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September 9, 2021

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As water scarcity grows in California, so will greenhouse gas emissions without urgent efficiency measures

New report evaluates relationship between water use and energy use; identifies water-sector policy recommendations for achieving climate targets

San Francisco, Calif.—Without urgent water efficiency measures, carbon emissions associated with water usage in California are likely to spike in coming years, as changing sources of water supply and population growth drive up energy-intensive urban and agricultural water needs. Climate change-fueled droughts are likely to further increase water-related energy use and carbon emissions. That’s the finding of a new report—[*The Future of California’s Water-Energy-Climate Nexus*](#)—out today from researchers at the Pacific Institute and commissioned by non-partisan, non-profit think tank Next 10.

“Managing California’s water system requires an enormous amount of energy. Water shortages, like the record-breaking drought we’re experiencing today, make the job of supplying water to millions of Californians and to our state’s agricultural sector even more challenging and energy-intensive,” said F. Noel Perry, founder of Next 10. “We could face a substantial increase in water sector carbon emissions in the coming years if we fail to implement water efficiency measures.”

The report finds that continued population growth and ongoing water challenges are prompting urban water planners to pursue new water-supply options, such as desalination and recycled water, which are often more energy-intensive than traditional water sources, such as from local surface water supplies. In the agricultural sector, declining groundwater levels make pumping water more energy-intensive. Meeting higher urban water demands—coupled with more energy-intensive water supply options for urban and agricultural users—could push water-related energy use and associated greenhouse gas emissions higher.

“When we save water, we also save energy and reduce greenhouse gas emissions. The importance of water conservation measures in meeting California’s climate targets should not be underestimated, especially as drought and water scarcity become more intense with climate change,” said Dr. Julia Szinai, lead author of the report and Researcher at the Pacific Institute.

The report finds that measures to improve efficiency in urban water usage will have the largest beneficial impact on California’s water-related carbon emissions, as urban water is roughly twice as energy-intensive as agricultural water. If California fails to implement urban conservation measures and



per-capita water demand is maintained at current levels, statewide urban water demand would increase 24% by 2035 with population growth, resulting in a 21% increase in annual water-related electricity use and a 25% increase in annual natural gas use. But implementing comprehensive water conservation and efficiency efforts could deliver substantial climate benefits—reducing water-related electricity usage by 19%, natural gas usage by 16%, and water-related climate emissions by 41% cumulatively by 2035, according to the authors.

Previous Pacific Institute research shows that California has experienced a dramatic decoupling between water use and growth over the last 40 years. Total urban demand has declined, despite continued population and economic growth, due to water-use efficiency improvements and less water-intensive commercial and industrial activities. Pacific Institute research also shows there is still significant urban water conservation and efficiency potential remaining in California.

“California has been incredibly successful at reducing urban water usage over the last few decades. But the reality is, as climate-fueled drought wreaks havoc on our water systems, we have to do much more,” said Heather Cooley, lead author of the report and Director of Research at the Pacific Institute. “The good news is that these conservation measures will also help the state meet climate targets and deliver co-benefits like lower energy bills and healthier air quality.”

The report authors identify specific water policy recommendations that could help the state meet its energy and greenhouse gas reduction goals:

- Expand urban water conservation and efficiency efforts;
- Accelerate water heater electrification;
- Maintain groundwater levels and expand more flexible, high-efficiency groundwater pumps;
- Provide financial incentives and regulatory pathways for water suppliers to invest in less energy- and greenhouse gas-intensive water systems, including through existing financial incentives and programs for energy efficiency and greenhouse gas reduction;
- Expand and standardize water data reporting and energy usage tracking; and
- Formalize coordination between water and energy regulatory agencies about forecasted energy demand changes.

California has been shifting its electricity generation to renewable resources, but the majority of homes still use fossil fuels like natural gas for water heating, which is the most energy-intensive process related to water. The report finds that programs to provide incentives for transitioning from gas water heaters to highly-efficient electric alternatives like heat pumps can play a key role in cutting water-related emissions.

Wastewater treatment, as currently practiced, is also an energy-intensive end use of water—using nearly 1% of total electricity use across the country. The report identifies key opportunities to cut pollution by moving to wastewater treatment systems that have the capacity to generate renewable energy by capturing the gas from the decomposition of waste and employing it to power the treatment



facility. For example, the East Bay Municipal Utility District's wastewater treatment plant produces more renewable energy onsite than is needed to run the facility, allowing the plant to sell excess energy back to the electrical grid.

"Conserving water in California means saving energy. Employing these solutions will help protect the critical resource of water through water efficiency and make our water supplies more resilient to climate change," said Noel Perry, founder of Next 10.

Media interested in speaking with report authors or experts on energy use and emissions in the water sector, contact Chloe Zilliac at chloe@sunstonestrategies.org or 650.644.8259.

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About Next 10

Next 10 is an independent, nonpartisan, nonprofit organization that educates, engages and empowers Californians to improve the state's future. With a focus on the intersection of the economy, the environment, and quality of life, Next 10 employs research from leading experts on complex state issues and creates a portfolio of nonpartisan educational materials to foster a deeper understanding of the critical issues affecting our state.

About Pacific Institute

Founded in 1987, the Pacific Institute is a global water think tank that combines science-based thought leadership with active outreach to influence local, national, and international efforts in developing sustainable water policies. The Pacific Institute's mission is to create and advance solutions to the world's most pressing water challenges. From working with Fortune 500 companies to disenfranchised communities, the Pacific Institute leads local, national, and international efforts in developing sustainable water policies and delivering meaningful results.