Water Use Efficiency and the Role for Energy Utilities

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ABSTRACT

California and other parts of the Western United States are facing historic "extreme" or "exceptional" drought conditions. The water-energy nexus has sharpened the focus and justification for energy utilities to play a leading role in supporting water efficiency programs and policies. In California, nineteen percent of electricity use and thirty percent of natural gas use is water-related. Energy is required for water supply extraction, conveyance, treatment, distribution, and wastewater collection and treatment, as well as for on-site uses such as pumping and heating. Conversely, water is required to produce electricity, both in hydroelectric and thermoelectric power plants. Thus, quite simply, saving water saves energy, and saving energy saves water.

This paper describes the water efficiency regulatory efforts led by the California Statewide Utility Codes and Standards Program. First, we provide background on the regulatory structures and state policies that influence and inform water efficiency efforts—particularly for energy utilities. Second, we summarize the Program's recent support of new appliance and building standards for showerheads, toilets, urinals, kitchen faucets, residential lavatory faucets, commercial food service equipment, and landscape irrigation. Third, we present recommendations for various utility program strategies, including but not limited to those that benefit: landscape irrigation equipment, agricultural irrigation, tub spout diverters, use of graywater and rainwater, use of recycled water, and compact hot water distribution design. The results and recommendations based on California's experience are intended to provide valuable insights for further efforts in California and in other states and nations.

Introduction

For over a decade the California Statewide Utility Codes and Standards (C&S) Program, comprised of the four California Investor Owned Utilities (IOU) – Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric (SDG&E), Southern California Edison (SCE), and Southern California Gas Company (SoCalGas) (herein referred to as the Utility C&S Program or Program)[1] – has supported the adoption of energy efficiency appliance and building standards in California.[2] In particular, the Program has helped California residents save energy and reduce greenhouse gas emissions by: 1) influencing state and federal standards and code-setting bodies to strengthen energy efficiency regulations, 2) improving compliance with existing

[1] The Los Angeles Department of Water and Power (LADWP) has also co-sponsored building code advocacy through the Statewide Utility C&S Program.
[2] The Utility C&S Program also advocates for appliance standards at the federal level but these efforts are not described in this paper.

codes and standards, 3) assisting local governments to develop ordinances that exceed statewide minimum requirements, and 4) coordinating with other programs and entities to support the state's ambitious energy policy goals.

In recent years, the Utility C&S Program has embraced the opportunity to advocate for stronger water efficiency codes and standards due to a greater understanding of the water-energy nexus, the impacts of climate change on water and energy use, and the ongoing drought in the Western United States. By successfully encouraging state agencies to adopt more stringent regulations in 2015 and early 2016, the energy IOUs have demonstrated their value in helping to promote water efficiency in California.

California's Water Landscape

The relationship between water and energy in California is undeniable. Nearly nineteen percent of electricity use and thirty percent of non-power plant-related natural gas use in California is associated with water consumption in the urban sector (CEC 2006, 5).[3] Energy is required for water conveyance, treatment, distribution, and on-site usage (e.g., pumping, heating), as well as for the collection, treatment, and disposal of wastewater. Conversely, water is required to produce electricity, and typically results in evaporative losses in both hydroelectric plants and thermoelectric power plant cooling towers.[4] In a drought-riddled state where much of the population resides in deserts, every drop counts.

California is currently in its fifth year of drought. According to the United States Geological Survey (USGS), the 2014 and 2015 Water Years[5] were the warmest years on record, and 2014 was the third driest year on record (USGS 2016a). As a result of the severe drought conditions, Governor Jerry Brown declared a state of emergency on January 17, 2014 (Brown 2014), followed by a mandatory 25 percent statewide reduction in urban water use on April 1, 2015 (EO 2015), and a reaffirmation of drought regulations on May 9, 2016 (EO 2016).

Despite the increase in precipitation this winter due to El Niño associated storms, approximately 84 percent of California is still in an official drought, with 21 percent of the state experiencing "exceptional drought" conditions, the highest classified intensity (as of June 7, 2016) (see Figure 1 below). In total, an estimated 34 million California residents are living in drought conditions (U.S. Drought Monitor 2016). Further, statewide average snowpack is only 9 percent of normal (as of June 8, 2016) (DWR 2016b); California relies heavily on snow melt to replenish surface and groundwater reservoirs around the state. Frank Gehrke, chief of the California Cooperative Snow Surveys Program, said that more than four years of drought have left a water deficit around the state that may be difficult to overcome in just one winter season (DWR 2015).

In addition to the ongoing drought, climate change will continue to impact California's water resources. Climate change has already been causing variability in weather patterns across the state, including severely reduced snowpack and drought. Variable weather patterns are expected to persist due to climate change, which may lead to longer and more severe droughts

[3] Urban uses include outdoor and indoor residential water use; water used in commercial, institutional, and industrial applications; and unreported water use, which is primarily attributed to leaks.

[4] Some exceptions are run of the river hydroelectric plants, which do not result in large areas of stored water, and "dry-cooling" for fossil fueled power plants that do not result in direct air-water interface.

[5] The USGS defines the "water year" as the 12-month period from October 1 through September 30 of the following year. The water year is named for the calendar year in which it ends, and which includes nine of the twelve months.

(DWR 2016a). Water efficiency and conservation actions taken today will help mitigate water resource issues both in the short term and in the future.

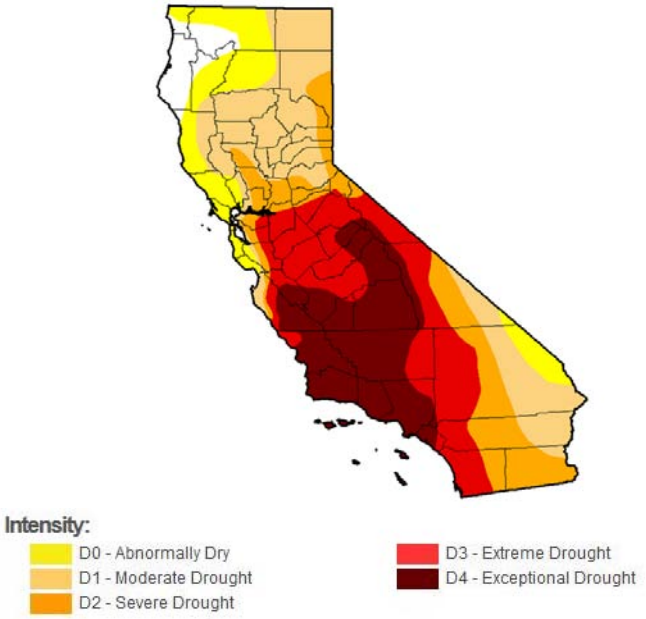

Figure 1. California drought classification by region, as of June 7, 2016.
Source: U.S. Drought Monitor 2016.

Establishing stringent water efficiency regulations is one cost-effective intervention[6] for reducing California's water demand, particularly when compared to solutions that aim to increase capacity or develop new reliable water supplies.[7] The adoption of water efficiency regulations is necessary for removing poor performing (i.e. water wasting) products from the market and to ensure that new building and landscape installations implement up-to-date water efficiency practices and eliminate outdated methods. Additional benefits of water efficiency regulations include lower water and energy bills for consumers and significant environmental co-benefits, such as a reduction in greenhouse gases, a potential decrease in polluted runoff from inefficient irrigation systems, and an increase in the amount of water available for natural resources (e.g., streams).

Regulating Water Use Efficiency and Conservation in California

Policy Drivers

Water is essential to supporting and sustaining California's environmental, economic, and public health needs. Since water security is critically important to the state, mandating water efficiency through policy is seen as an effective tool for water resources management. The *Water*

[6] Other cost-effective interventions to reduce water use in California may exist but are not explored in this paper.
[7] For instance, projects such as ocean water desalination and the construction of new dams, reservoirs, and water conveyance projects cost billions of dollars.

Conservation Act of 2009 is one of California's prominent pieces of legislation. The law established the goal of achieving a 20 percent reduction in urban per capita water use by 2020. In part, the law requires urban retail water suppliers to develop and include water use targets in their water management plans. If urban retail water suppliers do not meet the water conservation requirements established by the law, they will not be eligible for state water grants or loans (WCA 2009).

Another historic and aggressive policy is Executive Order B-29-15, which established the first mandatory statewide water reductions in California, and directed a number of state agencies to take immediate action to save water (EO 2015). These actions include establishing new efficiency standards for buildings, appliances, and landscaped areas, providing incentives for water efficiency, and increasing enforcement of existing efficiency regulations (EO 2015). As a result, agencies such as the California State Water Resources Control Board (SWRCB), California Department of Water Resources (DWR), California Energy Commission (Energy Commission or CEC), and California Building Standards Commission (BSC) have promptly adopted water saving regulations. Several of these regulations are described later in this paper.

Many state agencies have developed plans that outline recommendations and objectives for meeting the state's water conservation policies. For example, California's *Climate Scoping Plan* (2008), a framework for implementing California's *Global Warming Solutions Act*, contains water efficiency goals and recommendations for the state, including the adoption of more stringent building and appliance standards (CARB 2008, 42, 65-66). The *California Water Action Plan* (2016), which describes the Governor's plan to work with the California Legislature to expand funding for water efficiency and conservation, also recommends the development and implementation of water efficiency standards as one strategy among many to address the impacts of climate change (CNRA 2016). Based on the many laws and policies on the books, it is clear that the adoption of water efficiency codes and standards is a well-supported objective and a viable approach to helping address California's water resource and climate change challenges.

Regulatory Structure

There are several avenues for mandating water use efficiency and conservation in California, including establishing regulations for water retailers, consumers, appliances, buildings, and landscapes. The authority to regulate water use is distributed among many state agencies, and each agency is responsible for adopting regulations for certain uses and/or sectors of the economy.

There is often overlap of agency jurisdiction and scope given that water use in one sector may have impacts on water use in another sector. For example, the Energy Commission is responsible for updating the state's Title 20 Appliance Efficiency Regulations (which includes plumbing products such as faucets and toilets) but the California Department of Housing and Community Development (HCD) is responsible for updating the state's plumbing code. As such, coordination between these two agencies is important for maintaining consistent and effective regulations. Coordination is also needed to ensure that DWR's periodic amendments to the Model Water Efficient Landscape Ordinance (MWELO) and the Energy Commission's updates to Title 20 are accurately captured in California's Building Energy Efficiency Standards (Title 24), which is under the jurisdiction of BSC. Furthermore, local jurisdictions oftentimes shoulder the responsibility of implementing and enforcing regulations adopted by state agencies. Given the various players in the field of water use efficiency, coordination is critical.

In response to California's drought emergency and Executive Order B-29-15, several state agencies conducted rulemakings in 2015 to adopt water saving regulations. For example, the Energy Commission adopted more stringent water efficiency requirements for toilets, urinals, faucets, and showerheads; DWR enhanced the stringency of the state's MWELO; and BSC and HCD opened concurrent rulemakings to align California's Green Building Standards Code (i.e. CALGreen) and plumbing code with the plumbing fixture regulations adopted by the Energy Commission. Opportunities for stakeholders, including energy utilities, to participate and help shape the proposed regulations were present in each of the rulemakings. In particular, the Utility C&S Program played a very active and integral role that led to the eventual adoption of numerous water efficiency codes and standards described below.

Utility C&S Program Water Efficiency Codes and Standards Advocacy

In California, the energy IOUs are primarily motivated to advocate for water efficiency regulations because of the impact of water use on energy consumption. Given the water-energy nexus, the California Public Utilities Commission (CPUC), the state agency responsible for regulating the activities of the energy IOUs, authorized the IOUs to pursue water efficiency activities, such as rebate and incentive programs and codes and standards advocacy, as part of their energy management portfolios. Through the Utility C&S Program, the energy IOUs work in collaboration to advocate for the adoption of more stringent energy and water efficiency regulations.

In the past year, the Utility C&S Program has seen the successful adoption of water efficiency regulations for 10 different products for which the energy IOUs proposed the same or similar requirements (see Table 1 below). Many of these regulations will also result in a significant reduction in hot water use, which is important since 90 percent of homes in California use natural gas to heat water (CEC 2012, 10) and up to 50 percent of household natural gas usage can be from water heating (CPUC 2010, 3-31). The anticipated statewide savings of these adopted regulations in the first year of implementation is projected to be 5.8 billion gallons of water, 39.8 gigawatt-hours (GWh) of electricity, 23.7 million therms of natural gas, and 28.2 GWh of embedded electricity.[8, 9] Water and energy savings will dramatically increase over time as more efficient products are phased in and existing stock turns over.

Various stakeholders participated in the rulemakings to adopt the water efficiency regulations, including manufacturers, industry associations, retailers, water utilities, building officials, independent testing facilities, academic research entities, efficiency advocacy organizations, and the Utility C&S Program; participation largely involved submitting written comments on agency proposed language and attending public workshops and hearings. In addition to those activities, the Utility C&S Program also conducted technical and market research; developed water and energy savings models; conducted water, energy, and cost-effectiveness analyses; conducted extensive stakeholder outreach; crafted proposed regulatory language; and presented at public meetings at the request of agency staff. The research and

[8] Embedded electricity is the amount of energy needed to produce, convey, and treat a given quantity of water.

[9] The savings estimates were calculated by the Utility C&S Program. The estimates represent the statewide savings in the first year the regulation is in effect, and were calculated using baseline energy use and California stock and shipment data. For the assumptions and methodologies used for calculating the savings, please see the Utility C&S Program's CASE reports posted on the Energy Commission and BSC websites. All standards proposed by the Utility C&S Program were shown to be cost-effective.

analyses conducted by the Utility C&S Program informed the development of Codes and Standards Enhancement (CASE) reports that contained proposals for the adoption of new codes and standards or changes to existing codes and standards. These extensive reports were submitted to the state agencies and are available on the Energy Commission and BSC websites.

Additionally, the Utility C&S Program provided a great deal of assistance and support to agency staff even before the rulemakings were officially initiated (this support continued through adoption). To support agency staff, the Utility C&S Program addressed stakeholder concerns regarding the proposed regulations, which typically involved conducting additional research and sharing the findings with agency staff. For example, some stakeholders expressed concerns that low flow plumbing fixtures (e.g., "pint" urinals) would cause corrosive damage to building plumbing systems because less water is introduced into the pipes. They argued that less water meant that waste would less frequently be flushed out into the sanitary sewer system thereby causing corrosion of the pipes. After consulting manufacturers and conducting additional research into the City of Los Angeles' ordinance that requires the installation of pint urinals, the Utility C&S Program was able to persuade the Energy Commission to adopt the standard that now prohibits the sale of wall-mounted urinals in California that use more than 0.125 gallons of water per flush.

The Utility C&S Program also played a role in tracking concurrent rulemakings among agencies to help staff better coordinate their efforts to harmonize requirements found in different parts of the California Code of Regulations. This included providing regular updates to staff at multiple agencies about Utility C&S program proposals, and the potential role of each agency to help coordinate efforts across agencies.

To help strengthen advocacy efforts for the proposed water efficiency regulations, the Utility C&S Program reached out to key stakeholders, including national efficiency advocate organizations, water utilities, trade associations, manufacturers, and distributors. Through this outreach it became evident that consulting key industry players earlier in the process yielded better results. By asking stakeholders to provide input on preliminary proposals, the Utility C&S Program was not only able to obtain beneficial information and data, but also support for the proposals. For example, California's leading commercial food service research group, the Food Service Technology Center (FSTC), was involved in the development of the green building standards proposed by the Utility C&S Program from a very early stage. The input, data, and support from FSTC helped strengthen the proposed standards while legitimizing the proposals in the eyes of other stakeholders that the Utility C&S Program consulted. The commercial food service equipment standards that the Utility C&S Program and FSTC (along with input from several manufacturers and distributors) collaboratively developed were ultimately adopted into California's Green Building Standards Code in January 2016.

The Utility C&S Program is currently working to support the adoption of Title 20 appliance standards for landscape irrigation spray sprinkler bodies and controllers. The Program is working closely with the Energy Commission, and coordinating with efficiency advocate organizations and trade associations, the U.S. Environmental Protection Agency (WaterSense® Program), and numerous experts. Outdoor water use represents a significant opportunity since it accounts for roughly half of urban water use in California (PPIC 2015).

Table 1. Adopted California water efficiency regulations as proposed by Utility C&S Program

Product	Regulation	Adoption Date	Requirement(s)	First Year Statewide Savings Estimates
Toilets (residential & commercial)	Title 20	April 8, 2015	Mandatory maximum 1.28 gallons per flush (gpf) for full flush volume and dual-flush effective flush volume	263 million gallons of water 1.3 GWh of embedded electricity [1]
Urinals (residential & commercial)	Title 20	April 8, 2015	Mandatory maximum 0.125 gpf (wall-mounted urinals)	193 million gallons of water 0.9 GWh of embedded electricity
Kitchen faucets (residential)	Title 20	April 8, 2015	Mandatory maximum 1.8 gallons per minute (gpm) with optional temporary flow of 2.2 gpm at 60 pounds per square inch (psi)	1.3 billion gallons of water 4.4 GWH of electricity 6.9 million therms of natural gas 6.4 GWh of embedded electricity
Lavatory faucets (residential)	Title 20	April 8, 2015 (Amended August 12, 2015)	Mandatory maximum 1.2 gpm at 60 psi	1.8 billion gallons of water 8.6 GWH of electricity 5.5 million therms of natural gas 8.6 GWh of embedded electricity
Showerheads (residential & commercial)	Title 20	August 12, 2015 (amended December 9, 2015)	Mandatory maximum 2.0 gpm at 80 psi (Tier 1); maximum 1.8 gpm at 80 psi (Tier 2); minimum flow rate requirements	2.2 billion gallons of water 26.8 GWh of electricity 11.3 million therms of natural gas 10.7 GWh of embedded electricity
Landscape irrigation (residential & commercial)	MWELO	July 2015	Various mandatory reporting, performance, and irrigation system design requirements	Not available [2]
Combination ovens (commercial)	CALGreen	January 20, 2016	Voluntary maximum 1.5 gallons/pan/hour, including condensate water	200,000 gallons of water 1 MWh of embedded electricity
Food waste disposers (commercial)	CALGreen	January 20, 2016	Mandatory maximum 1 gpm when not in use or auto shutoff after 10 minutes of inactivity. Total maximum water use of no more than 8 gpm	48 million gallons of water 232.7 MWh of embedded electricity
Dishwashers (commercial)	CALGreen	January 20, 2016	Voluntary requirement to comply with efficiency requirements in U.S. Environmental Protection Agency ENERGY STAR® program for commercial dishwashers	4 million gallons of water 19.4 MWh of embedded electricity
Food steam cookers (commercial)	CALGreen	January 20, 2016	Voluntary maximum 2 gallons/pan/hour for batch food steamers, and maximum 5 gallons/pan/hour for cook to order steamers. Total water use includes condensate water	5 million gallons of water 24.2 MWh of embedded electricity
Food waste pulpers (commercial)	CALGreen	January 20, 2016	Voluntary maximum 2 gpm potable water use	755,000 gallons of water 3.7 MWh of embedded electricity

[1] The embedded electricity estimates were calculated using the assumption of 4,848 kWh per million gallons of water for indoor water use, which is derived from research conducted for CPUC Rulemaking 13-12-011.
[2] Savings estimates were not calculated, as the Utility C&S Program's recommendations focused on enhanced compliance, and that no studies have yet been conducted to translate utility proposed improvements into water savings estimates.

Recommendations

Opportunities to Increase Water and Energy Savings

Additional significant opportunities for water savings still remain that will build on the water efficiency regulations recently adopted by the State of California. These potential savings can be achieved through a combination of strategies that include codes and standards and extend to complementary efforts that can be sponsored, designed, and/or implemented by energy utilities outside of California. These strategies are described below.

Codes and standards. Energy utilities can participate as public stakeholders in a rulemaking by submitting written comments on proposed regulations, participating in public workshops, and/or developing proposed efficiency requirements and regulatory language for adoption. Energy utilities can also leverage their subject matter expertise by conducting technical, market, and cost-effectiveness analyses and developing comprehensive proposals or reports that help support agency staff tasked with making recommendations to decision makers. Coalition-building and the formation of collaborative relationships with efficiency advocate organizations, agency staff, and key industry actors (e.g., manufacturers, builders) are also critical to the process. The implementation of these best practices has been very effective in the adoption of energy and water efficiency codes and standards in California, and has enhanced the value of energy utilities in establishing water efficiency regulations.

The Utility C&S Program has identified additional opportunities for increasing water efficiency through appliance and building standards. Many of these opportunities would result in direct energy savings, either from a reduction in water heating demand, on-site pumping or standby power. Table 2 below lists a number of measures that have been identified as potential candidates for water efficiency regulations. Some of these measures could also be candidates for rebate and incentive programs.

Rebate and incentive programs. One important strategy in a utility's energy management portfolio is the implementation of rebate and incentive programs to complement codes and standards. Large opportunities for energy and water savings include replacing inefficient equipment, detecting leaks, improving wasteful industrial processes, and supporting water recycling and reuse. Many incentive and rebate programs have been instrumental in steering the market toward a reduction in water and energy use by increasing the market availability of efficient products and the understanding consumers and facility managers have about efficient options. The Utility C&S Program has identified a number of measures that could potentially be pursued through incentive and rebate programs, which could also prime the market for future water efficiency regulations (see Table 2 below). In particular, preliminary research into agricultural irrigation efficiency shows promise, especially for collecting key data and information that could inform the development of effective codes and standards in the agricultural sector.

Code readiness programs.[10] Code readiness programs can also help pave the way for future efficiency regulations. This type of program can increase code compliance and support market transformation of more complex measures (i.e. influence innovators and early adopters to accelerate changes to regulations early in the product life cycle, such as compact hot water distribution or indoor graywater use). Code readiness activities can also supplement existing code advocacy efforts, such as research and development of code enhancement proposals.

Energy and water utility partnerships. Partnerships between energy and water utilities can increase the efficacy of the abovementioned opportunities. The collaboration can expand each utility's sphere of influence and lend credibility to the joint program. Further, each different utility can bring a positive contribution to the program, leveraging their respective experience, expertise, and resources. For example, the Utility C&S Program has experience with the adoption of nearly 200 federal and state standards, which has enabled the energy IOUs to develop a broad area of experience and relationships in this arena that can be shared with other utilities. In addition, through CPUC's Water/Energy Nexus rulemaking (R.13-12-011), CPUC is working with energy IOUs and water utilities to develop a partnership framework for the promotion of water-energy nexus programs, including exploring the feasibility of water utilities "piggybacking" on the energy IOUs' advanced metering infrastructure in order to advance smart water meter deployment in California (CPUC 2016). The data obtained from smart water meters will help with leak detection efforts and increase consumer awareness about water consumption.

Table 2. Additional water efficiency opportunities[1]

Measure	On-site Energy Savings	Sector	Description	Potential Strategies
Agricultural irrigation	Yes (pumping)	Agricultural	Promote efficient irrigation system design and equipment	Incentive programs to collect data to inform future codes and standards
Commercial combination ovens	Yes (water heating)	Nonresidential	Promote use of combination ovens that use less water to cook food	Appliance and/or building standards
Commercial dipper wells	Yes (water heating)	Nonresidential	Promote use of dipper wells that prevent constant flow of hot water in eateries (e.g., ice cream and coffee shops)	Appliance and/or building standards
Commercial dishwashers	Yes (water heating)	Nonresidential	Promote high efficiency appliances (e.g., ENERGY STAR) in equipment leasing market	Incentive programs and/or appliance and/or building standards
Commercial food steam cookers	Yes (water heating)	Nonresidential	Promote use of steam cookers that use less water to cook food	Incentive programs and/or appliance and/or building standards

[10] PG&E's Code Readiness Subprogram collected data on key measures to support market adoption and to inform upcoming rulemakings.

Commercial food waste disposers	No	Nonresidential	Promote equipment that automatically shuts off water flow when not in operation, and those with lower flow rates	Incentive programs and/or appliance and/or building standards
Commercial food waste pulpers	No	Nonresidential	Promote use of pulpers (i.e. food waste management) with lower flow rates	Incentive programs and/or appliance and/or building standards
Compact hot water distribution design	Yes (water heating)	Residential	Promote compact plumbing design in new construction to reduce distance between water heater and points of use	Building standards
Evaporative condenser controls	Yes	Nonresidential	Promote water efficient building designs in new construction	Building standards
Landscape irrigation controllers	Yes (standby power reduction)	Residential and nonresidential	Promote devices with weather-based, rain or soil moisture sensors, and reduced standby power usage	Incentive programs and/or appliance standards and/or WaterSense labeling
Landscape irrigation emission devices	No	Residential and nonresidential	Promote devices with pressure-regulation and those that reduce drift and evaporation	Incentive programs and/or appliance standards and/or WaterSense labeling
Leaks and leak detection	Yes (water heating)	Residential and nonresidential	Promote leak detection for irrigation systems and indoor plumbing in new construction; promote better design of toilets	Incentive programs and building standards
Graywater	No	Residential and nonresidential	Promote building construction that enables graywater for indoor (e.g., toilet flushing, commercial food disposal practices) and outdoor (e.g., irrigation) uses	Incentive programs and building standards
Pool and spa covers	Yes (water heating)	Residential	Promote covers to decrease evaporation and water heating	Incentive programs and/or appliance and/or building standards
Rainwater collection	No	Residential and nonresidential	Promote building construction that enables rainwater for indoor (e.g., toilet flushing) and outdoor (e.g., irrigation) uses	Incentive programs and building standards
Recycled water	No	Residential and nonresidential	Promote building construction that enables use of recycled water	Incentive programs and building standards

Smart water meter deployment	No	Urban	Promote smart meters to foster conservation and better data collection	Incentive programs and building standards
Steam trap controls	Yes	Industrial	Promote water efficient building design in new construction	Building standards
Tub spout diverters	Yes (water heating)	Residential	Promote efficient tub spout diverters that reduce leakage in shower/tub combinations	Appliance standards

[1] The potential strategies are listed in alphabetical order.

Conclusion

The traditional role of energy utilities has expanded beyond advocating for energy efficiency. The water-energy nexus, impacts of climate change on water and energy use, and the severe drought in the Western United States have provided both the impetus and justification for the involvement of energy utilities in influencing the adoption of more stringent water efficiency regulations, as well as the development of various water-energy nexus programs that will save water and energy in California.

Since the water-energy nexus is not unique to California, energy utilities outside of the state can aim to have a presence in codes and standards development and/or in implementing programs that promote energy savings through water efficiency and conservation. Energy utilities can also work to develop close partnerships with local and state government agencies, water utilities, and other entities to identify potential mutual benefits. Regardless of the type of water efficiency action that an energy utility decides to pursue, coordination with other utility-run programs is recommended to ensure that goals and objectives are widely understood, that existing resources can be leveraged to create added value, and that the impacts of one program do not adversely affect another program. The ability of energy and water utilities to pool resources and leverage diverse technical expertise through partnerships that promote water and energy efficiency will also increase the success of these programs, and is highly recommended as a key implementation strategy. The best practices and recommendations presented in this paper will hopefully serve as a model, or at the very least, as inspiration for increasing the role of energy utilities in the water efficiency arena.

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