - How much water do you use?
 - Where is it going?
 - Water Balance
 - Distribution Curve
 - End-use Breakout



Water Balance

- Municipal Systems
- Surface water
- Well Water
- Reclamation

Water Sources

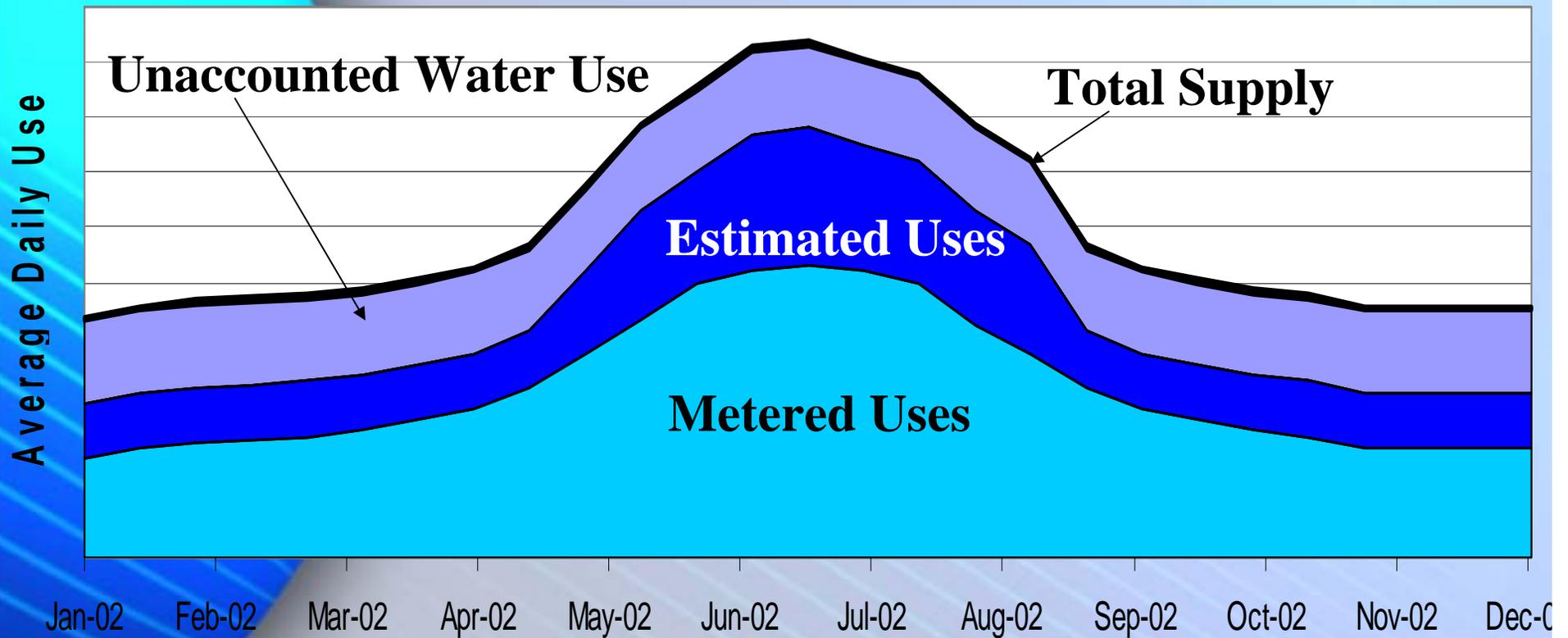
- Metered Uses
- Unauthorized Use
- Leaks
- Evaporation
- Meter Inaccuracies

Water Uses

What goes in must come out ... somewhere!!



Annual Distribution Curve



Goal – track down as much water use as possible

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Walk-Through Audits



Gather Facility information

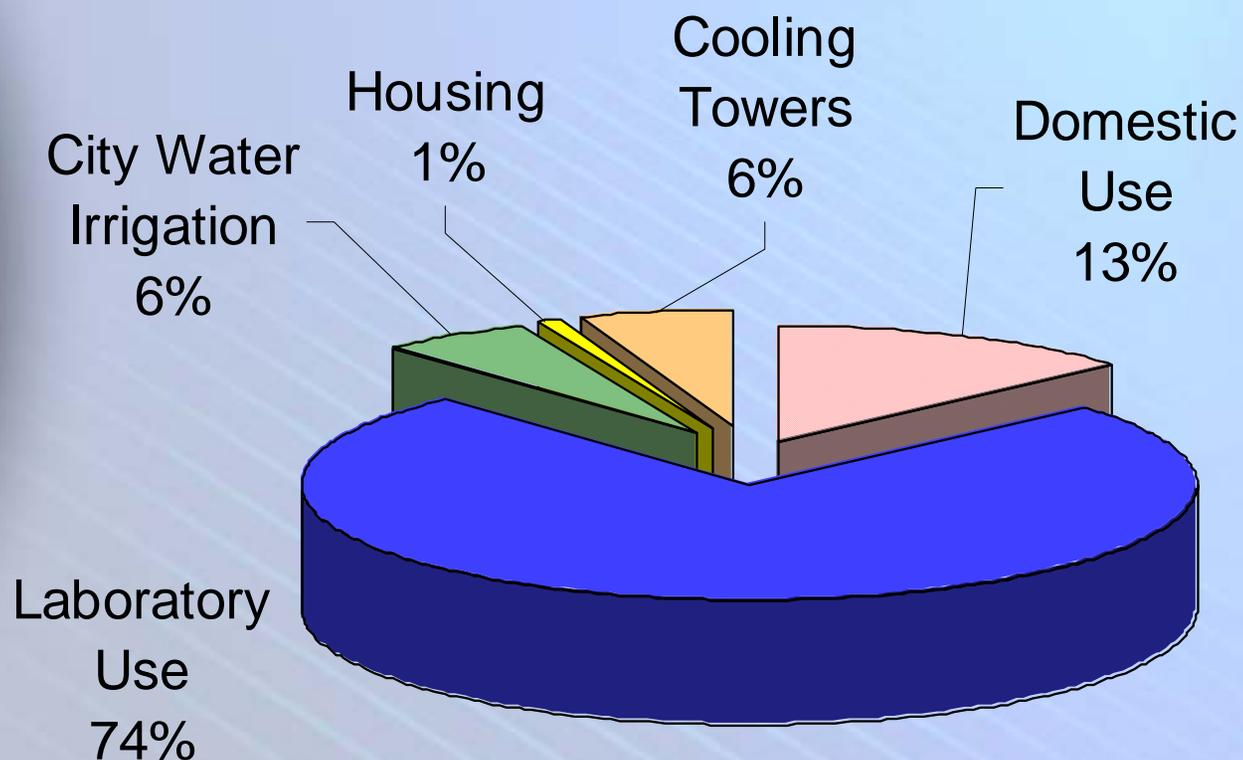
- ❖ All major water using processes
- ❖ Location and accuracy of water measurement devices
- ❖ Location of main shut-off valves
- ❖ Verify operating schedules and occupancy of buildings.
- ❖ Identify O&M practices and opportunities for improvement

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End-Use Pie Chart Example



Example pie chart – is not representative of an average

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O&M Recommendations

Federal O&M Examples

- ❖ Proper chemical treatment on cooling towers
- ❖ Routinely inspect steam traps and lines
- ❖ Inventory all single pass cooling:
 - ensure equipment is adjusted to spec
 - shut down when not operating
- ❖ Leak detection and repair
- ❖ Efficient landscape practices



Warren Gretz, NREL/PIX 06451

This cooling system helps DOE reduce energy and water consumption

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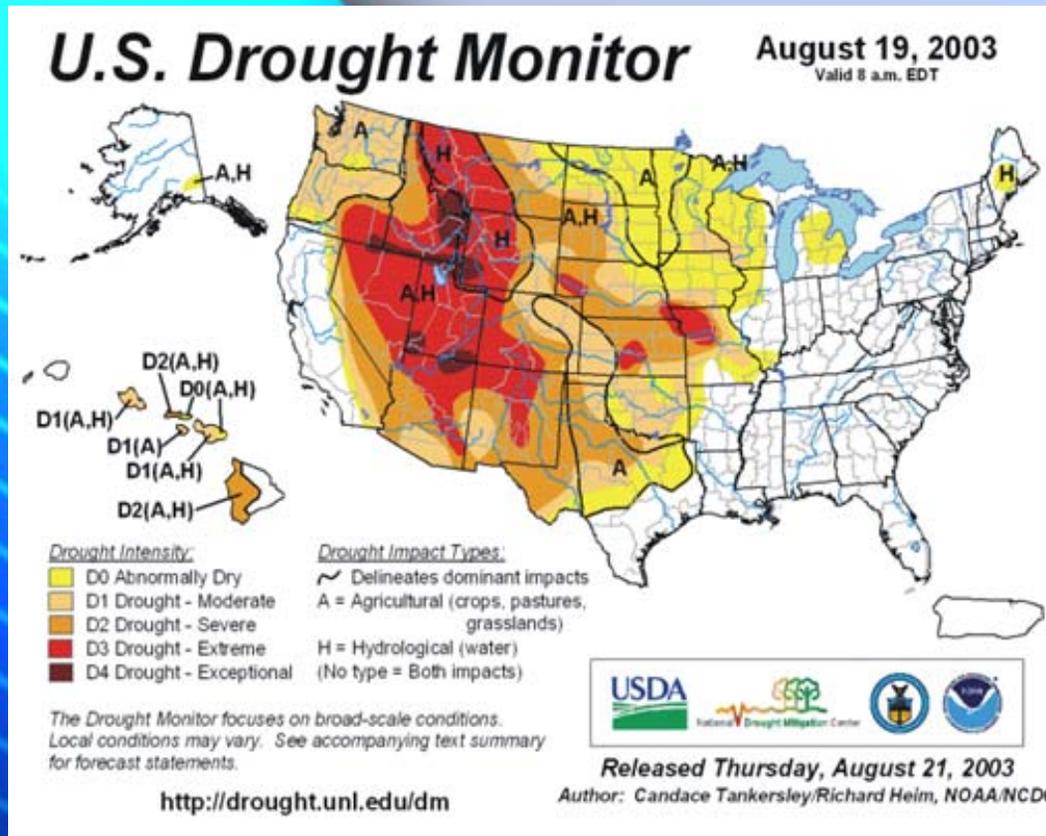
Efficient Water Technologies to Examine

- ❖ Low flush and dual flush toilets
- ❖ No-water urinals
- ❖ Horizontal axis washer
- ❖ Drip and subsurface irrigation technologies
- ❖ Water re-use and recycle

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Contingency Planning



- ❖ Methodology for monitoring threats
- ❖ Trigger mechanism for enacting mitigation
- ❖ Response mitigation that is tied to triggers
- ❖ Integrate mitigation into operating plans



Comprehensive Planning

Place water conservation as a priority along side energy efficiency:

- ❖ Include water issues in the **earliest** stages of planning and design
- ❖ Include water, waste water, and storm water issues
- ❖ Consider bundling water measures in energy projects
- ❖ Consider alternative financing mechanisms for funding water projects along with energy



For more information

- ❖ Air Force Water Conservation Guidebook: <http://www.afcesa.af.mil>
- ❖ GSA Water Management Guide: go to www.gsa.gov and search under "Water Management Guide"
- ❖ Water Wiser: www.waterwiser.org
- ❖ American Water Works Association: www.awwa.org
- ❖ California Urban Water Conservation Council: <http://www.cuwcc.org>
- ❖ Irrigation Association: www.irrigation.org
- ❖ National Drought Mitigation Center: <http://drought.unl.edu/>



Questions and Answers??

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