The Energy Efficiency-Water Efficiency Nexus

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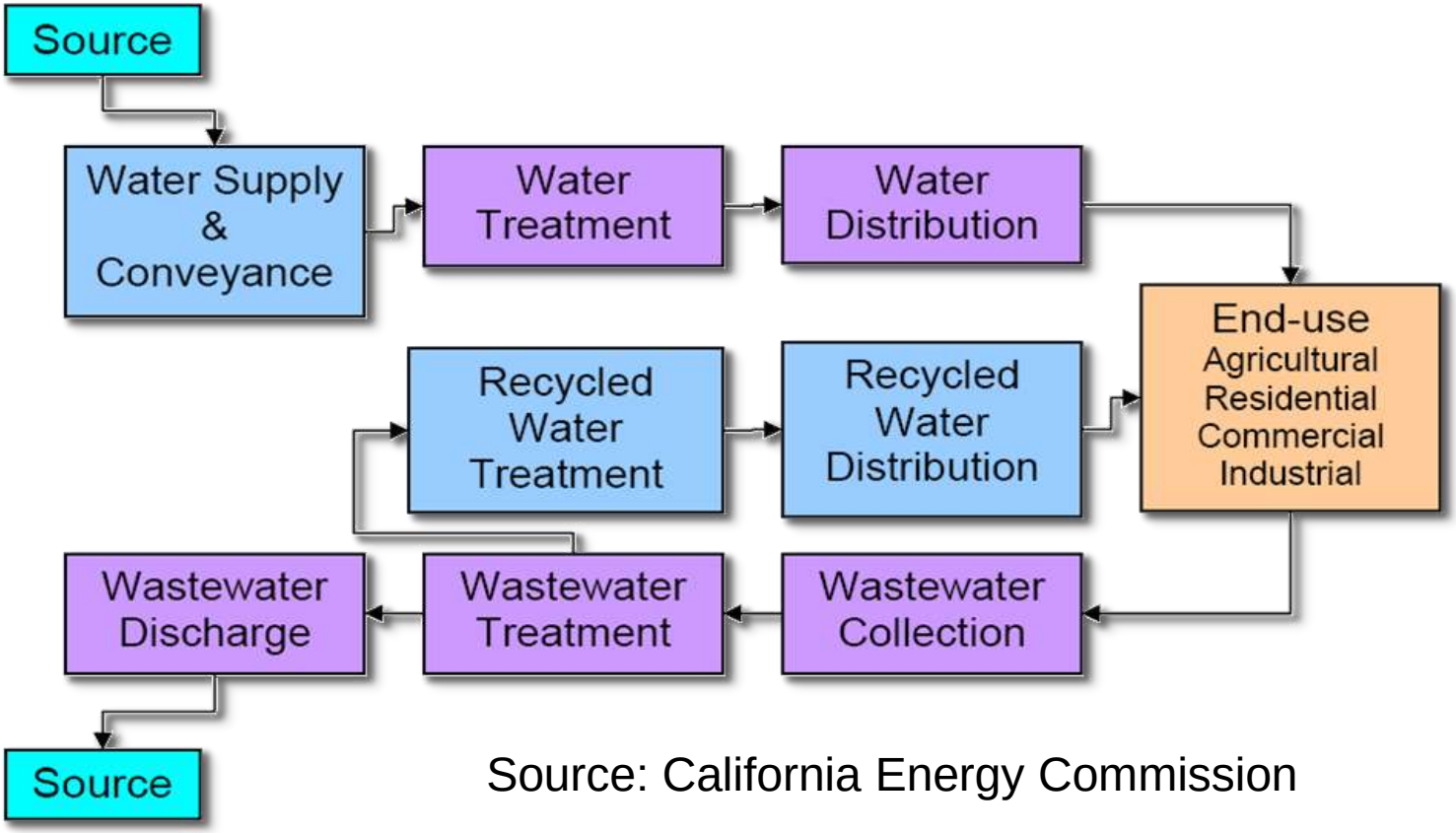
Overview

- Energy use impacts of water supply and treatment systems
- Potential energy and water savings from efficient products and technologies
- Example energy, water, and GHG savings in a typical building
- States issues for consideration
- Conclusions

Energy Use Impacts of Water Supply and Wastewater Treatment

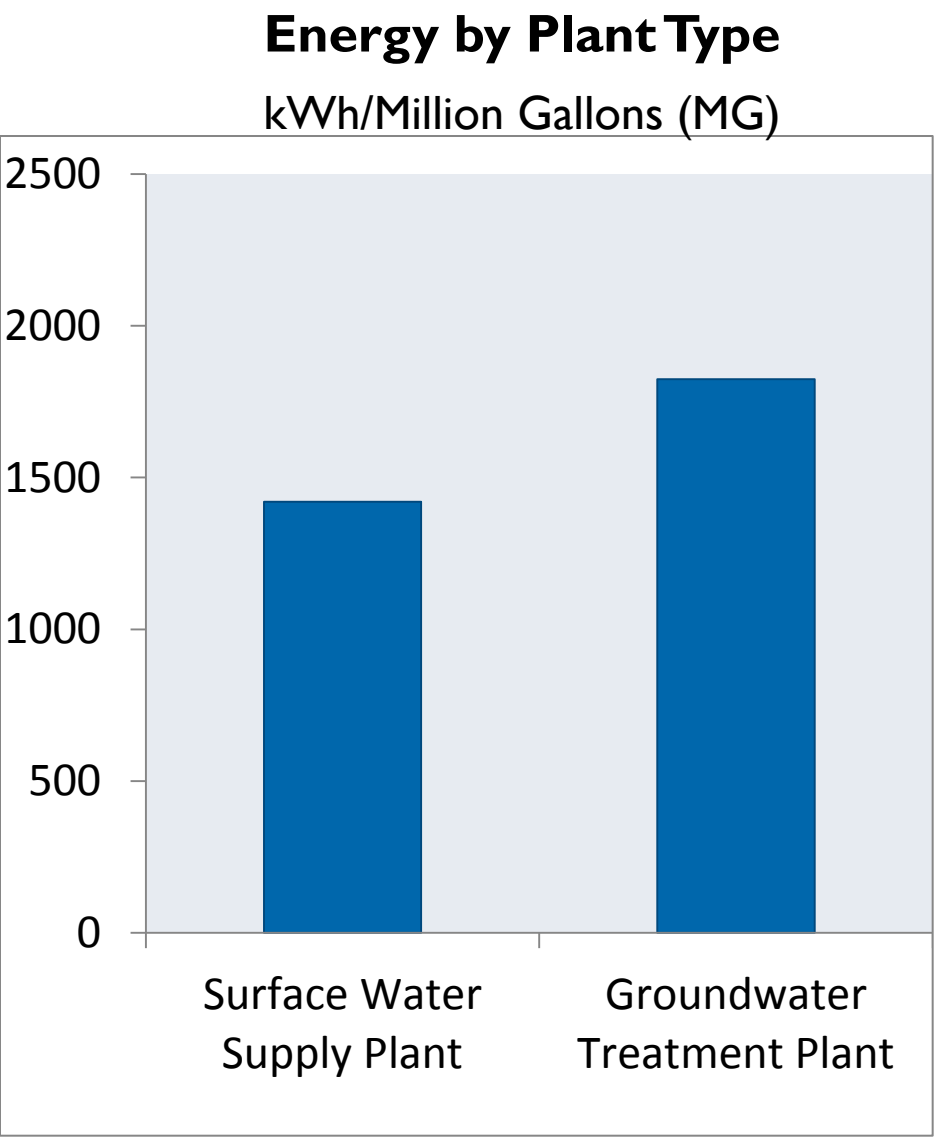
Water Systems are Electricity-Intensive

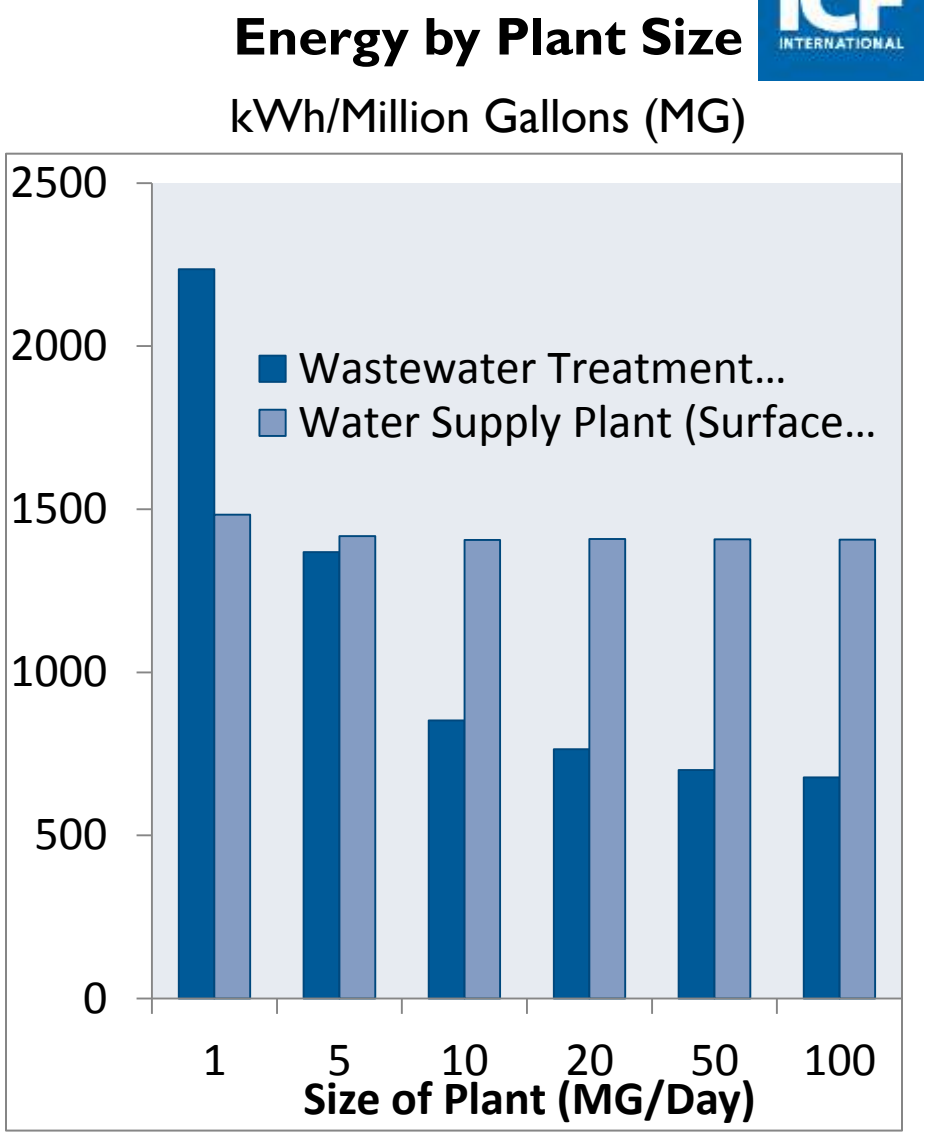
California's Water System Electricity Usage
Is ~20% of total state electricity usage



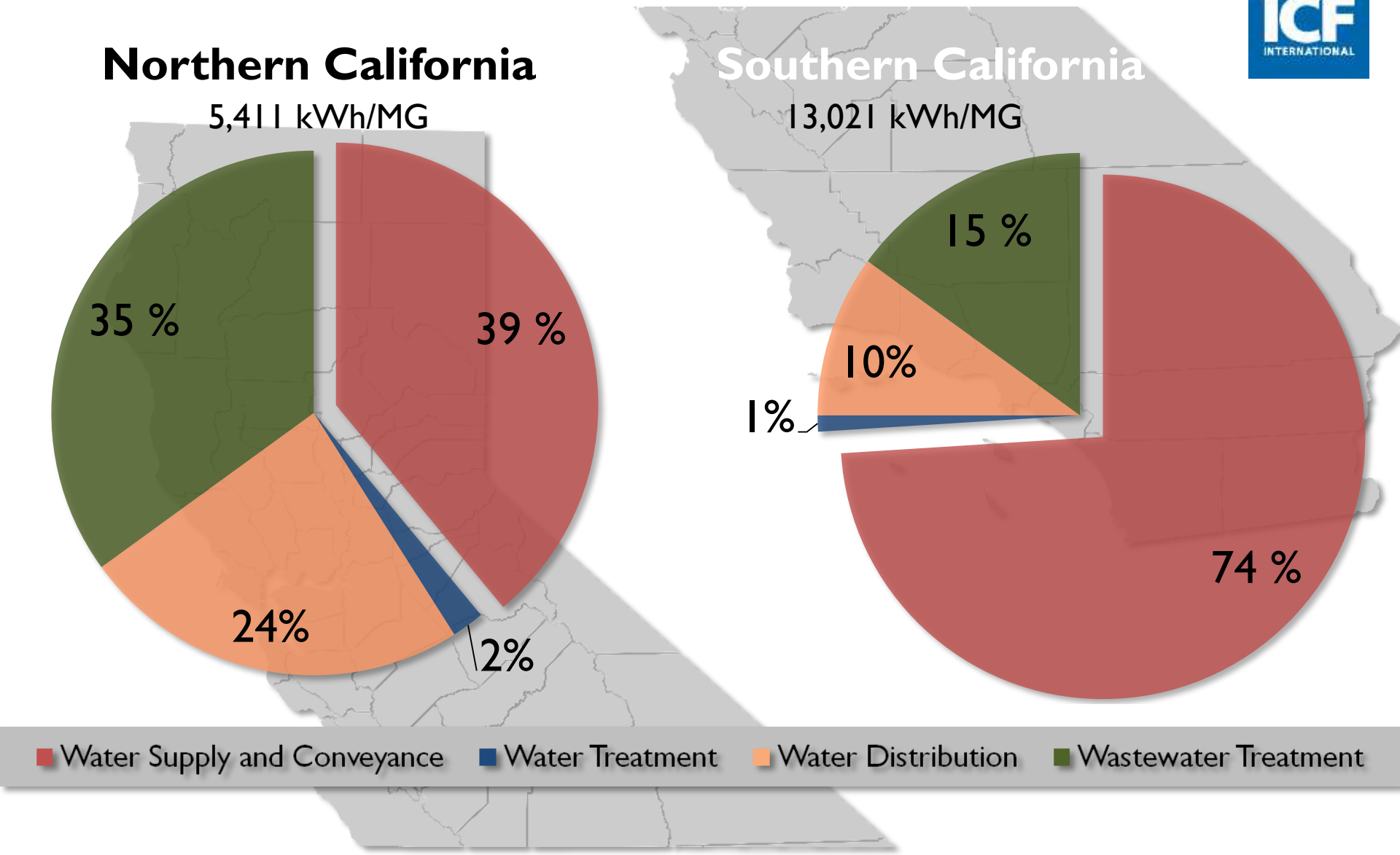
Source: California Energy Commission

Energy Intensity Varies by System Type and Size





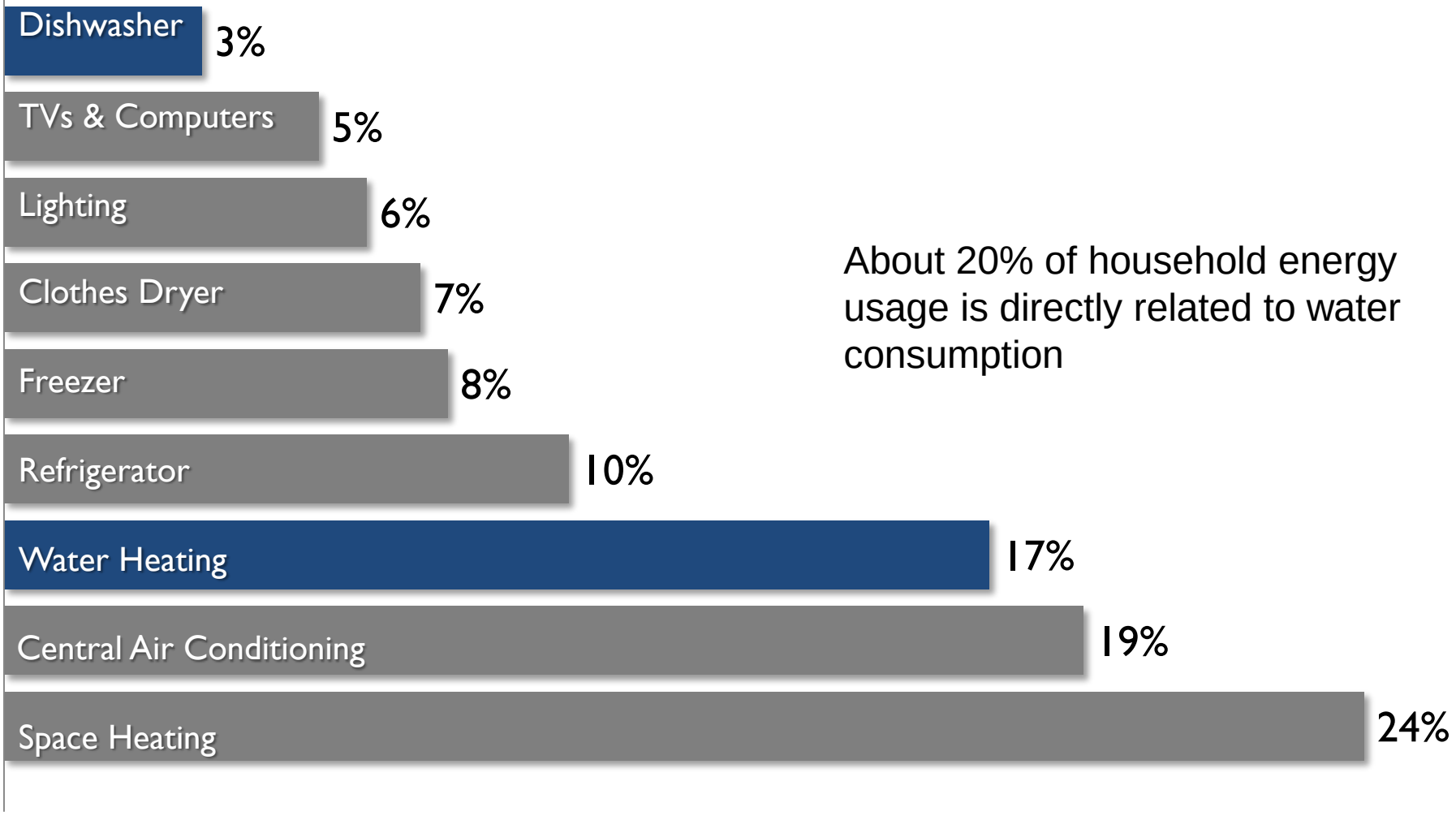
Energy Intensity Varies by Region



Source: California Energy Commission

Potential Energy Savings Associated with Water Efficiency Technologies and Products

Water-Related Household Energy Consumption



About 20% of household energy usage is directly related to water consumption

WaterSense℠ Toilets Savings Potential

Each WaterSense℠ (1.28 GPF) toilet would save **25,500 gallons** per year

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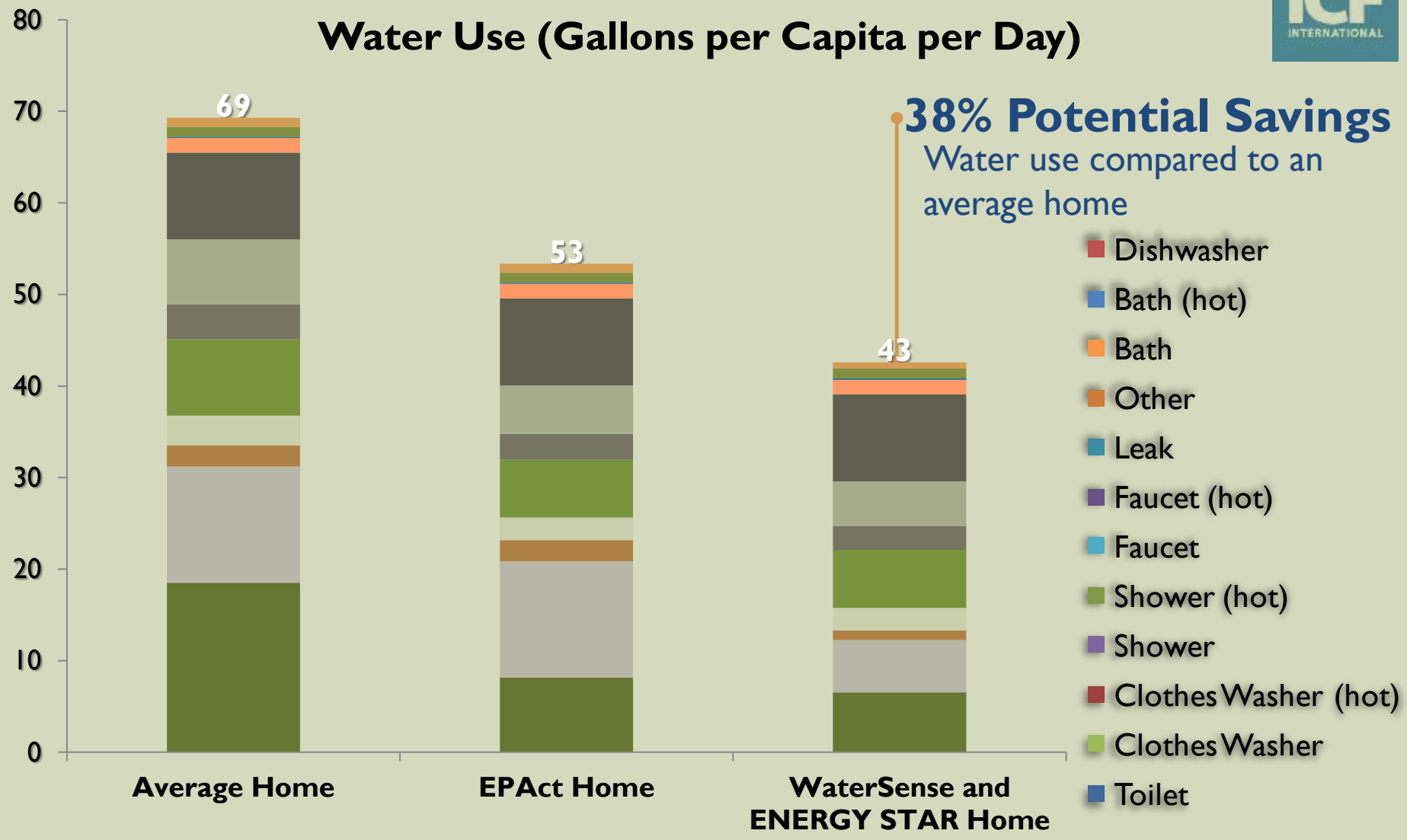
Enough water to fill 3 swimming pools

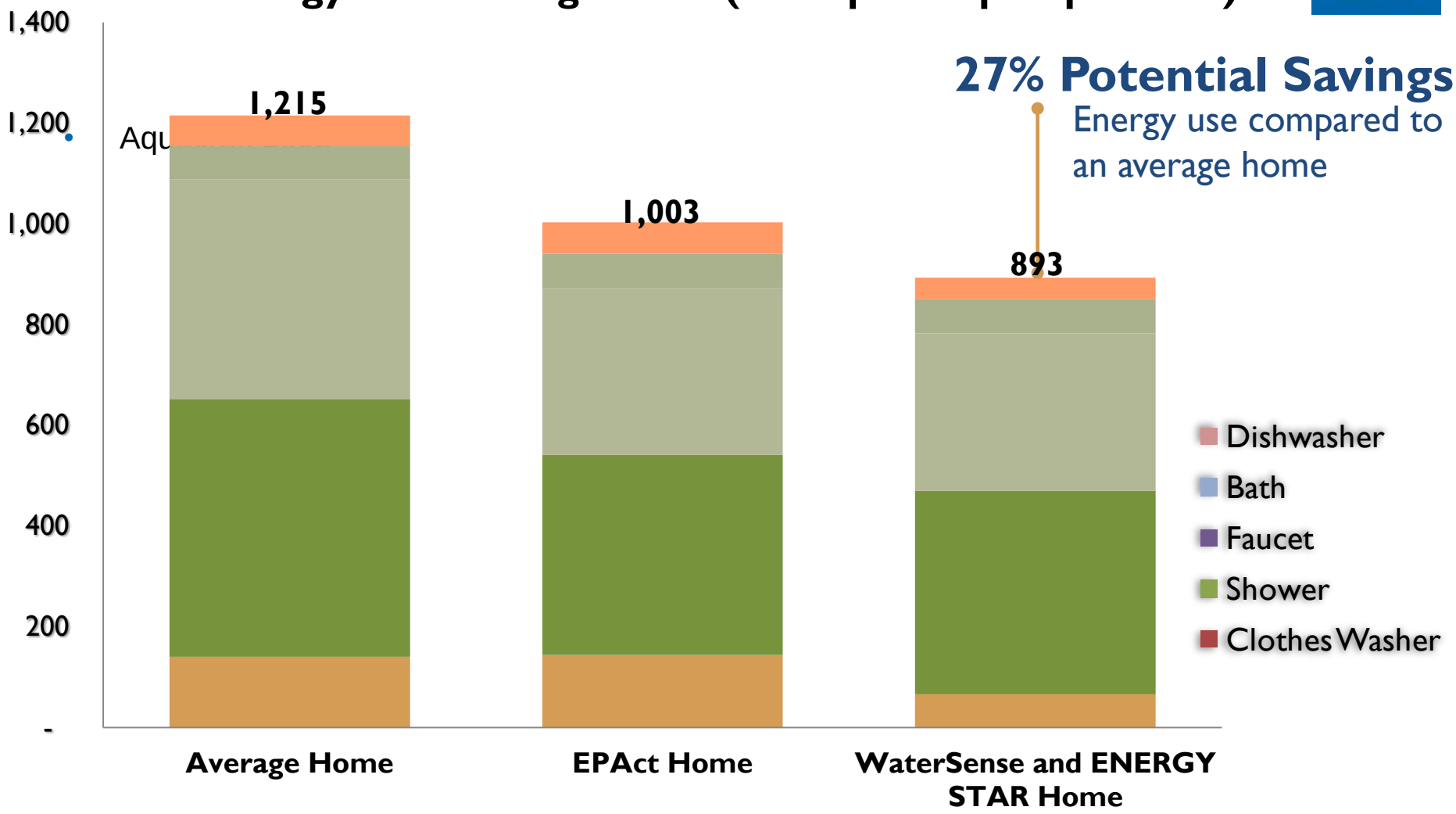
Source: WaterSense program

Residential Water Savings Potential is Substantial



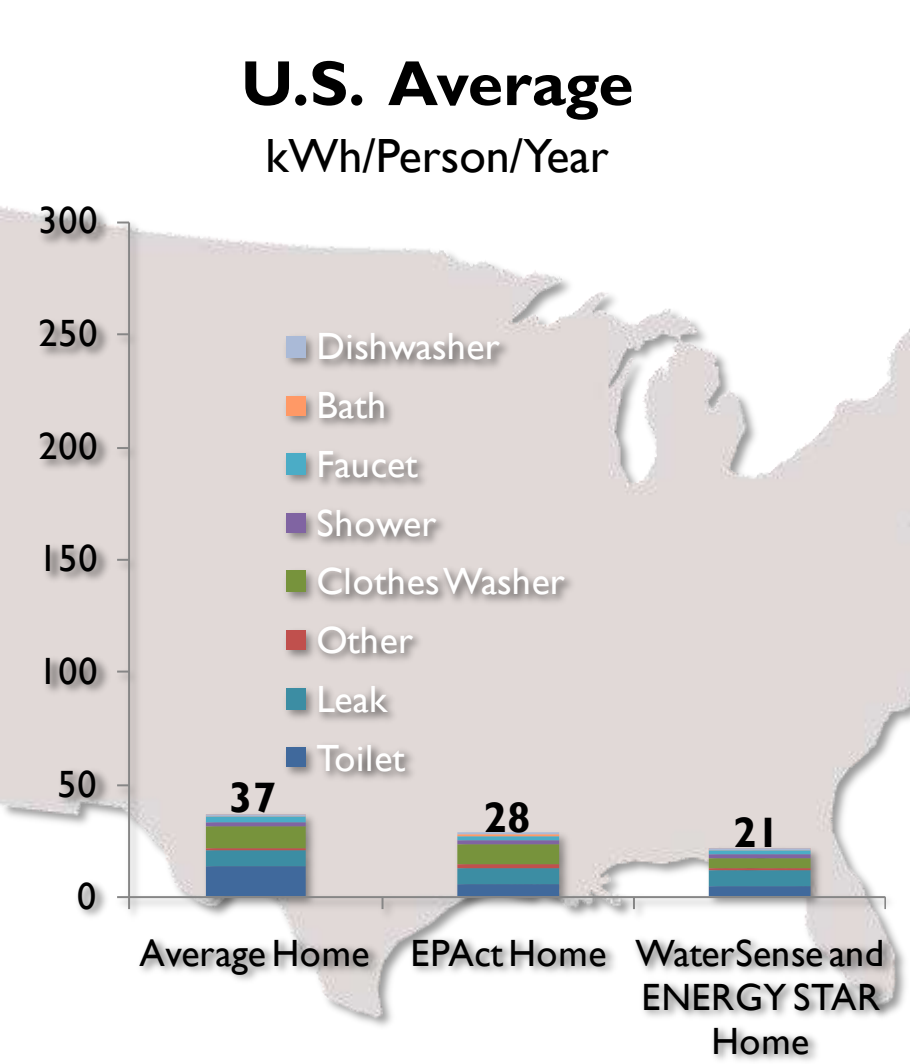
Sources: EPAct standards, WaterSense specifications, ENERGY STAR calculators

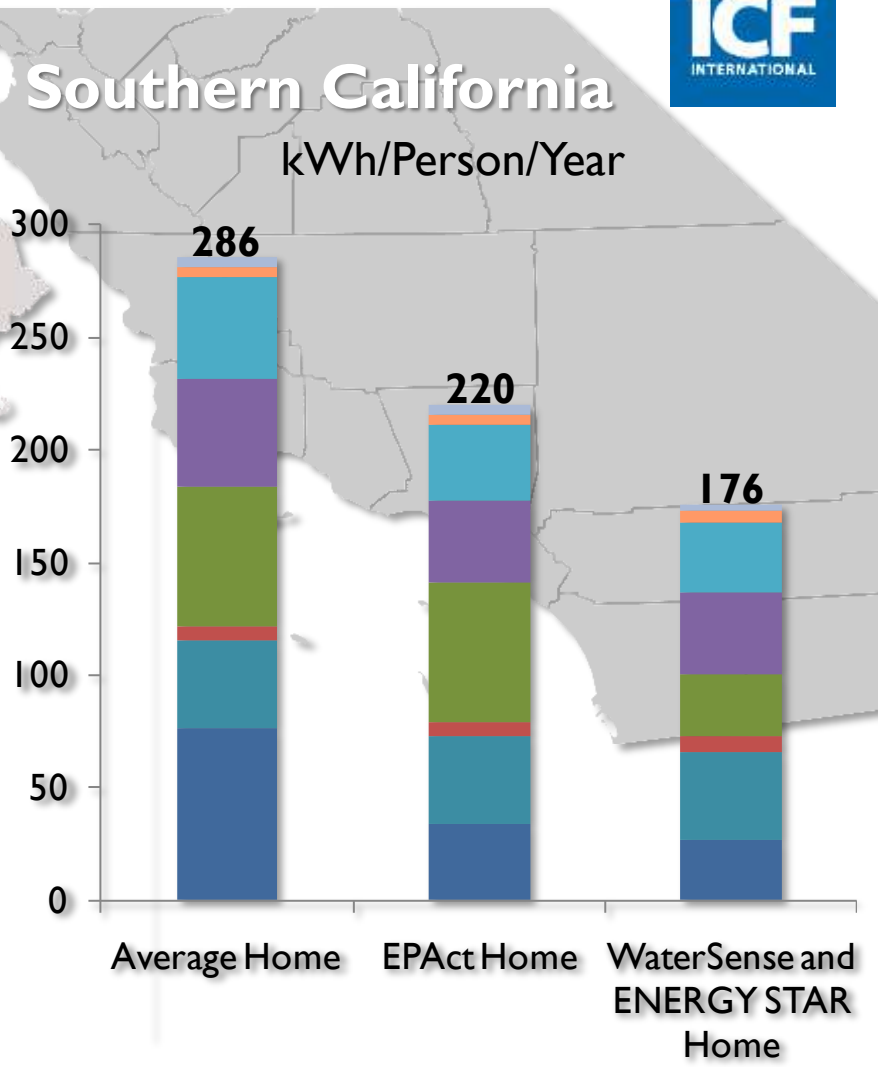
Residential Hot Water Energy Savings Potential



Sources: EPAct standards, WaterSense specifications, ENERGY STAR calculators

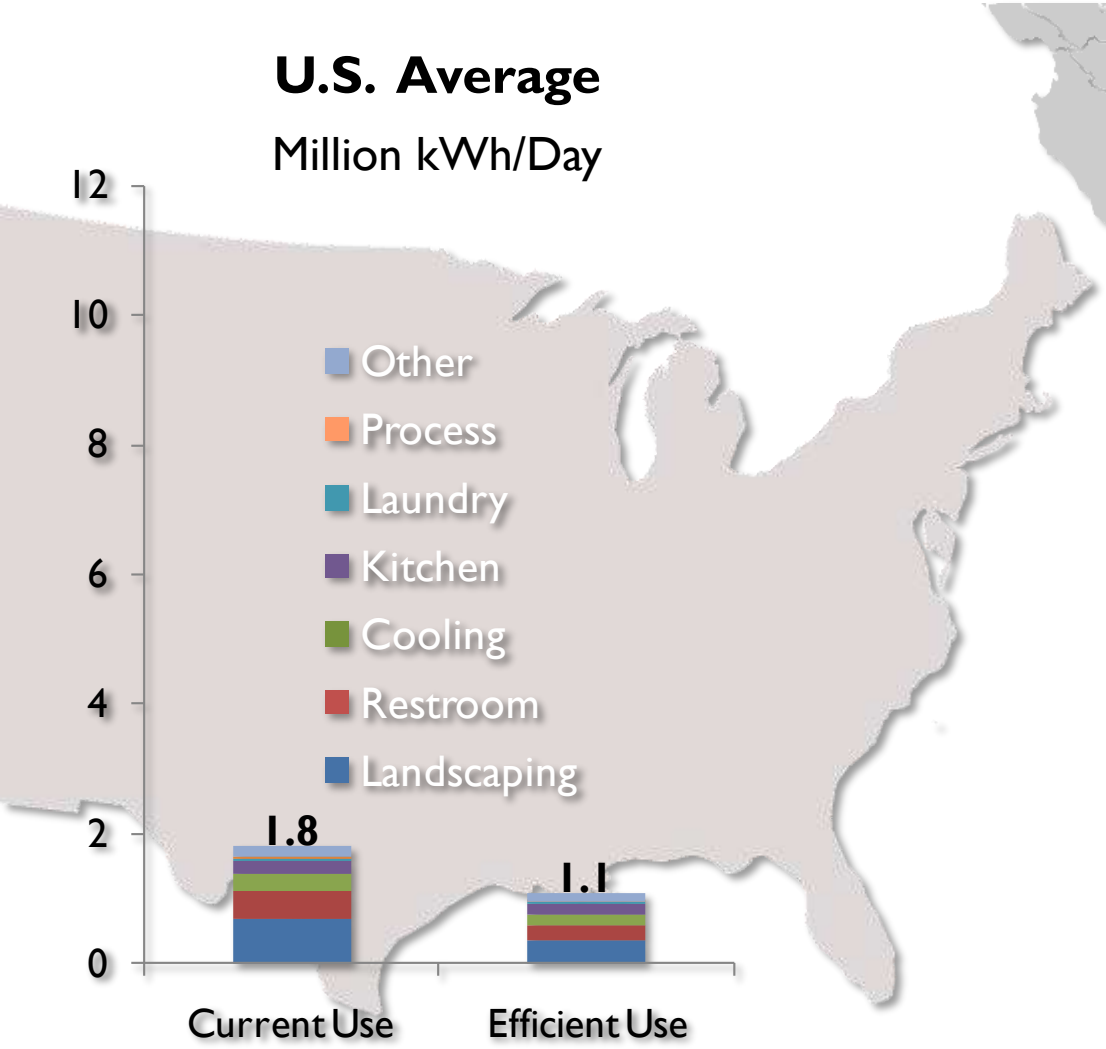
Efficiency Potential Varies Greatly by Region



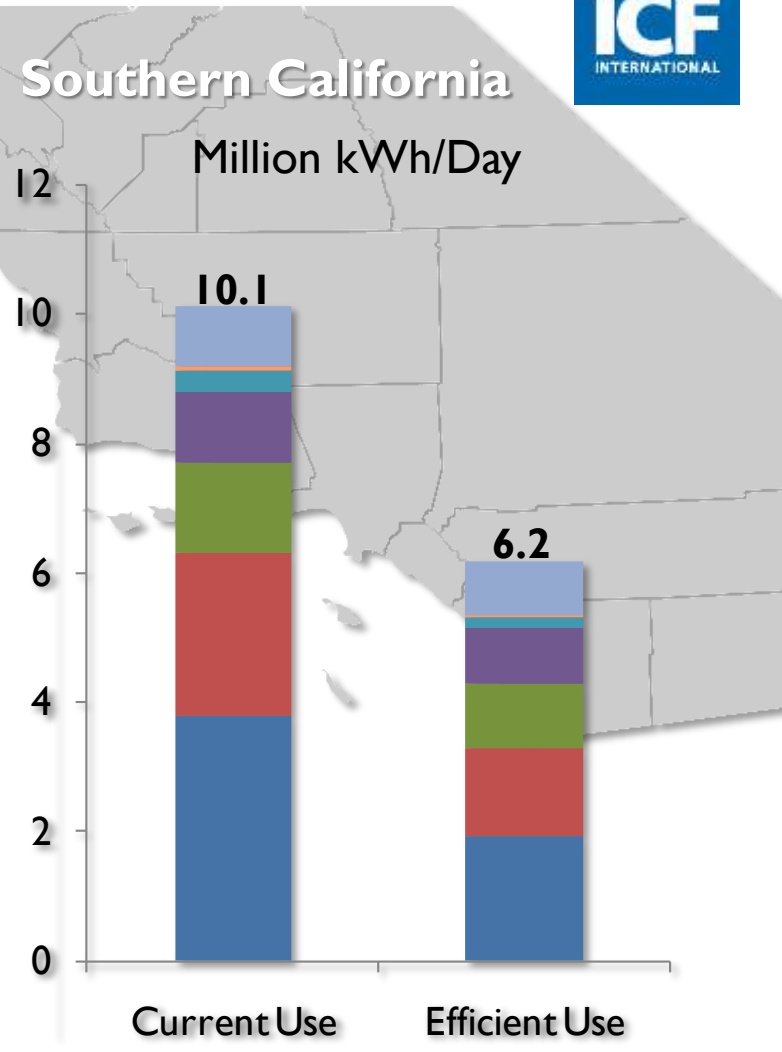


Source: California Energy Commission

Commercial/Industrial Energy Savings Potential



Electricity Usage: 1,785 kWh/MG



Electricity Usage: 11,110 kWh/MG

Source: California Energy Commission

Example: Water, Energy, and GHG Savings Potential from Water Efficient Products in a Typical Office Building

Example Commercial Office Building

Building	10 Stories, 1,000 Employees, 1 Cafeteria
Toilets/Urinals	8 toilets and urinals per floor
Faucets / Aerators	8 faucets per floor
Spray Valves	2 spray valves per cafeteria
Commercial Dishwashers	1 commercial dishwasher in the cafeteria
Residential Dishwashers	1 residential dishwasher per floor
Showers	4 showers per building

ENERGY STAR Products Savings Potential

Annual Savings per ENERGY STAR Product in an Office Building

	Potential ENERGY STAR Savings	Water Savings (Gallons)	Energy Savings (kWh)	Greenhouse Gas Savings (lbs. CO_2)
Commercial Dishwasher	*0.5 Gallons/Cycle*	255	2,845	3,801
Residential Dishwasher	*2 Gallons/Cycle*	520	91	122

Assumes:

- **1 cycle/ day for residential dishwashers,**
- **2 racks/day for commercial dishwashers,**
- **260 days a year.**

Savings come from water pumping, treatment, heating, and wastewater management.

WaterSense℠ Products Savings Potential

Annual Savings per WaterSense℠ Appliance/Office Environment

EPA WaterSense	*Potential WaterSense Savings*	Water Savings (Gallons)	Energy Savings (kWh)	Greenhouse Gas Savings (lbs. CO_2)
Toilets	*2.2 GPF*	25,530	77	102
Urinals	*0.5 GPF*	5,750	17	23
Faucets	*0.6 GPM*	1,725	227	304
Showers	*0.5 GPM*	1,150	152	203
Spray Valves	*1.1 GPM*	5,482	723	967

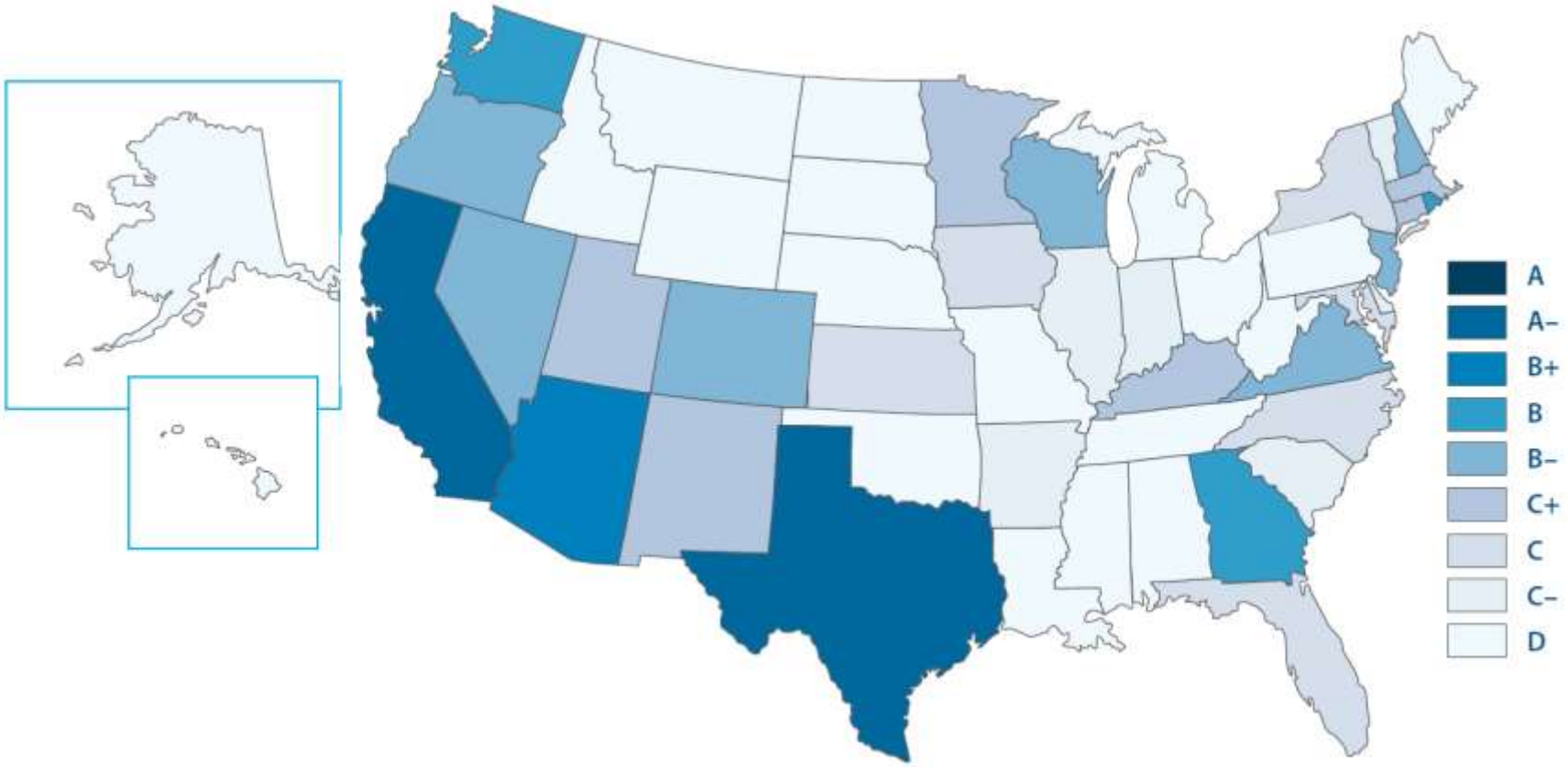
Assumes:

- **50 flushes per day, per toilet and urinal in an office environment.**
- **Faucets are used for 12.5 minutes per day.**
- **Showers run for 50 minutes per day.**
- **Spray valves values based upon 50 dishes a day.**

Savings come from water pumping, treatment, heating, and wastewater management.

Water/Energy Efficiency Issues for States to Consider

State "Scores" on Water Efficiency Vary
(Alliance for Water Efficiency State Scorecard)



Key Differences Between Water and Energy Policy Drivers

- Energy has regional/national infrastructure—water much less so
- Water intensity shows much greater regional variations
- Energy efficiency has a large funding base (~$8 billion)
  - Water efficiency funding is a small fraction/not well tracked
- Energy efficiency supported by large, typically investor-owned utilities
  - Water utilities typically much smaller, municipal, with more limited access to capital
- Energy efficiency driven by state policies such as Energy Efficiency Resource Standards and Integrated Resource Planning
  - State water policies do not tend to drive specific funding for efficiency
  - Energy policies rarely support integration with water efficiency
- Water resources are becoming a “right now” issue in several states
  - Energy supply is not critical in most states, with some hydro exceptions

Conclusions

- Water supply and treatment systems are major energy users
  - So water efficiency saves energy
- Water and energy savings can both be realized through a range of efficient products
- Savings potentials are substantial—up to 38%
- Virtually any residential and commercial building can benefit from ENERGY STAR and WaterSense labeled products
- State policies and programs on water efficiency are very spotty
- States should consider policy drivers most relevant to their conditions

Thank You!
Questions?

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