



## WHO IS CUWA?

Established in 1990, the California Urban Water Agencies (CUWA) is a nonprofit corporation of 11 major urban water agencies that collectively deliver drinking water to approximately two-thirds of California's population. Water delivered by CUWA's 11 member agencies is a lifeline supporting California's urban populations and powering the bulk of the state's over \$2.7 trillion economy.

## DISTRIBUTED SYSTEMS APPROACH

The distributed systems approach is a regionally optimized blend of both centralized and onsite reuse. This approach considers competing demands for wastewater, along with system impacts, cost, energy, and other factors.

## GUIDING REGIONAL REUSE OPTIONS - A DISTRIBUTED SYSTEMS APPROACH

Climate change, population growth, and regulatory drivers are putting pressure on California's urban water supplies, inspiring greater water supply diversification. By recycling water, agencies can extend their local water supplies to improve supply reliability and resiliency, support growth and development, and supplement environmental flows. California's State Water Board has ambitious recycled water goals, and CUWA agencies have conceptual plans to double their water reuse by 2035.

## DEVELOPING A FIT-FOR-COMMUNITY PORTFOLIO

Water reuse can be achieved through both centralized and onsite (decentralized) systems for non-potable and potable uses. While no one reuse strategy fits all communities, an integrated water management approach can help utilities tailor their water supply portfolio to meet site-specific conditions and objectives.

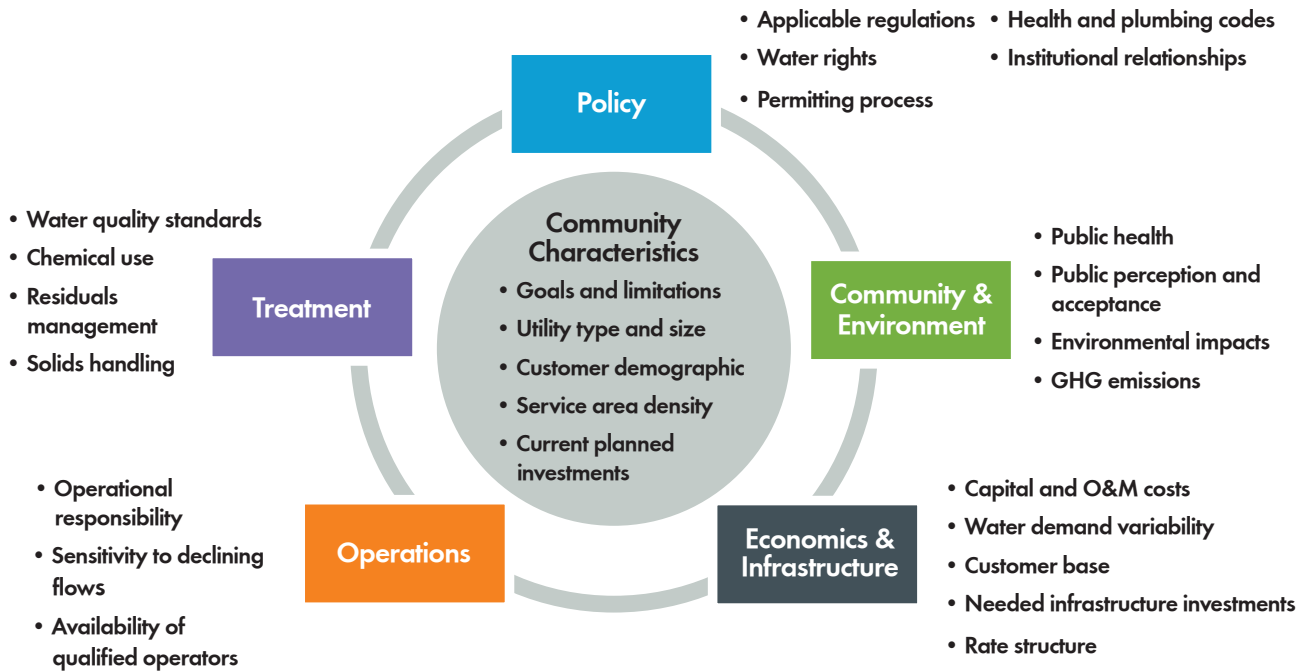
With several reuse options available, utilities can apply a **distributed systems approach**, defined as a regionally optimized combination of water reuse strategies for local conditions, to produce an effective "fit-for-community" reuse strategy.

The right reuse portfolio for a given region will account for system and community considerations and enabling conditions. Favorable conditions for a range of reuse options are summarized below. Evaluating factors in advance can help save costs, reduce greenhouse gas emissions, increase public awareness, and advance environmental stewardship within a community.

Favorable Conditions	Non-Potable Reuse (NPR)	Potable Reuse (PR)	Onsite Reuse (Onsite)
	<ul style="list-style-type: none"> <li>• Large, consistent demand for recycled water (non-potable)</li> <li>• Customers in proximity of centralized facility or existing distribution system</li> <li>• Recycled water needed to support community development and growth</li> </ul>	<ul style="list-style-type: none"> <li>• Community goal to expand locally controlled potable water supplies</li> <li>• Desire for sustainable groundwater management and mitigation of land subsidence</li> <li>• Access to cost-effective means for concentrate management</li> <li>• Prior investments in advanced water treatment within the system</li> </ul>	<ul style="list-style-type: none"> <li>• Recycled water demand in dense urban environments or challenging topography</li> <li>• Existing water or wastewater systems close to capacity</li> <li>• Planned growth or new development in areas where expansion of water or wastewater infrastructure would be cost prohibitive</li> </ul>

## CONSIDERATIONS TO ACHIEVE FIT-FOR-COMMUNITY SOLUTIONS

Why are some agencies moving toward potable reuse rather than expanding non-potable reuse supplies? What local conditions favor various reuse options, and what are the needed factors for successful implementation? The following sections address these questions and highlight the key considerations for various reuse strategies, based on the elements shown below.

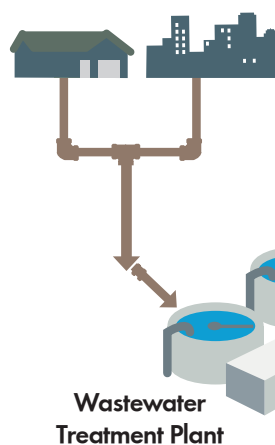


\*Colors associated with each category carry through the subsequent figures.

### NPR

**Non-potable reuse: any application of recycled water not involving human consumption.**

NPR has an important role to play, as using recycled water offsets demand on potable supply and helps to enhance urban green space and quality of life. NPR uses a separate distribution system, which may require significant capital investment and construction. NPR is more favored in new development or areas with existing dual distribution systems.



#### + - Public perception

Irrigating urban green spaces with recycled water during drought may invoke different reactions from the public. Some view it as a way to support community benefits with a drought-resilient supply. Others may be concerned about maintaining landscape irrigation during drought, regardless of the water source.

#### + + Treatment process

NPR builds upon existing wastewater treatment plants, which have infrastructure to handle solids and waste streams. Operations are familiar and existing operators can manage the facility.

#### + - Recycled water demand

NPR relies on demand from recycled water customers and is best leveraged where demand is significant and consistent. Storage may be required if the demand is seasonal or highly variable.

#### - Recycled water distribution

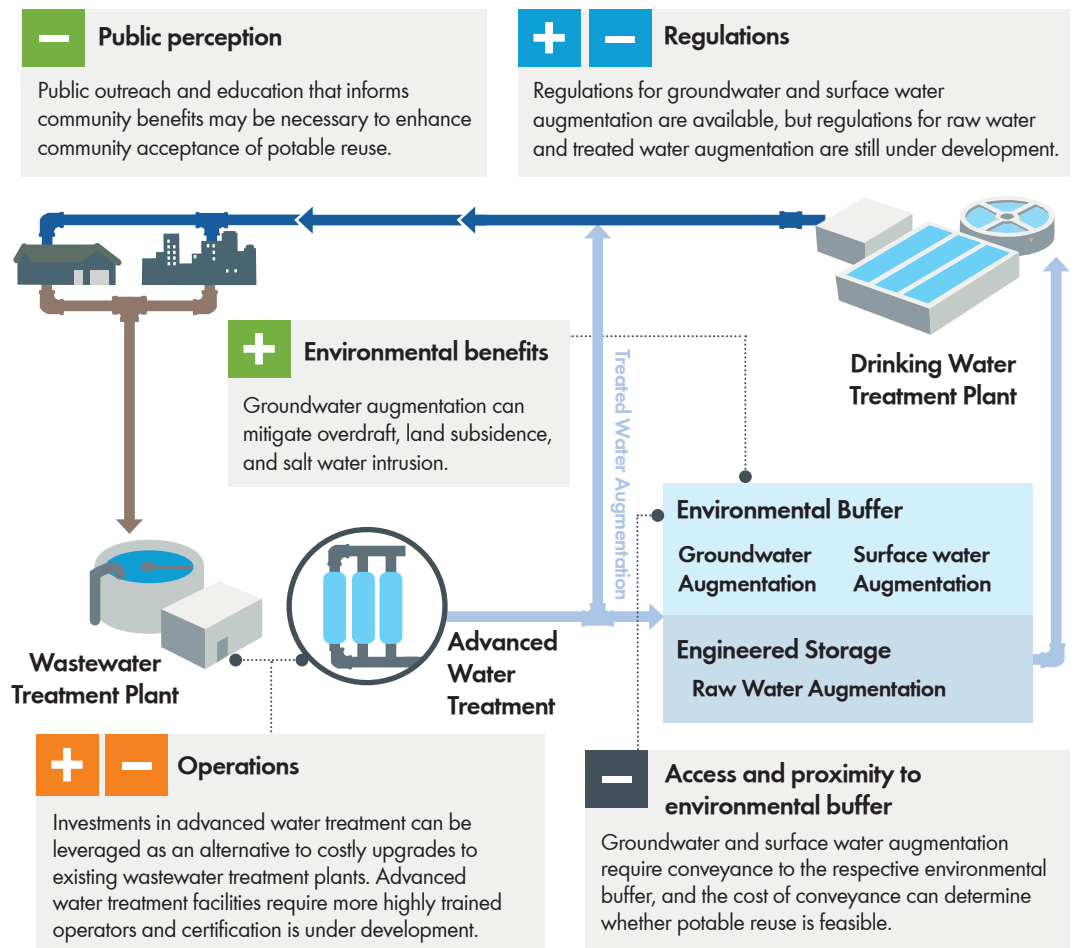
NPR requires a separate recycled water distribution system, which may be cost prohibitive in areas with difficult topography or dense, existing urbanization.

**Recycled Water Customers**

## PR

**Potable reuse:** application of purified water (achieved through additional levels of treatment) to augment a potable water supply.

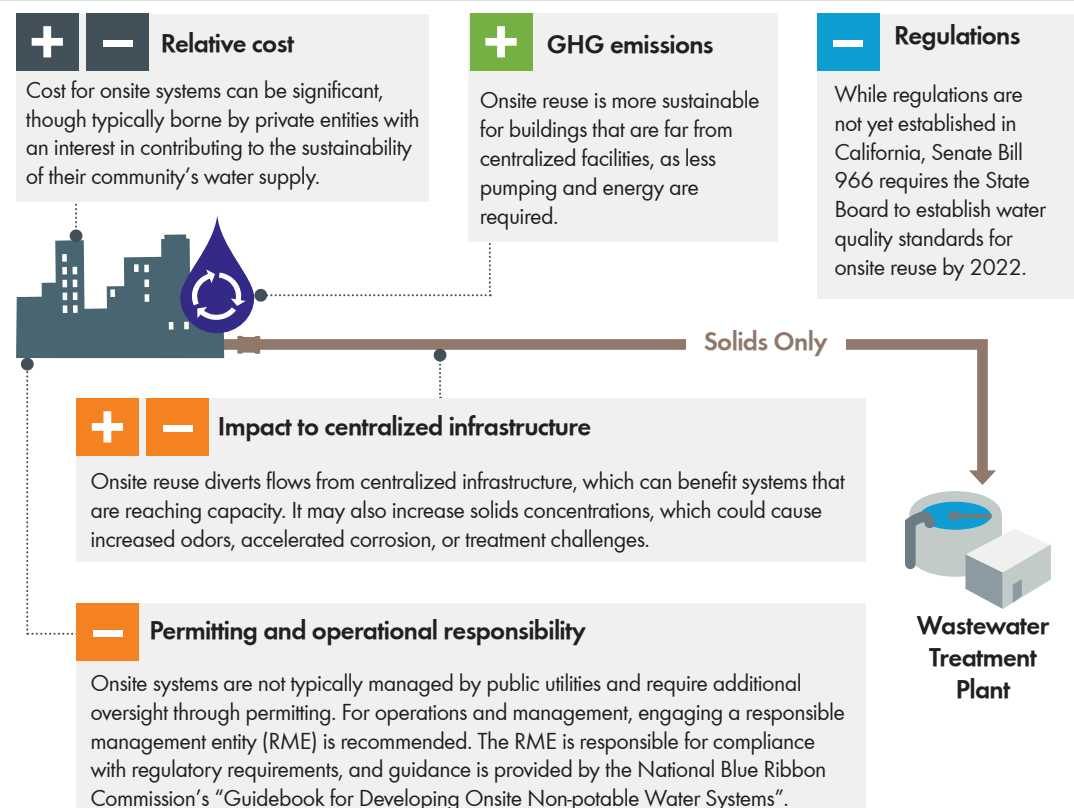
Potable reuse has taken off recently in the U.S. and has been in practice for several decades in other countries. It leverages existing water distribution infrastructure, circumventing the need for a separate distribution system. As potable reuse continues to evolve, there is a need for further research to support regulations and safe and cost-effective implementation.



## ONSITE

**Onsite reuse:** onsite treatment and reuse of alternative sources of water (e.g., rainwater, graywater, blackwater) at the building or district scale.

Onsite reuse is gaining momentum as a strategy that's implementable by building owners with support from their local utility. It provides the building owners, and their community, with a sense of environmental stewardship and serves as one of the strategies to gain environmental credits through rating programs like LEED.



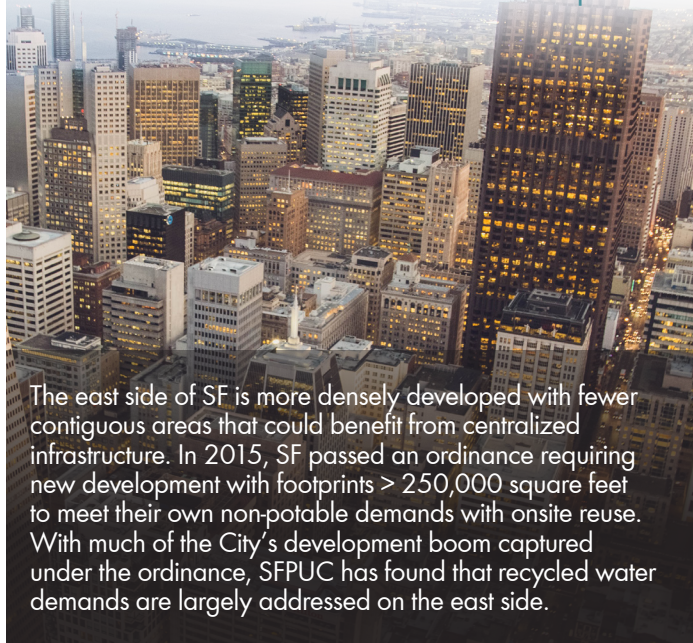
## SFPUC OPTIMIZES REGIONAL REUSE THROUGH A DISTRIBUTED SYSTEMS APPROACH

### Centralized NPR for larger parcels of irrigated land



The western side of SF is home to large irrigation customers, such as the Golden Gate park, golf courses, and San Francisco Zoo. To capitalize on economies of scale, SFPUC is building a large centralized recycled water plant to serve them.

### Onsite reuse for dense urban development



The east side of SF is more densely developed with fewer contiguous areas that could benefit from centralized infrastructure. In 2015, SF passed an ordinance requiring new development with footprints > 250,000 square feet to meet their own non-potable demands with onsite reuse. With much of the City's development boom captured under the ordinance, SFPUC has found that recycled water demands are largely addressed on the east side.

## WORKING TOGETHER TO ADVANCE FIT-FOR-COMMUNITY REUSE

### For businesses looking to incorporate water sustainability into their culture:

- Align with urban water agencies to invest in regional strategies that reflect the interconnectedness of our water systems and optimize a community's available wastewater
- When contemplating onsite systems, team with a responsible management entity with experience in long-term operations

**For policy makers:** maintain flexibility at the local level. Any legislation or codes related to water reuse should enable implementation of the reuse strategy that best fits local community needs.

### For utilities leading efforts to optimize water supply reliability:

- Evaluate centralized and onsite reuse opportunities through a distributed systems approach
- Engage policy makers and public health officials to explore barriers and incentives

### EXPANDING LEED CREDITS TO REFLECT ALL SUSTAINABLE REUSE OPTIONS

A building, neighborhood, or community can employ multiple strategies to increase their water efficiency. Many developers opt for onsite reuse to achieve green building certification through rating systems like LEED. However, LEED offers water efficiency credits for using any type of alternative water source, including centralized reuse, and further clarification of the rating criteria will improve awareness of this opportunity. Rewarding whichever combination of reuse strategies makes the most sense from a holistic, regional perspective aligns with the distributed systems approach and would enable development of fit-for-community solutions through partnerships between businesses and utilities.