

# Water Reuse

## Regeneration at its finest



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We are all indebted to the reclamation and reuse pioneers, including Tallahassee, Florida, United States (US), which began to use reclaimed water for agricultural purposes in the 1960s. In the 1970s, the Singapore government commissioned a study to determine the feasibility of producing reclaimed water while, in the US, Orange County, California, began operation of Water Factory 21, and St. Petersburg, Florida, developed a water system for landscape irrigation. The Scottsdale Water Campus came online in the late 1990s and is one of the all-time favorites with which I have been involved. It had many notable firsts, like several other reuse projects in the US state of Arizona.

Think of the progress we've made. The Scottsdale Water Campus recently celebrated its 20th anniversary, and today we see water reuse – or water recycling – taking on a more prominent role in portfolios. This is particularly true where demand outpaces other sources of water, such as in arid regions and in regions that face unique water challenges including drought and seawater intrusion. In the United States, we've come to expect states like those in the southwest to lead the way with zero discharge, groundwater replenishment, and other sustainable strategies. In Singapore, PUB is similarly proving that it's possible to change water supply portfolios and public perception through successful water recycling programs.

Interest in potable reuse continues to rise. When polled on plans to invest in new alternative water supply solutions for Black & Veatch's 2018 *Strategic Directions: Water Report*, 37 percent of the 2018 survey respondents said their utilities are at least

somewhat likely to develop direct potable reuse (DPR) options while 53 percent said the same of non-potable reuse, and many expect to invest in some type of indirect potable reuse (IPR).

Reuse is also gaining more regulatory footing. Early this year, Arizona joined Texas and California in establishing a pathway to a regulatory approach to DPR. Arizona's new guidelines allow the state to offer permits to facilities that apply advanced treatment to reclaimed water to produce potable drinking water. Florida formed a potable reuse commission to develop a comprehensive, Florida-specific framework for potable reuse.

In March, California issued an expert panel report establishing the feasibility of regulating DPR and identifying the research necessary to successfully implement DPR projects. The state has regulations for IPR but plans to release regulations focused on DPR in 2023. California's decision to accept and apply the Membrane Bioreactor Validation Protocol developed by the Australian Water Recycling Centre of Excellence makes it possible to evaluate the effectiveness of membrane bioreactor (MBR) treatment on future potable reuse schemes and provides a framework for taking advantage of the reuse benefits attached to MBR treatment.

Emerging and advanced technologies stimulate the growth of reuse practices. Effective risk management in DPR schemes demands a robust multi-barrier strategy for disinfection, pathogen removal, and management of compounds of emerging concern (CECs) and regulated chemical contaminants. Anaerobic mainstream treatment technologies offer promise through their potential to reduce the number of unit operations between the source water (wastewater) and the water supplied to a water purification facility. Mainstream deammonification holds value for utilities that seek low nutrient levels without reliance on supplemental carbon, yet we need more research on these mainstream technologies.

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Smart-monitoring infrastructure, such as smart metering, real-time controls, and data analytics, will be critical because of the

monitoring requirements sure to be imposed as states move toward DPR. Important advances in process monitoring and measurement as well as in new detection and measurement tools will enhance system reliability and reduce risk.

The water industry has made great strides in increasing awareness and understanding of water recycling needs and technologies, but education needs to continue. Some forward-thinking utility leaders have focused on educating youth in addition to adults. That, among many other smart communication practices, has gone a long way toward raising awareness of reuse benefits and water's importance.

Those of us who have been passionate about water recovery and reuse for many years see growth in integrated planning as a greater number of communities think more holistically about their supply needs, what's best for the community, and how to best use all available water resources. Unfortunately, capital costs and lack of funding remain a barrier. Survey results indicate only 22 percent of respondents charge the full cost of service for recycled water. One-third of survey respondents charge customers recycled water rates that are a percentage of potable rates. This practice is common in the industry and is intended to encourage use of recycled water, but the budget impacts as well as the subliminal messaging associated with cheaper water must be considered.

While we have many success stories, we still experience reuse challenges related to public perception and the speed of policy changes. Words often create much of the challenge for reuse because we tend to segregate water and label every drop based on its history rather than its potential. As an industry, we must focus on breaking that barrier and talk about water, period. The guarantee must be that the water quality delivered meets the requirement for a given use. The conversation isn't about a water drop's history but about the opportunity for its future use.

In her opening comments at WEFTEC 2018, Water Environment Federation Executive Director Eileen O'Neill used the term "ReGeneration." The global community of individuals driving resource recovery, renewable resources, and other means of sustaining our natural environment are all part of this movement. Adding reuse to portfolios and employing fit-for-purpose strategies can help the water industry meet demand, sustainability, and resilience goals.

Reuse is ReGeneration at its best.