

The Future Of Water Infrastructure

Exploring how reclaimed water will be used to alleviate water stress in the US

Project Introduction

Water demand will exceed supply by **50%** by **2040**.

This project was inspired by a recent ING bank report that predicts global water demand from industry is expected to increase 4% per year towards 2040, intensifying competition for water and causing regulatory risks.

This will leave many regions at increased risk of **Day Zero events**.

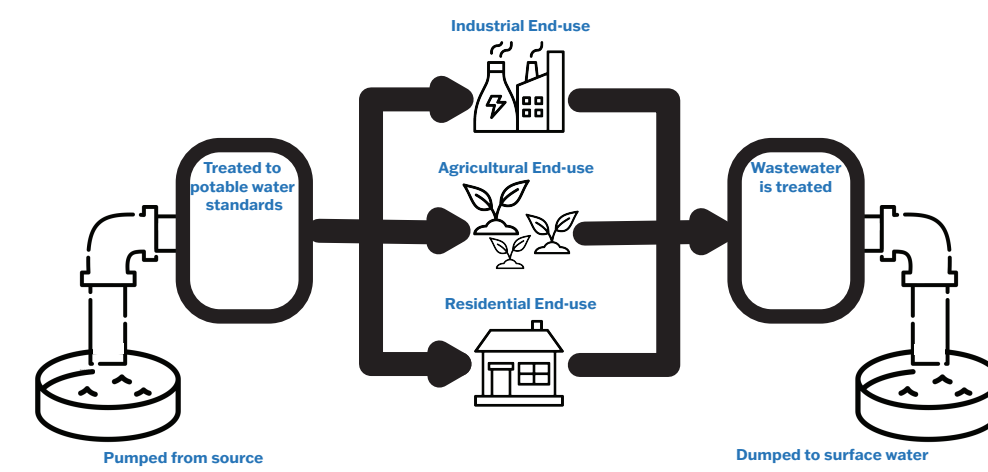
A Day Zero event is when water supply levels are so low that a municipality has to shut off its public water supply, instead rationing water to civilians daily. Notable regions that have reached or gotten dangerously close to taking these measures in recent years include Cape Town, South Africa in 2019, Chennai, India in 2020, and Karachi, Pakistan in 2021.

Our project is a report that assesses the current state of water reuse adoption,

suggesting opportunities for Watts to be proactive in addressing the water crisis, assess the viability of emerging water reuse technologies, and contribute to a water-conscious future.

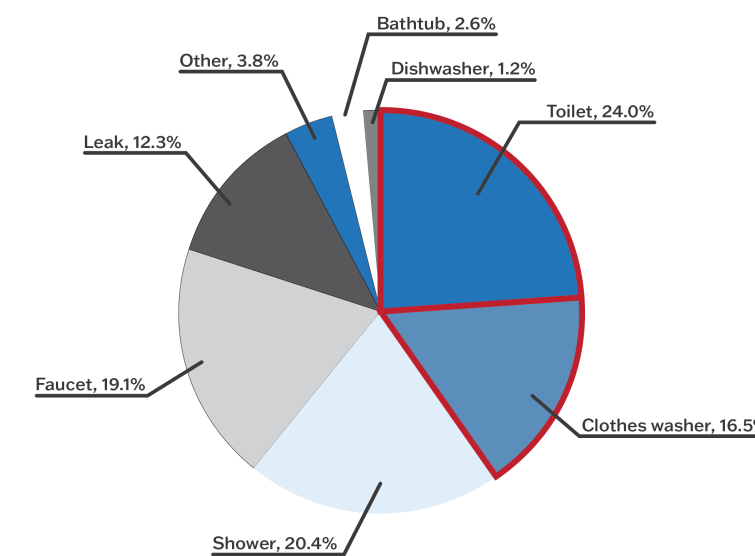
Why Reclaimed Water?

Our current water infrastructure is largely linear

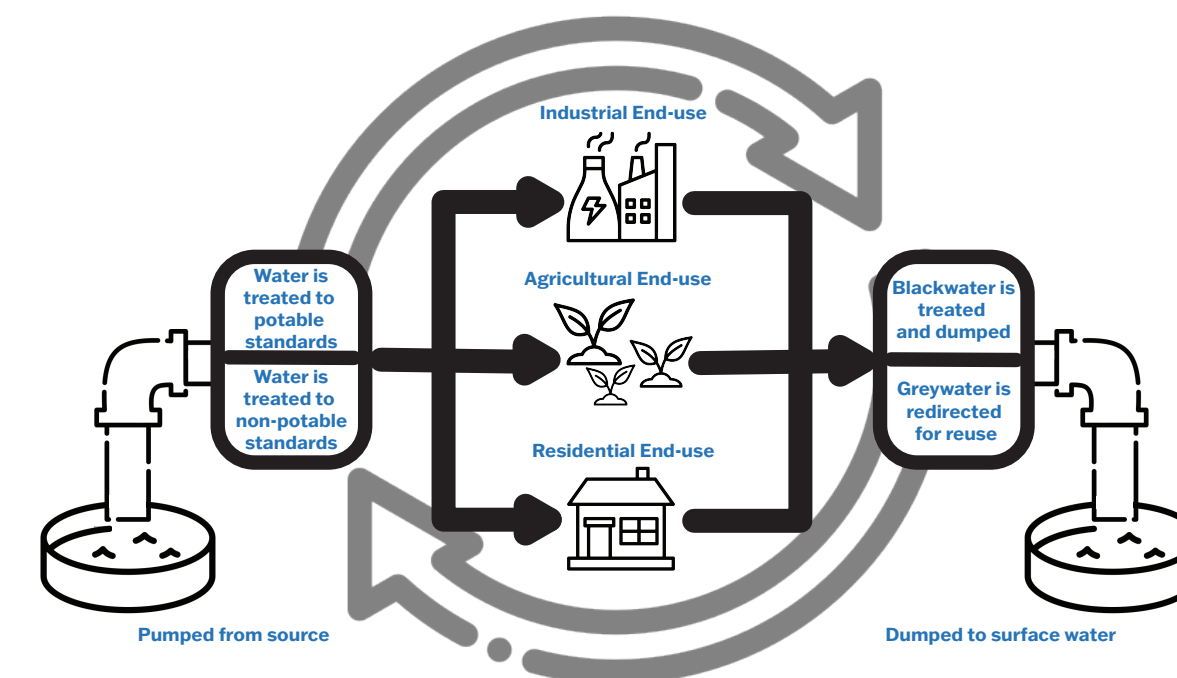


Water is pumped from sources like reservoirs or aquifers, treated to local drinking water standards, then transported for end-use. The three main categories for water use are industrial which includes factories and power generation, agricultural irrigation, and residential end-use that includes the water we use in our homes and other urban buildings. After water is used it's considered greywater if it's minimally contaminated, or blackwater if it's contaminated by things like feces and food waste. Both of these wastewater classes are taken to your local wastewater treatment plant and then, after treatment, are typically dumped to surface water as effluent.

As much as 1/3 of all indoor water use can be replaced with non-potable water

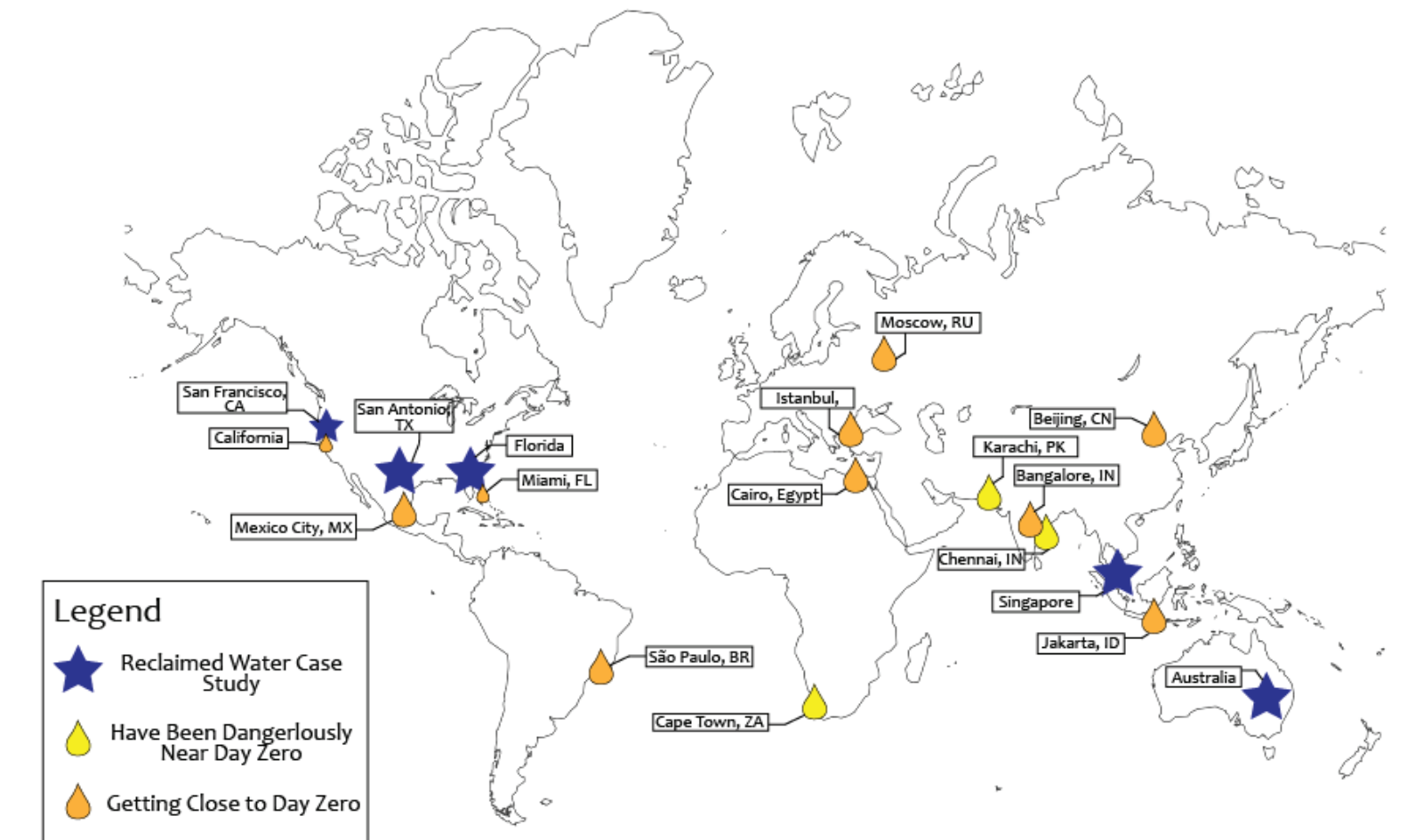


Nearly all of the water we use is treated to a potable water standard, even when we're not drinking it. In fact, non-potable uses like toilet flushing and clothes washing make up as much as 1/3 of the water we use in our homes. Think of how much our water supply gap could shrink if, instead of treating and tossing all greywater as effluent, we close the loop and redirect greywater for reuse in these non-potable applications.



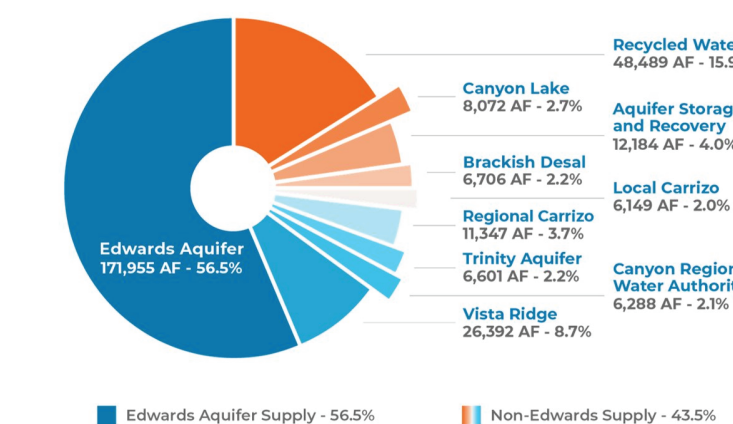
A closed-loop recycling system for greywater reuse can reduce water draw and alleviate water stress from drought or aquifer depletion

Selected Case Studies



This map shows global instances of near-Day Zero events, as well as locations of case studies for reclaimed water adoption.

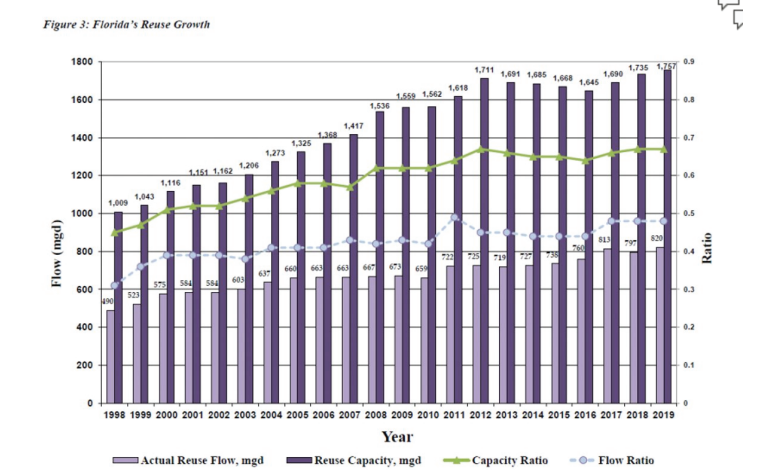
San Antonio, TX SAWS



This system may seem like a thing of the future, but technology is progressing quickly and many areas of the US are already implementing water recycling at a large scale. In an effort to reduce the reliance on the Edwards Aquifer, the San Antonio Water Supply dramatically ramped up their use of recycled water and now claims the nation's highest percentage of water reuse.

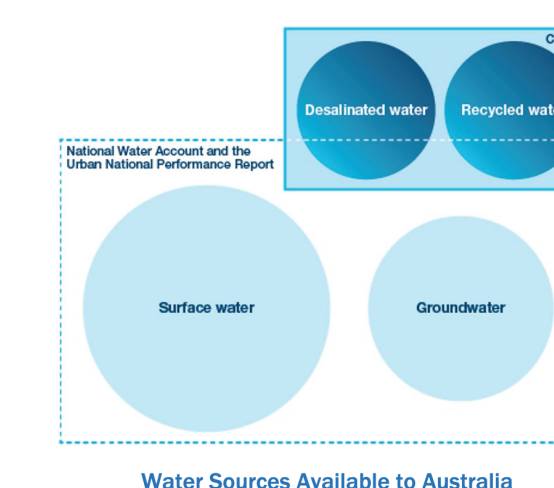
Florida 2032

In Florida, rising sea levels and depleted aquifers are threatening to contaminate many of their freshwater sources with saltwater. Florida's response to this trend is investing in reclaimed water – over the past few decades the state has been opening reclaimed water treatment plants to provide around 734 Mgal/day for irrigation and to maintain the natural water cycle. In early 2021 a bill was signed requiring all Florida utilities to eliminate “non-productive water discharge” by 2032. This means that all water will need to be productively re-used in some way, either being re-treated for residential or agricultural use or discharged in a way that helps maintain reservoir or aquifer levels.



Source: (2021). 2021 Reuse Inventory, Florida Department of Environmental Protection, Water Management Division.

Australia Purple Tap



In the early 2000s Australia experienced what they called the Millenium Droughts, the worst in recorded history. This was a significant catalyst for their move towards reclaimed water, and by 2006 many parts of southeastern Australia had a dual potable and non-potable water system, with recycled, non-potable water being supplied to homes in what is today known as the “purple tap” system.

Source: Bureau of Meteorology (2019). Climate Resilient Water Sources, Australian Government.

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