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# **California's Water-Energy- Climate Nexus**

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The Pacific Institute envisions a world in which society, the economy, and the environment have the water they need to thrive now and in the future. Our mission is to create and advance solutions to the world's most pressing water challenges.

# Today's Presentation

1. California's Water-Energy Nexus
2. Emerging Water and Energy Trends
3. Implications of Water-Energy Nexus and Emerging Trends



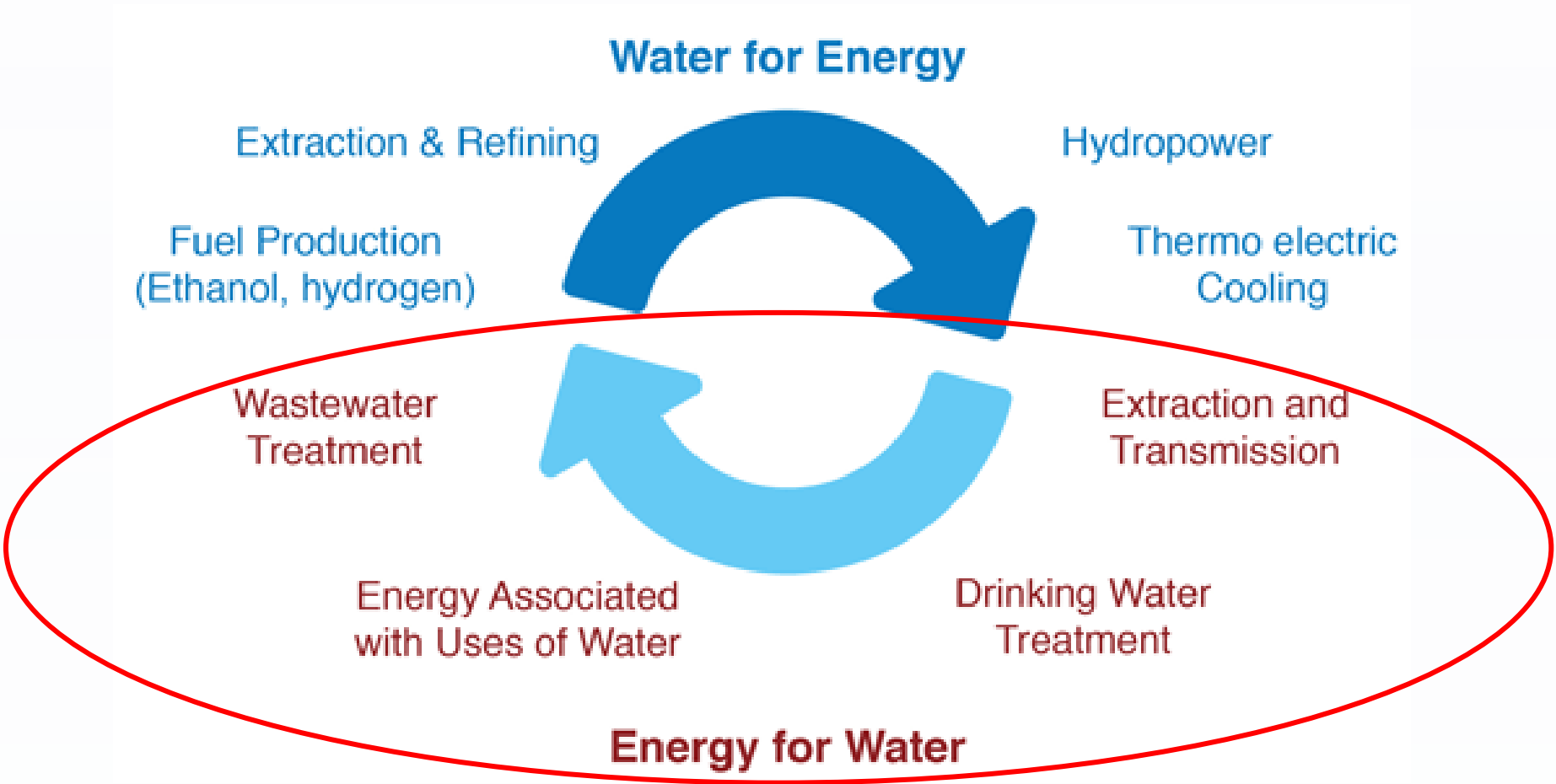


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# California's Water Energy Nexus

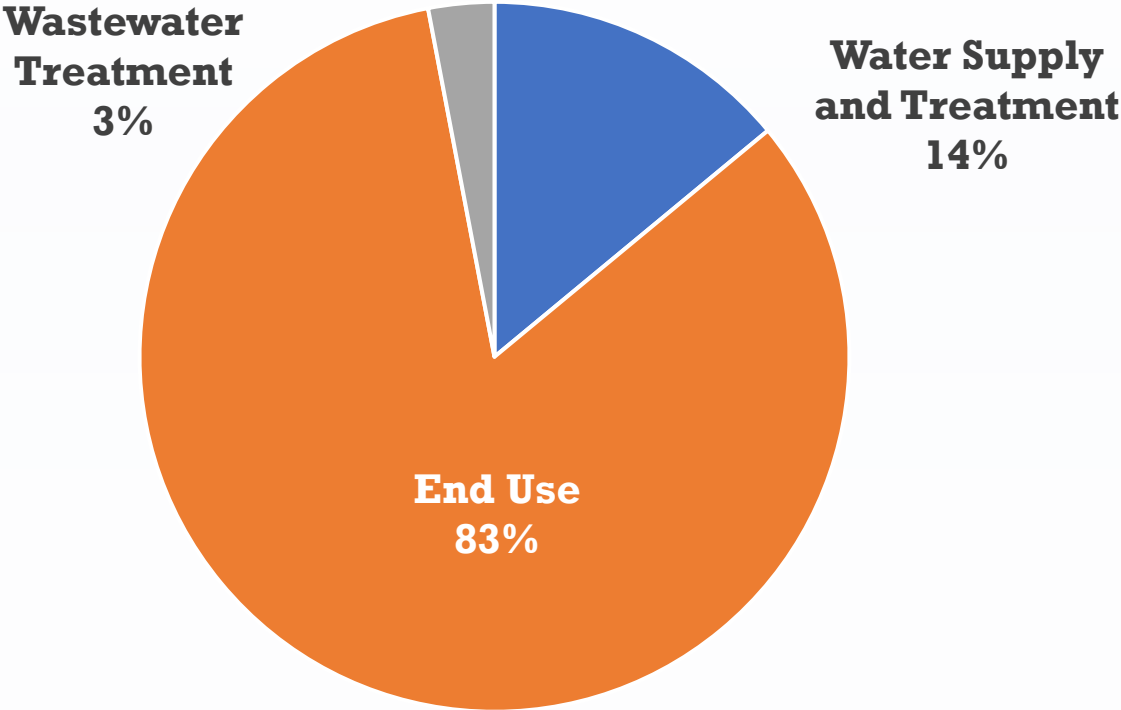


# The Water-Energy Nexus

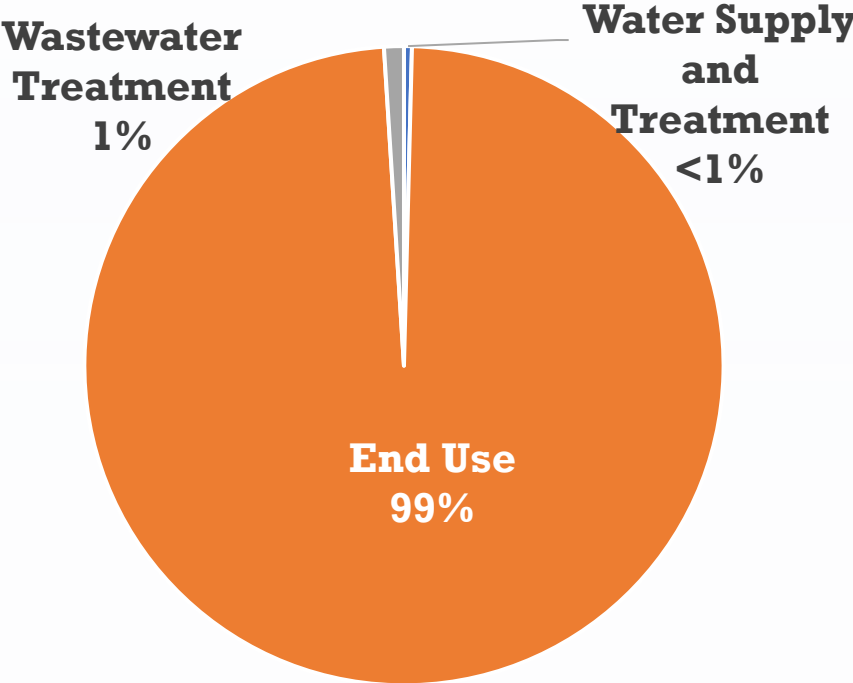


# Water-Related Energy Use in California

20% of state's electricity use:



33% of state's non-electricity natural gas use:



Source: CEC 2005

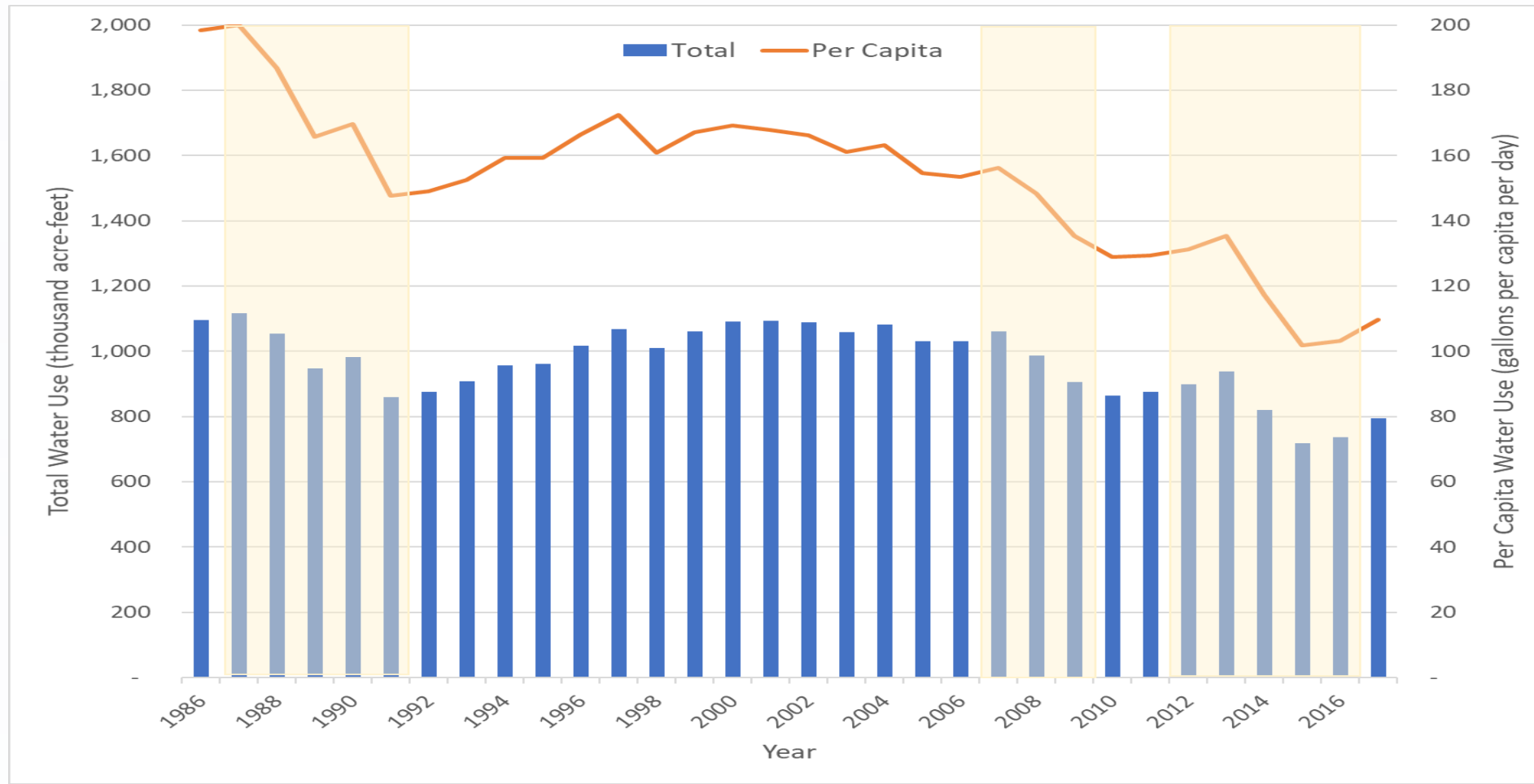


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# Emerging Water and Energy Trends



# San Francisco Bay Area reduced urban water use despite continued population and economic growth.

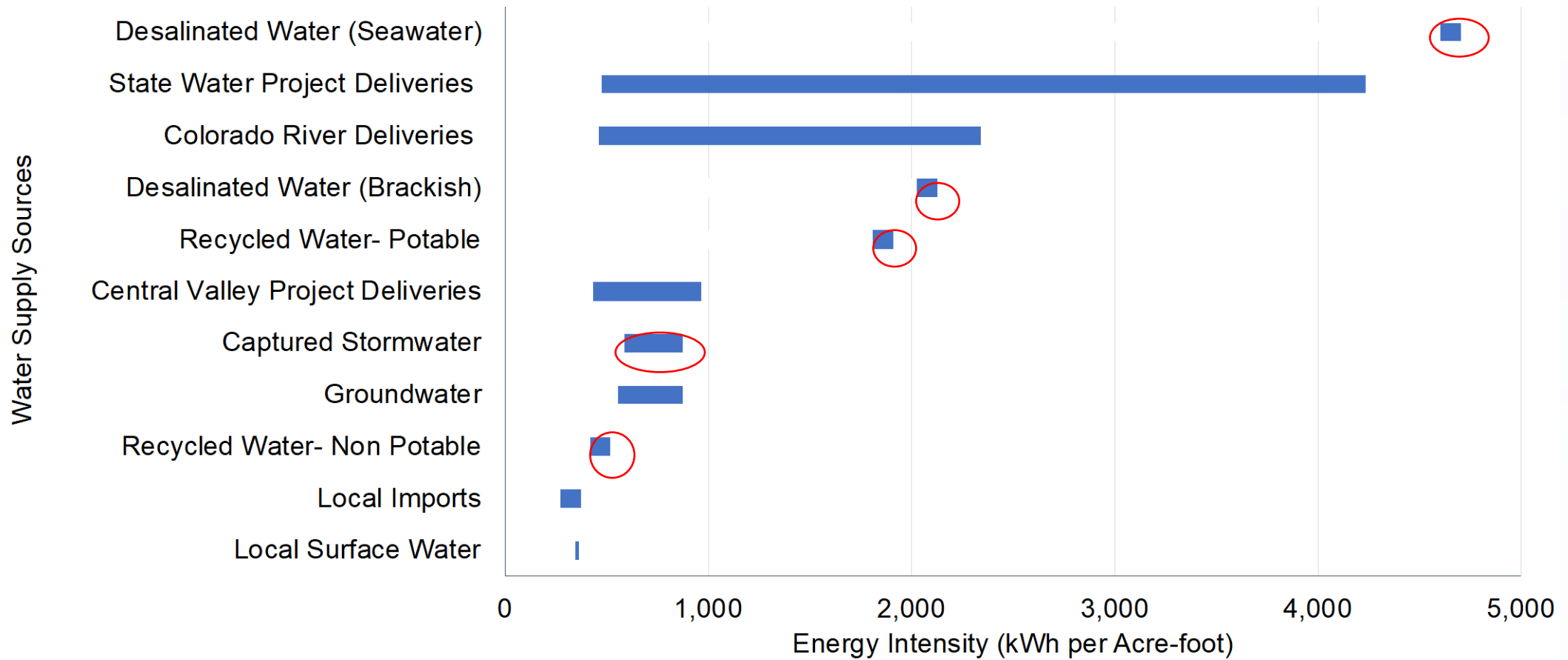




# Relevant Water Efficiency Policies

- Standards and codes for new appliances and fixtures
- Model Water Efficient Landscape Ordinance (MWELO) limits grass for new developments & major redevelopments
- Ban on Irrigating Non-Functional Turf with Potable Water
- Making Conservation a California Way of Life – establishes water budget for urban water suppliers

# Energy requirements for new water sources are relatively high.



Source: Szinai et al. Future of California's Water-Energy Climate Nexus. Pacific Institute

# Emerging Water and Energy Trends

## Water trends:



- A growing population, declining urban per capita water use, and shifting to more local sources with varying energy intensities

## Energy trends:



- Decarbonization of the electricity grid
- Greater electrification of end uses

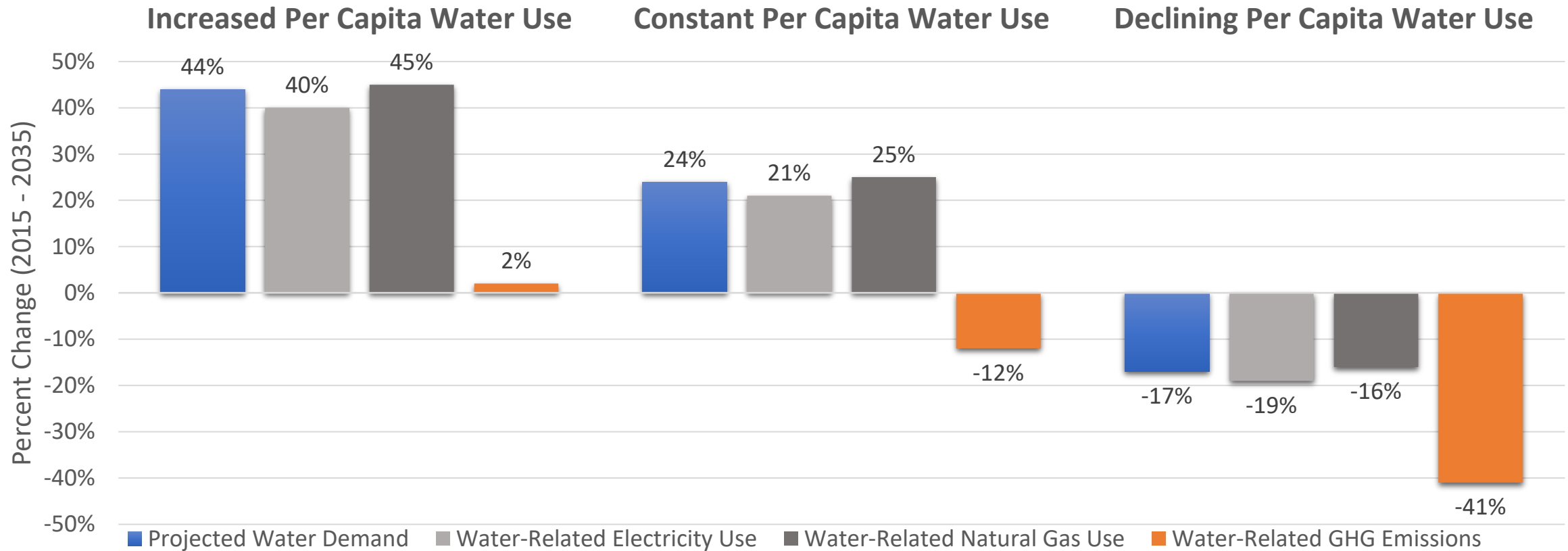
**Combined effect of these trends is not well understood.**



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# Implications of Water-Energy Nexus and Emerging Trends

# Urban water efficiency is essential for meeting water, energy, and climate goals.



Source: Szinai et al. Future of California's Water-Energy Climate Nexus. Pacific Institute

Energy savings  
make water  
efficiency  
measures more  
cost effective.



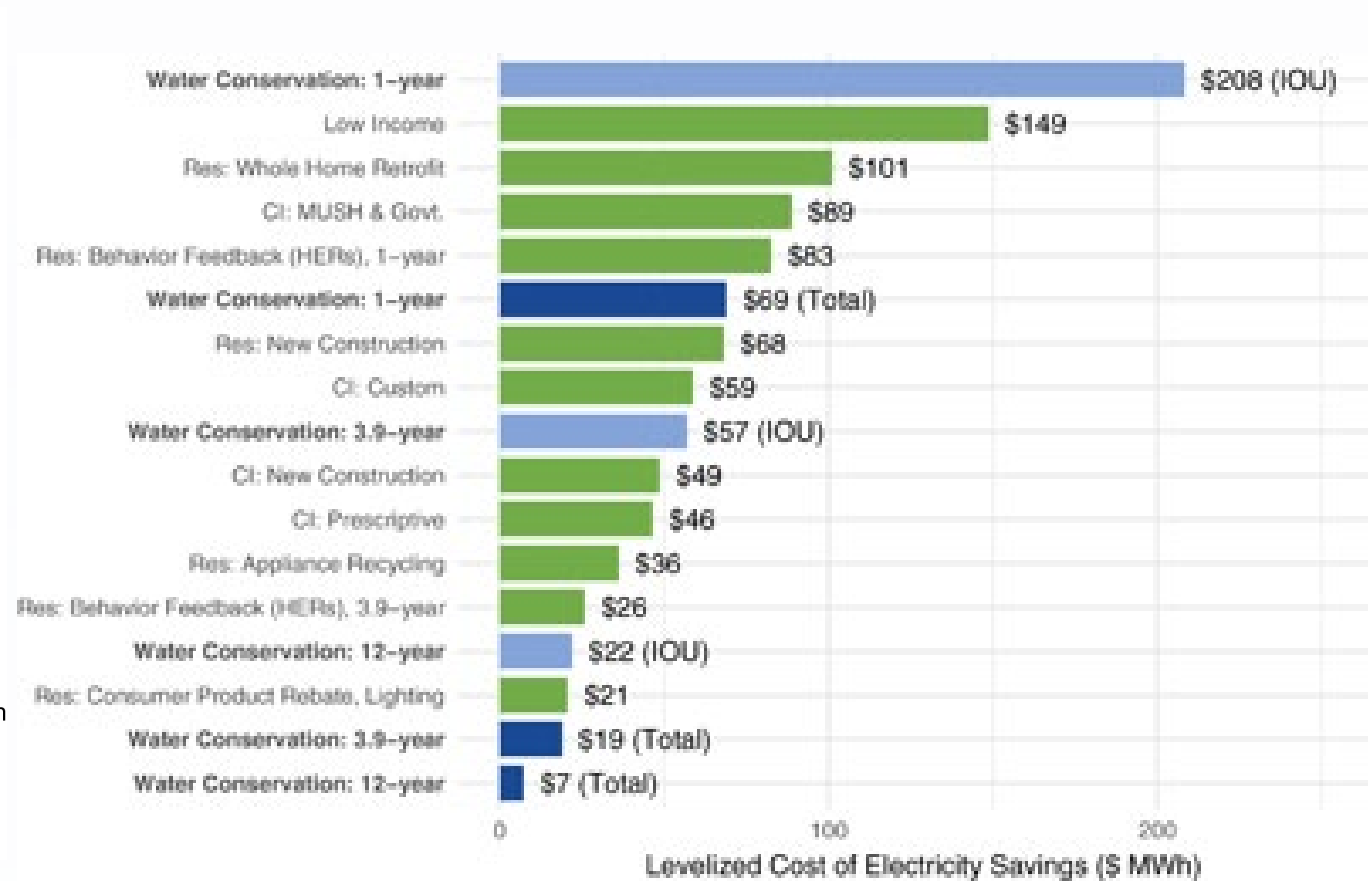
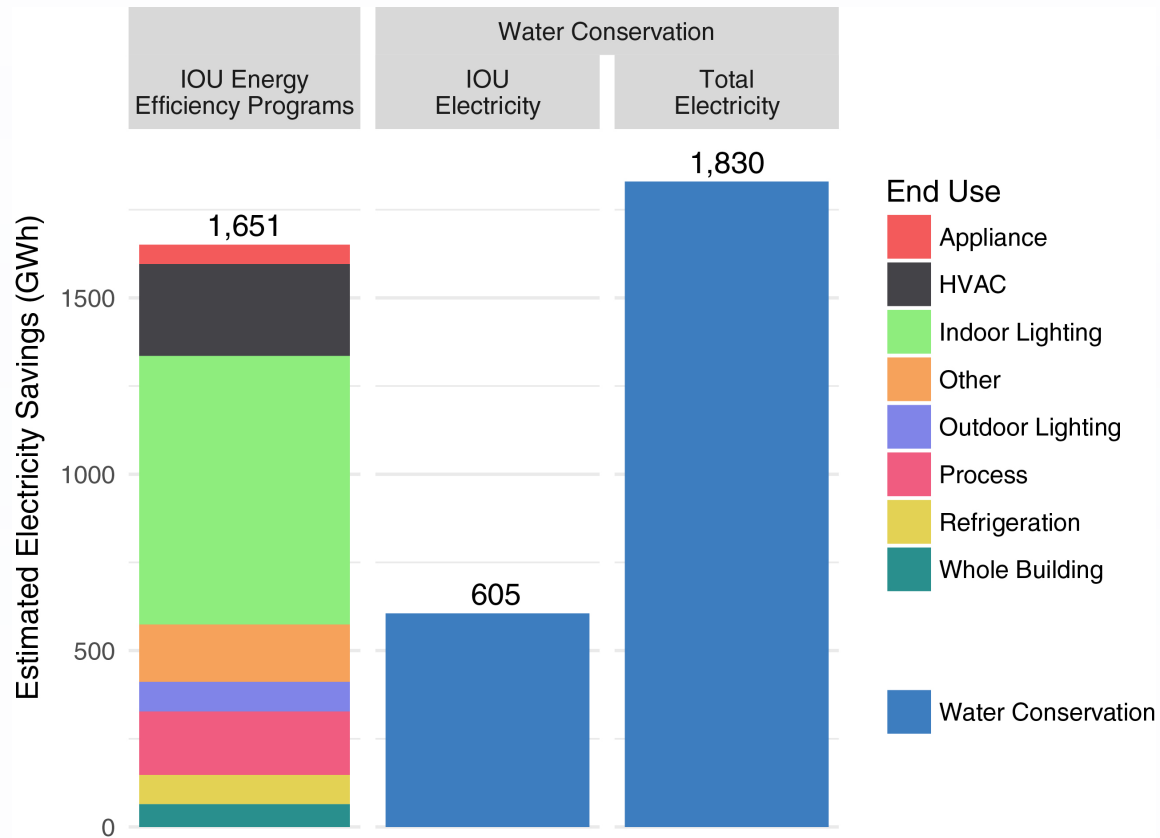
|                           | <b>New,<br/>Conventional<br/>Clothes<br/>Washer</b> | <b>Front-<br/>Loading<br/>Clothes<br/>Washer</b> |
|---------------------------|---|--|
| <b>Purchase<br/>Price</b> | <b>\$450</b>  | <b>\$750</b>                                     |
| <b>Water Cost</b>         | <b>\$496</b>  | <b>\$290</b>                                     |
|                           |   |  |
| <b>Total Cost</b>         | <b>\$946</b>  | <b>\$1,040</b>                                   |

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|                           | <b>New,<br/>Conventional<br/>Clothes<br/>Washer</b> | <b>Front-<br/>Loading<br/>Clothes<br/>Washer</b> |
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| <b>Water Cost</b>         | <b>\$496</b>  | <b>\$290</b>                                     |
| <b>Energy<br/>Cost</b>    | <b>\$401</b>  | <b>\$177</b>                                     |
| <b>Total Cost</b>         | <b>\$1,346</b>                                      | <b>\$1,216</b>                                   |

# Energy savings from water efficiency are cost competitive with energy efficiency programs.





# Key Takeaways

-  • Water and energy are interdependent resources, and both face constraints.
-  • Urban water efficiency is essential for meeting water, energy, and climate goals.
-  • Energy savings make water efficiency measures more cost effective.
-  • Energy savings from water efficiency are cost competitive with other energy efficiency programs.

# Select Pacific Institute Publications on the Water-Energy Nexus

**2004** **ENERGY DOWN THE DRAIN**  
The Hidden Costs of California's Water Needs  
2004 Report  
Marta L. Larson  
Bill D. Rind  
Pacific Institute  
Water-Energy Nexus  
Energy and Water

**2011** **Water for Future Water Needs for ET Intern**  
Heather Cooley, Julian Fulton, et al.

**2012** **Implications of Future Water Sources for Energy Demand**  
WaterReuse Research

**2013** **WATER-ENERGY SYNERGY: Coordinating Efficiency Programs**

**2021** **The Future of California Water-Energy Climate Nexus**

**2022** **Water-Energy Calculator 2.0**  
Version 2.0.4

**Overview**  
This tool was developed for the California Public Utilities Commission by Pacific Institute and SBW Consulting to estimate the embedded energy savings associated with water conservation and efficiency measures. Additional information regarding the methodology and data sources can be found in the accompanying report. An earlier version of this tool was developed by Navigant Consulting in 2014.

This tool does not estimate water savings or direct energy savings; rather, it estimates the energy saved due to water efficiency measures that reduce the amount of water extracted, conveyed, treated, and delivered to the customer as well as the wastewater collected, treated, and discharged. As such, it is intended to complement other tools that estimate water savings and direct energy savings and evaluate measure cost effectiveness.

**Uses and Limitations**  
Outputs are estimates based on local and regional data for California. As a result, this tool may not be appropriate for use outside of California. Embedded energy savings in this tool are only estimates; actual embedded energy savings may vary based on site-specific factors.



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**Thank you!**