

This presentation premiered at WaterSmart Innovations

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Federal Government Water Mandates and Federal Water Efficiency Resources

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Federal Water Efficiency Mandates

Executive Order (EO) 13423

- Potable water use intensity (WUI) reduction through FY 2015



Energy Independence and Security Act 2007

- Comprehensive water evaluations



EO 13514

- Extends potable WUI through FY 2020, adds new water use reduction for ILA* water use



EO 13693

- Supersedes EO 13514 and EO 13423, extends reduction requirements to FY 2025

*ILA = industrial, landscaping, and agricultural

Federal Water Categories



Potable water:
Sufficient quality
and permitted
for human
consumption



ILA water: *non-potable
from freshwater*
sources used in
industrial, landscaping
and agricultural
applications



Alternative water: non-
potable water **NOT**
*supplied from
freshwater*

Alternative Water

Rainwater Harvesting

Gray Water

Condensate Capture

Process Discharge

Wastewater Reclaim

Applications

- Irrigation
- Cooling Tower Make-up
- Toilet/Urinal Flushing
- Vehicle Wash
- Industrial Applications

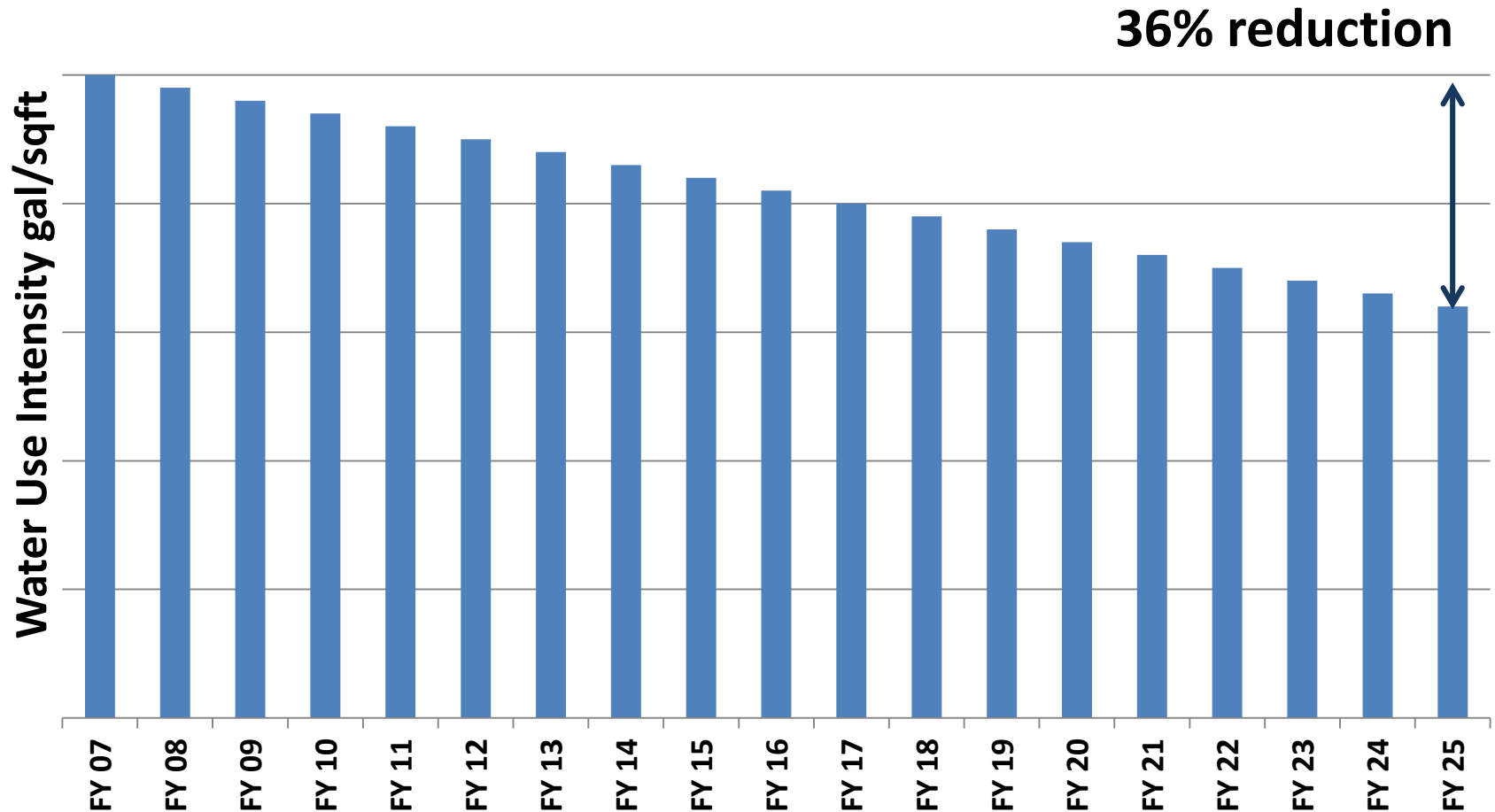
Planning for Federal Sustainability in the Next Decade

REDUCE

- Reduce potable WUI 2% per year through FY25 from FY07 baseline
- Reduce ILA water use by 2% per year through FY25 from FY10 baseline

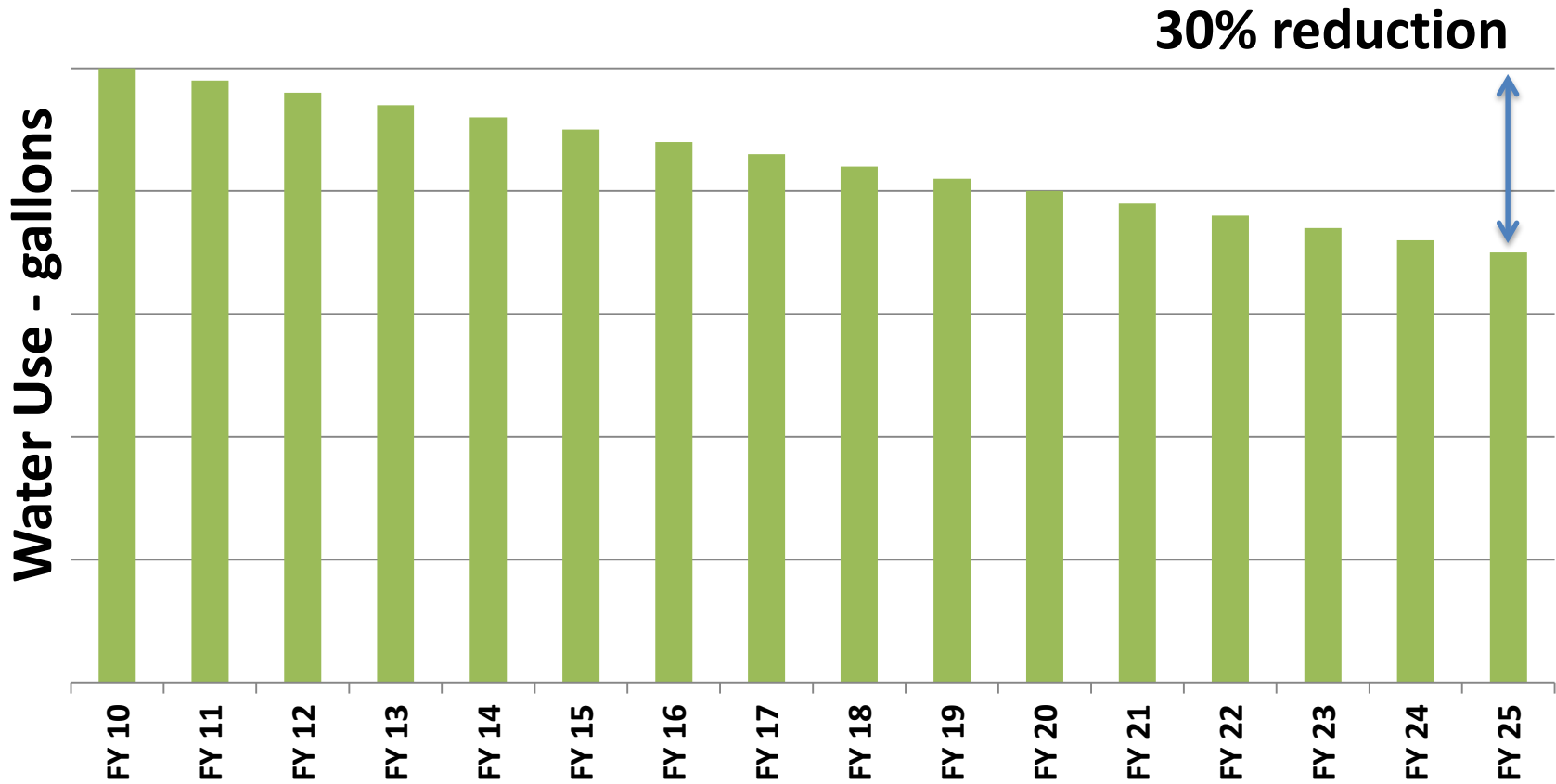
Potable Water Use Intensity Reduction

- WUI reduction: gallons per square feet of facility space
- 2% per year from FY07 through FY25



ILA Water Reduction

- ILA volumetric reduction: gallons
- 2% per year from FY10 through FY25



Planning for Federal Sustainability in the Next Decade

METER

- Install water meters
 - Large water processes > 1,000 gallons per day
 - Irrigated areas > 25,000 square feet
 - All buildings > 1,000 gallons per day

Planning for Federal Sustainability in the Next Decade

BALANCE

- Use water balance data to improve water management



EO 13693 Water Provisions

Planning for Federal Sustainability in the Next Decade

INSTALL

- Install EPA WaterSense products



High Efficiency Tank Toilets



High Efficiency Private Lavatory Faucets



High Efficiency Flushing Urinals



High Efficiency Showerheads



Advanced Landscape Controllers



Pre-rinse Spray Valves

WaterSense Website: <http://www.epa.gov/watersense/>

Planning for Federal Sustainability in the Next Decade

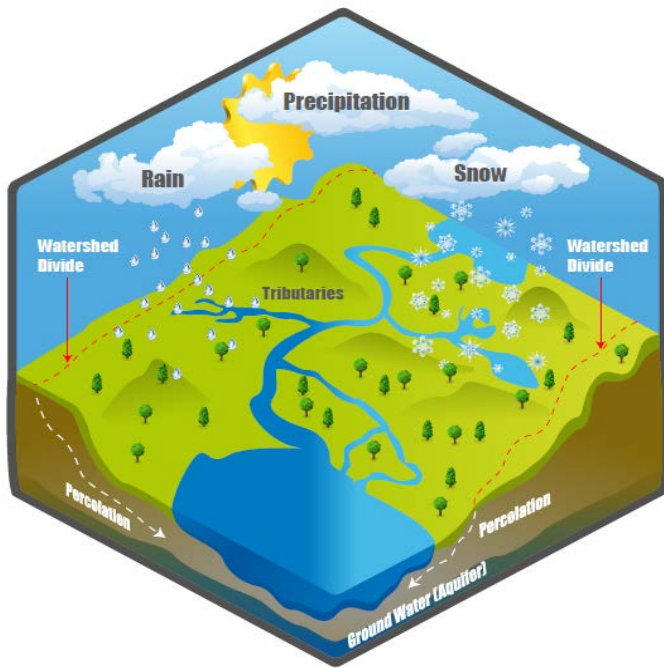
CONSTRUCT

- Construct and renovate net zero water buildings

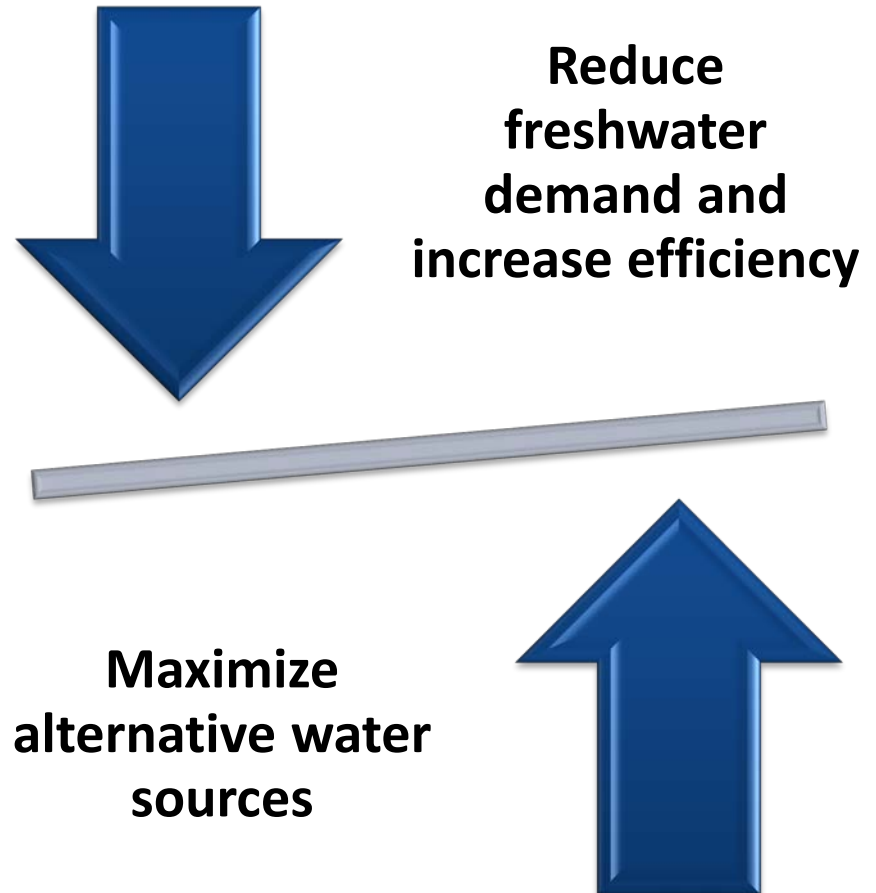
EO 13693 Definition: Net zero water building means a building that is designed, constructed, or renovated and operated to greatly reduce total water consumption, use non-potable sources as much as possible, and recycle and reuse water in order to return the equivalent amount of water as was withdrawn from all sources, including municipal supply, without compromising groundwater and surface water quantity or quality.

Net Zero Water Building

Hydrologic Cycle



Facility Water Cycle



Energy Savings Performance Contract (ESPC) Research

Is the Department of Energy's ESPCs effective at implementing innovative water efficiency projects?

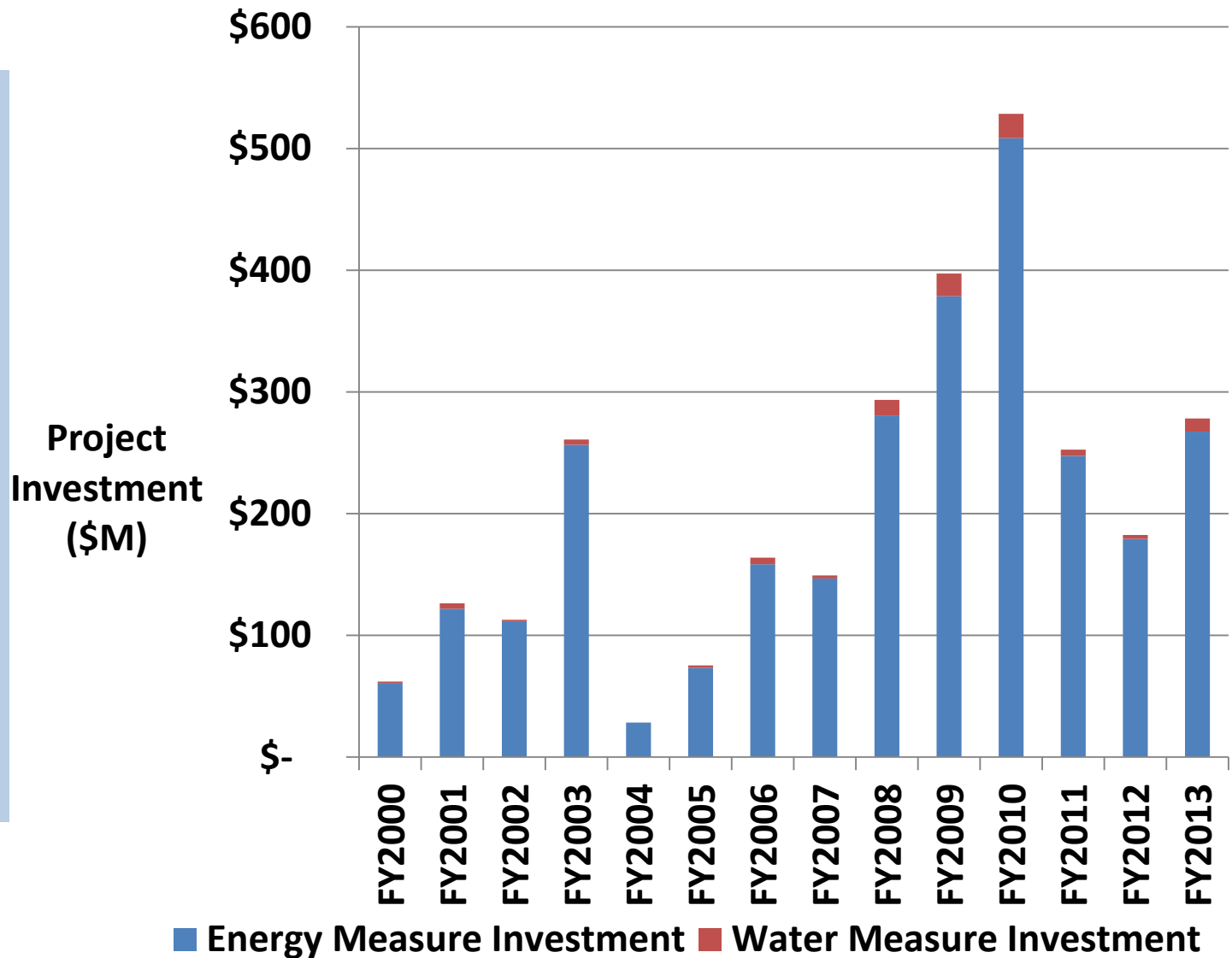
Project scope:

- What is currently being done?
- Where are the gaps?
- What can be done to improve the process?

How Effective are ESPCs at Water Efficiency?

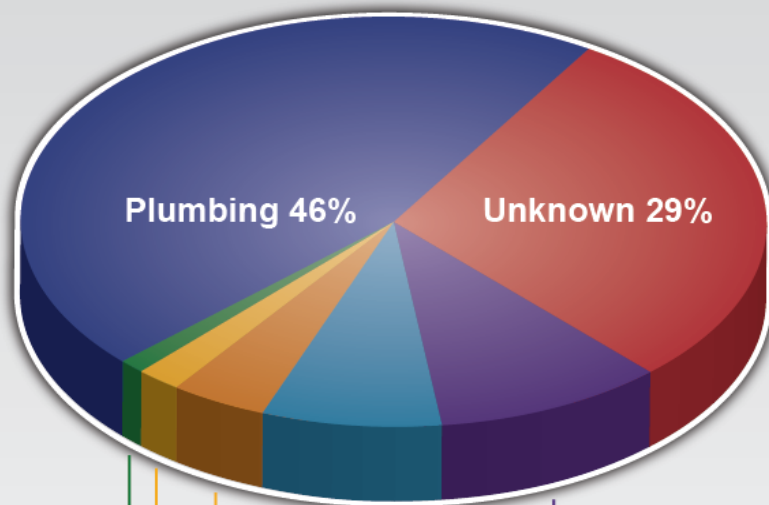
Observations:

- Only 3% of the total investments include water efficiency
- Water cost accounted for 9% of the total utility cost for federal agencies in FY12



What Technologies Are Being Implemented Through ESPCs?

Water Measure Type Breakout



Water Measure Type	Count of Projects	Avg. of Simple Payback
Process Optimization	5	2.7
Cooling/Heating	9	4.5
Irrigation	19	10
Unknown	57	11.1
Plumbing	90	13.7
Other*	15	16.1
Reuse	2	22.5

Reuse 1% Process Optimization 2% Cooling/Heating 4% Other 8% Irrigation 10%

Where Are the Missed Opportunities in ESPCs?

Project Planning

Gap:

No support in water is provided to agencies

Impact:

Opportunities for water measures are missed up front

Negotiation and Award

Gap:

Water balance is not required in investment grade audit

Impact:

Largest water users are not identified and opportunities are missed

Contractor Selection

Gap:

No water expertise is required

Impact:

Lack of water expertise leads to missed opportunities

What Were the Key Findings?

- ***The customer drives innovation!***
- ESCOs are risk adverse
- Agencies need help understanding water efficiency and little support is provided
- Contracts do not require water expertise

Simply put: You get what you ask for

Expand Water Efficiency in Financed Projects

Screen

- What is the potential for water efficiency?

Require Expertise

- Is the contractor qualified?

Conduct a Water Balance

- What are the primary water uses?

Specify Technologies

- Are you choosing the right technologies?

FEMP Water Project Screening Tool – Input Example



Water Project Screening Tool

Site Level Data

1. What is the total facility square footage?

2. Are the majority of your buildings older than 1994? (Y/N)

3. What is the estimated percent of each building type by floor area?

100% remaining

Office

Hospital/healthcare

Barracks

Prison

Laboratory

Dining/commercial kitchen






Gym/pool

Other

4. Does the site operate and maintain the water distribution system? (Y/N)

Next

FEMP Water Project Screening Tool – Output Example

EQUIPMENT	PROJECT POTENTIAL SCORE	WHAT YOUR SCORE MEANS	TECHNOLOGY OPTIONS
<p>PLUMBING</p> 	<p>  Resources: FEMP BMP #6 - Toilets and Urinals FEMP BMP #7 - Faucets and Showers EPA WaterSense </p>	<p>Many of the buildings likely have old plumbing fixtures; upgrading to high efficiency fixtures will save water.</p>	<p>Install high efficiency toilets, urinals, faucets, and showerheads. Ensure the contractor has specific expertise in water-efficient plumbing systems.</p>
<p>COOLING TOWERS</p> 	<p>  ALTERNATIVE WATER PROJECT POTENTIAL  Resources: FEMP BMP #10 - Cooling Tower Management EPA WaterSense </p>	<p>Cooling towers are a significant water user that offers large potential water savings.</p> <p>The site does not currently use alternative water for cooling tower makeup. Alternative water can significantly offset the use of freshwater.</p>	<p>Maximize cycles of concentration. Consider installing real-time controllers to control blowdown and chemical feed. Contract with a company that has specific expertise in this area.</p> <p>Consider switching to alternative water sources for cooling tower makeup, such as harvested rainwater, captured condensate, or reclaimed wastewater.</p>

Water-Efficient Technology Opportunities

Readily available

Easily retrofitted

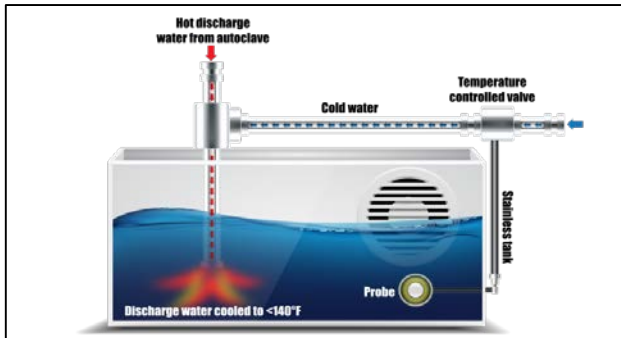
Proven water savings



Multi-stream rotational sprinkler heads



Automatic shut-off device for sprinklers



Steam sterilizer retrofit kit



Advanced cooling tower controls

Water Efficiency Certification

Association of Energy Engineers Certified Water Efficiency Professional



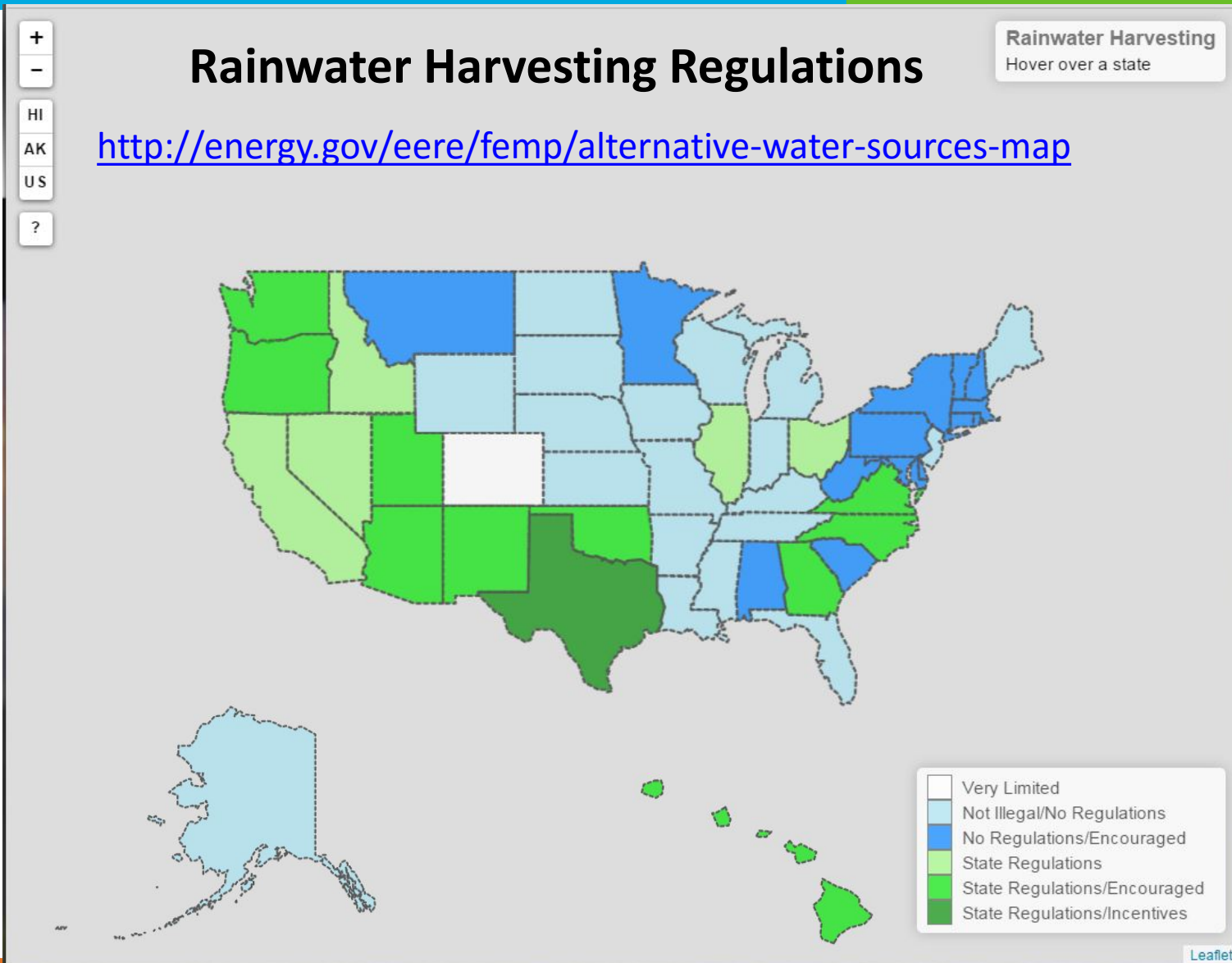
- Comprehensive two-day training
- Exam
- Commercial and institutional focus

<http://www.aeecenter.org/i4a/pages/index.cfm?pageID=4454>

Other Improvements to ESPCs

- Revised Notice of Opportunity template
- Revised measurement and verification (M&V) protocols to include water measures
- Developed training that focuses on M&V protocols for irrigation projects

FEMP Resources: Alternative Water Maps



Rainwater Harvesting Regulations – State Level

Rainwater Harvesting

Texas

Regulated through Water Development Board; Texas tax code section 151.355 provides sales tax exemption of rainwater harvesting equipment; Texas property code 202.007 prevents homeowners associations from banning rainwater harvesting installations; House Bill 3391 requires rainwater harvesting system technology to be incorporated into the design of new state buildings; check county for local incentives

Regulatory Programs:

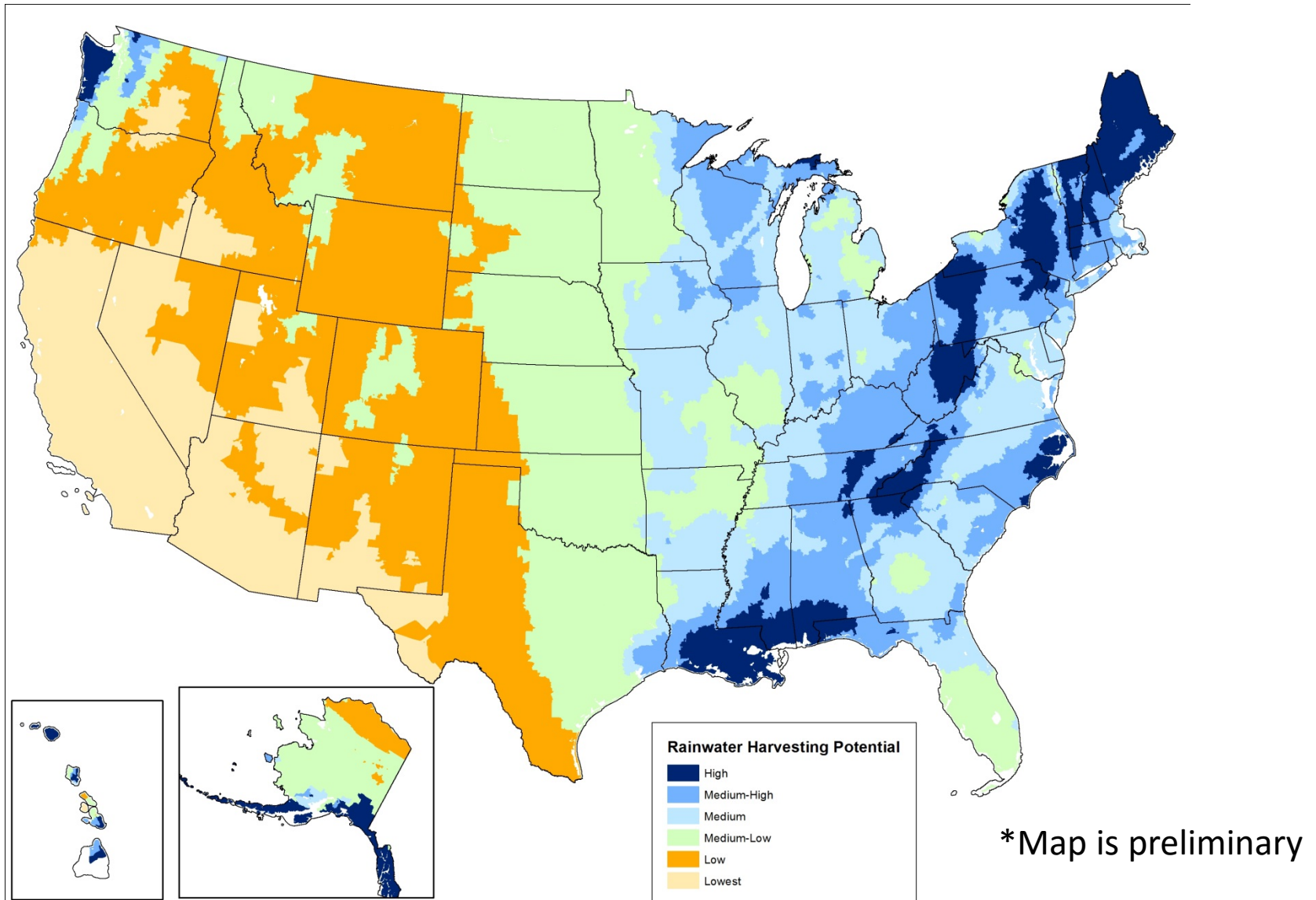
- [Water Development Board](#)

Technical Resources:

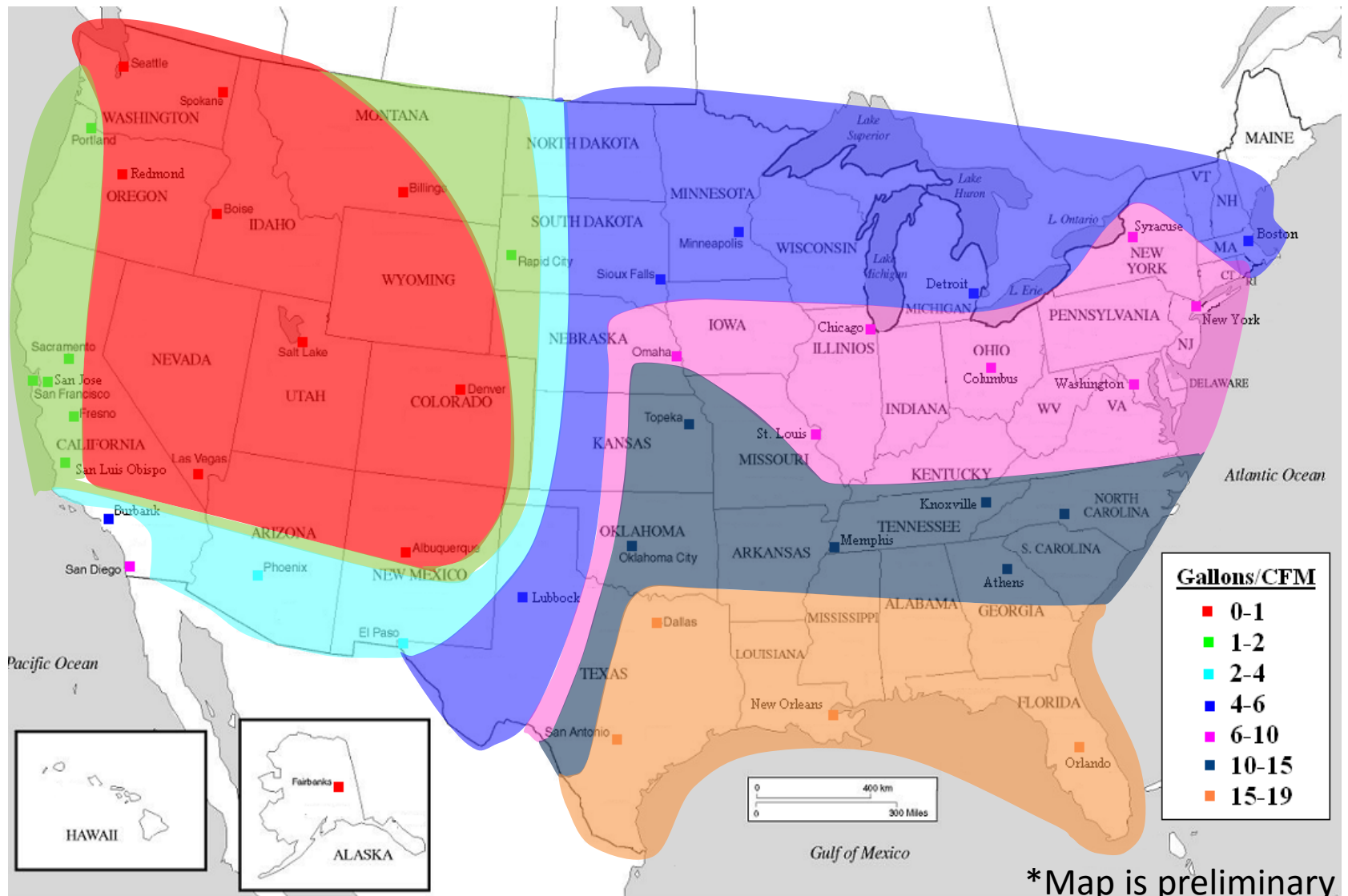
- [Texas Water Development Board rainwater harvesting resources \(including Texas Manual on Rainwater Harvesting\)](#)
- [Texas Rainwater Catchment Association](#)
- [Texas A&M Agrilife Extension](#)

Leaflet

Future Map – Rainwater Harvesting Potential for Irrigation*



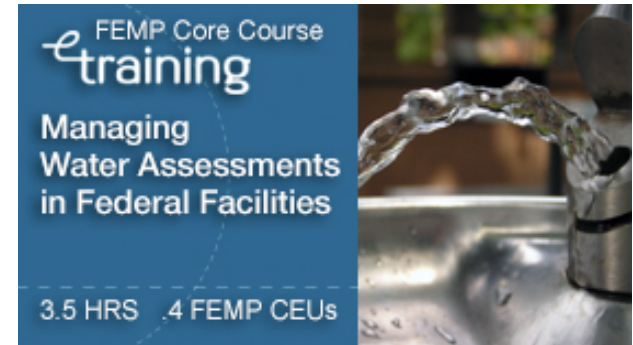
Future Map – Air Handling Condensate Capture Potential*



FEMP Water Management Training

Managing Water Assessments

<https://www4.eere.energy.gov/femp/training/training/managing-water-assessment-federal-facilities>



Best Practices for Comprehensive Water Management

<https://www4.eere.energy.gov/femp/training/training/best-practices-comprehensive-water-management-federal-facilities>



- ** Free
- ** Self-paced
- ** CEU credits

Thank you!

- FEMP Water Reduction Website:

<http://energy.gov/eere/femp/water-use-reduction>

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