UCDAVIS
Center for Water-Energy Efficiency

Research in Brief
November 2019

BARRIERS PREVENTING GROWTH OF ONSITE WATER REUSE IN CALIFORNIA

"A dedicated organization to serve as a statewide hub for resources, training, certifications, and a clearinghouse could serve to improve policies and local regulatory programs."

PROBLEM

Using alternate water sources, such as rainwater or gray-water, for onsite reuse has potential to offset potable water demands and reduce wastewater flows. Onsite water reuse has been allowable by California code for just over a decade, yet the proliferation of treated onsite water reuse systems has been sluggish due to challenges that have surfaced. A recent study surveyed system professionals and regulators at several levels to uncover beliefs about the regulatory environment and the most critical challenges to adoption of these systems, both industrial and commercial. In California where water consumption is becoming more regulated and water resources are limited, onsite water reuse provides one method to help reach water reduction targets.

WHAT IS ONSITE WATER REUSE?

Onsite water reuse systems collect and reuse alternate water sources in close proximity to the source, including graywater, rainwater, stormwater, and process water. One common type of small-scale onsite water reuse system collects laundry water for outdoor irrigation applications without treatment. However, onsite systems can also be quite large, such as reusing industrial process water in indoor, commercial settings, which requires treatment by California code. Treatment requirements depend on end use as well as the authority having jurisdiction, for example, county health or city building departments. While non-potable reuse is defined and regulated primarily by the California Plumbing Code Chapters 15 and 16 (2019), California Senate Bill 966 (2018) will by the end of 2022 require that onsite non-potable treated systems also be regulated actively by local programs.

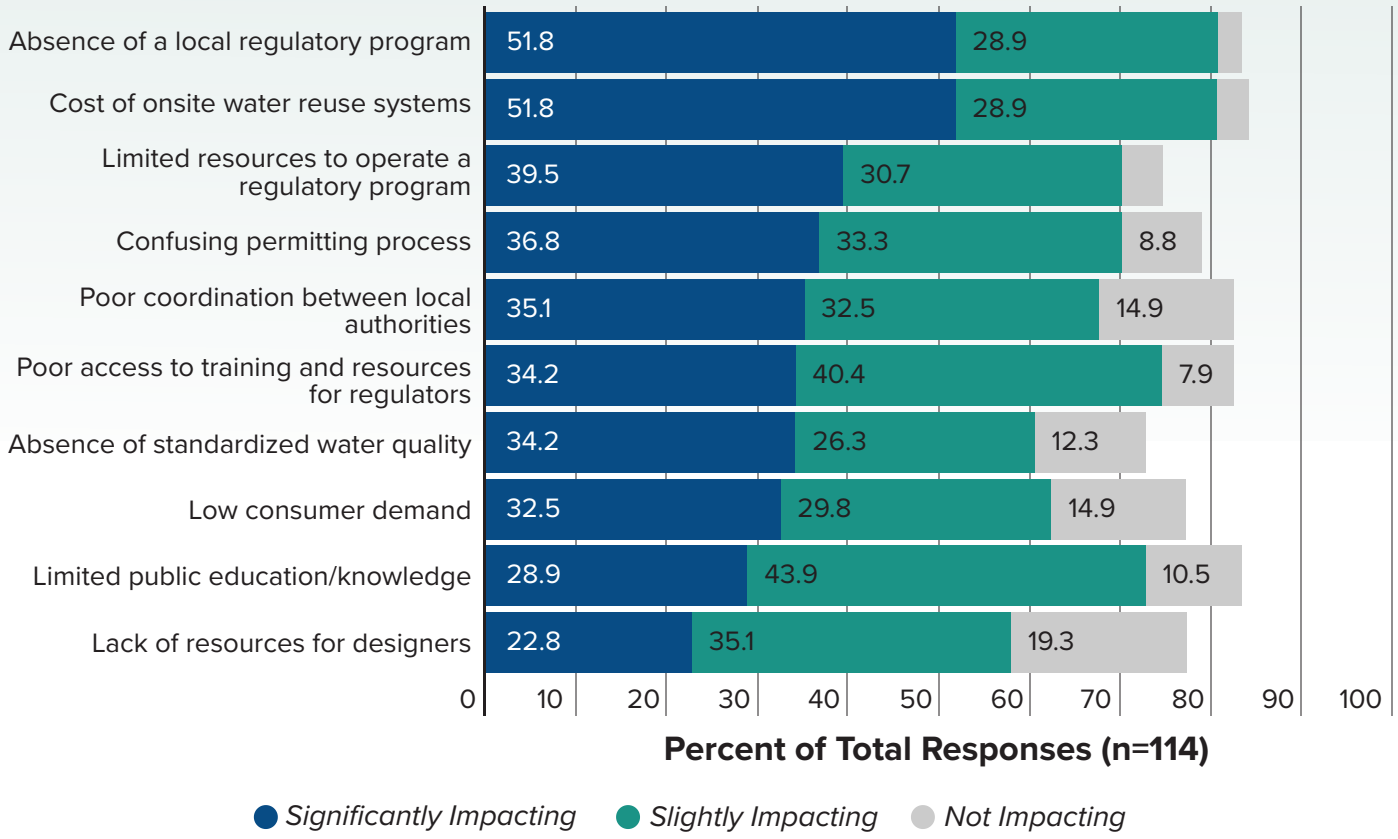


Figure 1: Survey results to questions about challenges preventing growth of onsite, commercial water reuse for indoor applications.

WHAT IS PREVENTING GROWTH?

To date, the reuse of water has been predominately performed on a centralized level in California, far from the original point of discharge, termed water recycling. Most research on reuse challenges has been focused on public opinion and centralized recycled water systems. Researchers at the Center for Water-Energy Efficiency (CWEE) decided to take a different approach and explore the challenges specific to onsite systems regulated exclusively at the local level (i.e., non-blackwater) from the perspective of the impacted stakeholders: local authorities, system designers, consultants, and engineers.

Researchers asked respondents to identify barriers preventing the growth of onsite non-potable water systems (ONWS), referring specifically to commercial indoor reuse; the top 10 barriers reveal a broad range of hindrances (see Figure 1).

WHAT IS PREVENTING GROWTH? (CONTINUED)

Two particularly salient survey findings include the absence of a local regulatory program and overall system cost as significantly impacting growth. First, acquiring a permit for an ONWS that involves treatment for indoor reuse, as required by state code, must soon rest on an established local regulatory program per California Senate Bill 966 (2018); interested parties will be otherwise blocked from moving forward with such systems. Tellingly, over a third of respondents reported limited resources for operating such a regulatory program. Second, in terms of cost, onsite treatment systems can be expensive and may not always be cost-effective. For example, retrofitting, versus installing ONWS in new construction can be cost prohibitive. Figure 2 illustrates four of the top ten barriers.

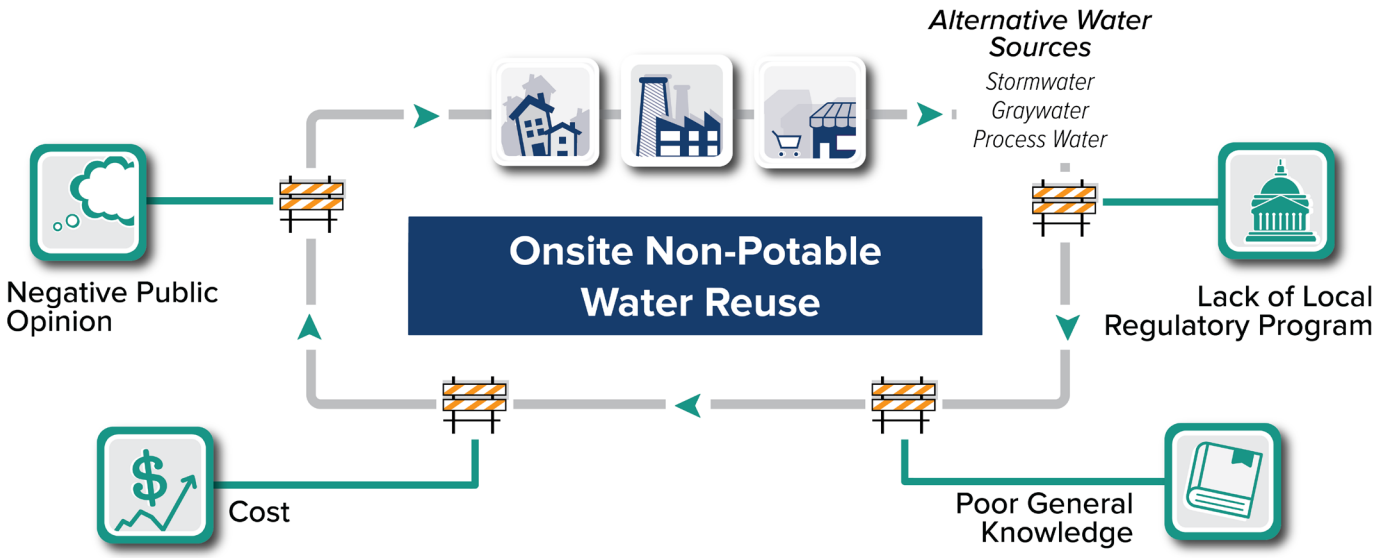
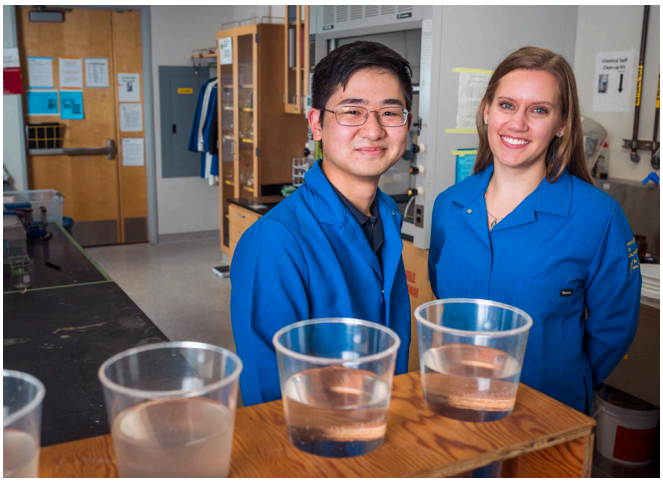


Figure 2: Four of the top ten barriers to the adoption of onsite non-potable water reuse systems, both industrial and commercial.

RECOMMENDATIONS

Researchers analyzed the results of the survey, as well as the regulatory environment, to propose some possible solutions. A dedicated organization to serve as a statewide hub for resources, training, certifications, and a clearinghouse could serve to improve policies and local regulatory programs. Increased positive messaging and modeling of successful onsite treated systems could also address issues of awareness and resistance on the part of the public and local authorities. If the benefits of onsite water reuse — especially for commercial indoor applications — are to be realized, such solutions must be targeted and implemented before significant growth can be achieved.



Students at UC Davis CWEE verifying water quality of an onsite water reuse system from a research demonstration site

A full description of this study has been accepted by the Journal of Resources, Conservation, and Recycling: Rupiper, A. M., & Loge, F. J. (2019). Identifying and overcoming barriers to onsite non-potable water reuse in California from local stakeholder perspectives. *Resources, Conservation & Recycling:* X, 4, 100018. https://doi.org/10.1016/J.RCRX.2019.100018

ABOUT CWEE

The mission of the UC Davis Center for Water–Energy Efficiency is to advance water management solutions for the integrated savings of water and energy resources. At a time when both energy and water resources are under increasing stress, CWEE is dedicated to breaking down the conceptual, technological, and regulatory barriers between the two. CWEE was established in 2011 and is now part of the UC Davis Energy and Efficiency Institute.

PREPARED BY

Amanda Rupiper, *PhD candidate in Civil and Environmental Engineering*

Frank Loge, *PhD, PE, CWEE Director and Professor of Civil and Environmental Engineering*

Halona Leung, *Operations Manager*

Leslie Crenna, *Senior Writer and Editor*

Paul Fortunato, *Creative Specialist at EEI*

FUNDER

This document was prepared as a result of work sponsored by the California Energy Commission. It does not necessarily represent the views of the Energy Commission, its employees, or the State of California. The Energy Commission, the State of California, its employees, contractors, and subcontractors make no warranty, express or implied, and assume no legal liability for the information in this document; nor does any party represent that the use of this information will not infringe upon privately owned rights. This report has not been approved or disapproved by the Energy Commission nor has the Energy Commission passed upon the accuracy of the information in this report.