

WATER CONSERVATION

Shouldn't Depend
on a **DROUGHT:**
LESSONS LEARNED
from California
Universities

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Water is a critical yet unpredictable natural resource that requires stewardship. Freshwater represents less than 3.5 percent of all the water available on the planet, and extreme weather events, such as droughts, are making its availability even less predictable. Such conditions force us to confront our reliance on this diminishing precious resource and the vulnerability it creates for humans and our environment.

While water shortages can impact regions across North America, nowhere has it been felt as severely as in California with its recent droughts. The lessons the state learned—and the best practices and planning implemented by California universities—can serve as an inspiration as well as a blueprint for other facilities and regions.

California suffered through two droughts within eight years. Low rainfall and increased demand led to the 2007-09 drought and a statewide emergency. Interrupted by a brief respite, the state then experienced its four driest years on record from 2011-15. This prompted Governor Jerry Brown to declare a drought state of emergency and issue executive orders, including mandatory statewide water reductions, increased conservation and enforcement efforts, and incentivized investments in new technologies.

Higher education followed suit; University of California President Janet Napolitano initiated a sweeping goal to decrease water usage across the university system by 20 percent.





Fortunately, California's drenching storms of 2017 assuaged the drought, leading Governor Brown to declare an end to the crisis in April 2017. That action, however, may have been premature. While it may be tempting to think that water scarcity and mandated reductions are a thing of the past and that facilities can refocus attention on other pressing issues, forward-thinking facility leaders recognize that water sustainability is a long-term priority that must be addressed on an ongoing basis. Just as quickly as the torrential storms appeared in California last year, the spigot could be turned off again and the drought could reoccur.

INCORPORATING WATER CONSERVATION INTO CAMPUS OPERATIONS

California campuses are leveraging the critical lessons learned from the drought to make water conservation a way of life. Camille Kirk, director of sustainability and campus sustainability planner for the University of California Davis (UC Davis), sums up this perspective in a quote she paraphrases from Louis Pasteur, "Luck favors the prepared mind."

One major obstacle to preparedness is the harsh reality that it's hard to get the attention—and budget—for water sustainability from university decision-makers without an immediate threat. These executives are juggling competing priorities and are hard pressed to meet the demands of multiple, diverse constituents. They must meet a level of service expectation, such as providing "curb appeal" (e.g., landscaped campuses and mission-critical lab operations) to compete with other institutions. Water projects are a hard sell because the cost of water is undervalued and payback time frames can be long-term.

FOUR STRATEGIES FOR SUSTAINABILITY

Forward-thinking leaders at higher education institutions across the state have successfully established water stewardship initiatives and engaged broad-based involvement. Following are some of the successful change-making practices gleaned from interviews with seven facility managers and sustainability professionals at California campuses, as well as our own experience working with our clients:

- **Make the business case—money talks.** While there can be many factors determining which projects a university funds, there is no arguing with initiatives that improve the bottom line. University of California San Francisco (UCSF) Sustainability Director Gail Lee has established a culture within UCSF for successful sustainability initiatives, which include making a business case that a particular initiative would save the university money while achieving a sustainability target. Eli Perszyk, UCSF's facilities services water program coor-

dinator, leveraged a rebate program that the City of San Francisco had implemented to make a case for water savings at UCSF. When the UC Office of the President established a new policy requiring its campuses to eliminate single-pass water cooling of laboratory equipment, he developed a rebate program for UCSF that was similar to the city's model.

Under the program, water usage was metered on old sterilizer equipment for two months to establish a baseline. Then, facilities installed and metered new, water-efficient equipment until a water savings of \$5,000 was demonstrated—at which point the rebate was paid to the laboratory. By replacing seven outdated sterilizers, UCSF is on track to annually conserve 6 million gallons of water, coupled with \$125,000 in water utility cost savings. This initial program was implemented in one building as a pilot, with the intent to roll out the program throughout the campus.

- **Look for opportunities to leverage the energy/water nexus.** While water is typically needed for energy production, conversely, energy is often needed to make water useable. Given this interrelationship, it's important to use water conservatively to produce energy and look for creative sources of water to support the process.

A cogeneration power plant at the University of California Los Angeles (UCLA) represented 20 to 30 percent of the university's overall water use on campus. The university's facilities group turned this operational fact into an opportunity for innovation; it developed a water reclamation project that captures water from various sources across the campus to augment water needed to cool the cogeneration power plant. The project currently reclaims over 28 million gallons of water annually, from sources such as condensate from air conditioners and water captured from laboratories across campus.

Kelly Schmader, assistant vice chancellor for facilities management, says, "We are saving 110,000 gallons of water a day just from condensate alone." The condensate is collected from 25 buildings, and as of Q1 2018, three more buildings are in the works. Nurit Katz, UCLA's chief sustainability officer, credits a lot of the project's success to the collaboration that came from "bridging silos within [the] facilities [department]," which led to the creation of a high-functioning, cross-disciplinary team including building engineers, project managers, and plumbers.

- **Engage student researchers to champion water conservation pilot projects.** Universities have unique access to eager, talented students looking for research projects to support their academic pursuits and résumés. Ryan Todd, sustainability manager at California State University (CSU) Sacra-

mento, explained that he recently worked with a student who conducted a feasibility study on the water-saving benefits of infrared faucets. That research project showed a 54 percent reduction in water usage for each faucet and ultimately helped secure a \$600,000 grant from the California Department of Water Resources to swap out all the inefficient water faucets across campus with infrared faucets.

- **Seek and be open to bold, creative solutions.** UC Davis' Camille Kirk was looking for an innovative approach to address short- and long-term water conservation measures across campus during the drought. Realizing she would get better ideas, results, and long-term benefits if she reached outside the Office of Sustainability, she convened a diverse group of university stakeholders, including staff at various levels within operations, dining services, landscape management, research water use, communications, engagement and outreach, utilities, infrastructure and new construction, and renovation. As a result, the group identified nearly 50 drought response ideas and actions to address the problem.

One of the ideas that was implemented led to significant, permanent water savings for the campus. Kirk says, "We now have a fantastic wastewater treatment plant with tertiary treated water." Michael Fan, director of utilities, adds, "Out of 10 campuses in the UC system, we're the only one that has a wastewater treatment plant." The university reduced total campus water use 15 to 20 percent by leveraging its existing treatment plant to use recycled wastewater instead of domestic potable water in two of its cooling towers—saving about 61 million gallons of potable water.

CSU Fullerton considered several options for reducing water usage to determine which would provide the greatest impact. Megan Moscol, sustainability programs manager at the university, in collaboration with the university's executive board, realized that there was a substantial upside if they just stopped watering the grass on campus. Keeping the campus green wasted a lot of water, and by not watering the grass, the campus could gain substantial water savings at no cost. As the idea evolved, it became clear that the university could make the landscape more reflective of the native environment. The university decided to hydroseed a custom blend of native California wildflowers, and by cutting out 20 acres of turf grass, it was able to cut its water use in half—an annual reduction of 40 million gallons. "Keeping the campus green through the summer, when we have the fewest students on campus, was where we achieved our biggest savings," adds Moscol.

Moscol's office collaborated with the Division of Student Affairs to lead campus informational tours about

these initiatives and used posters to inform campus stakeholders about the new native landscape. The transformed campus provided greater curb appeal and received positive feedback from students, many of whom posted pictures on Instagram (#csufc-appyday) and other social media sites. The Division of Student Affairs noted that the flowers were a welcome morale booster for stressed students during finals.

TAKING A LEAN APPROACH

Regardless of the approach universities take to promote water stewardship, by applying Lean principles they can achieve greater consensus and participation, and also ensure better results. In addition to focusing on reducing waste and increasing value, these principles are based on respecting the contributions of people at all levels throughout the institution and broader community.

By bringing together a multidisciplinary team and engaging key constituents across all areas of the university and neighboring community, institutions benefit from different perspectives and expertise. These working groups focus on identifying key factors contributing to water waste, determining shared goals and a unified vision of what they want to accomplish, establishing processes, brainstorming solutions, and assigning responsibilities.

There are other effective conservation and sustainability approaches universities can take in the months and years ahead. One key trend is fit-for-purpose water usage, which avoids use of potable water (i.e., drinkable water) for nonpotable uses (e.g., landscape irrigation, cooling towers). It's also important to keep in mind the value of embedding water stewardship into master planning, capital planning, and campus-wide building guidelines.

Water is one of the most widely used natural resources, but it is vulnerable. The lessons learned by California campuses about water conservation, and the actions they have taken to address the issue, serve as proof for facilities everywhere that significant, long-standing gains can be achieved when institutions make a concerted effort to address sustainability head on. 🌱

RESOURCES

California's Drought of 2007–2009: An Overview. Available: <http://www.water.ca.gov/waterconditions/docs/DroughtReport2010.pdf>.

"Gov. Jerry Brown Lifts Drought Emergency for Most of California." Available: <https://www.npr.org/sections/thetwo-way/2017/04/07/523031241/gov-jerry-brown-lifts-drought-emergency-for-most-of-california>.

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