Jacobs

Challenging today.
Reinventing tomorrow.

In the kNOW Webinar

Water Reuse: A Shared Solution for Utilities and Industry | May 13, 2026

Today's Agenda

Welcome | **Joseph Danyluk**, OneWater Director, Jacobs

Water Reuse Trends

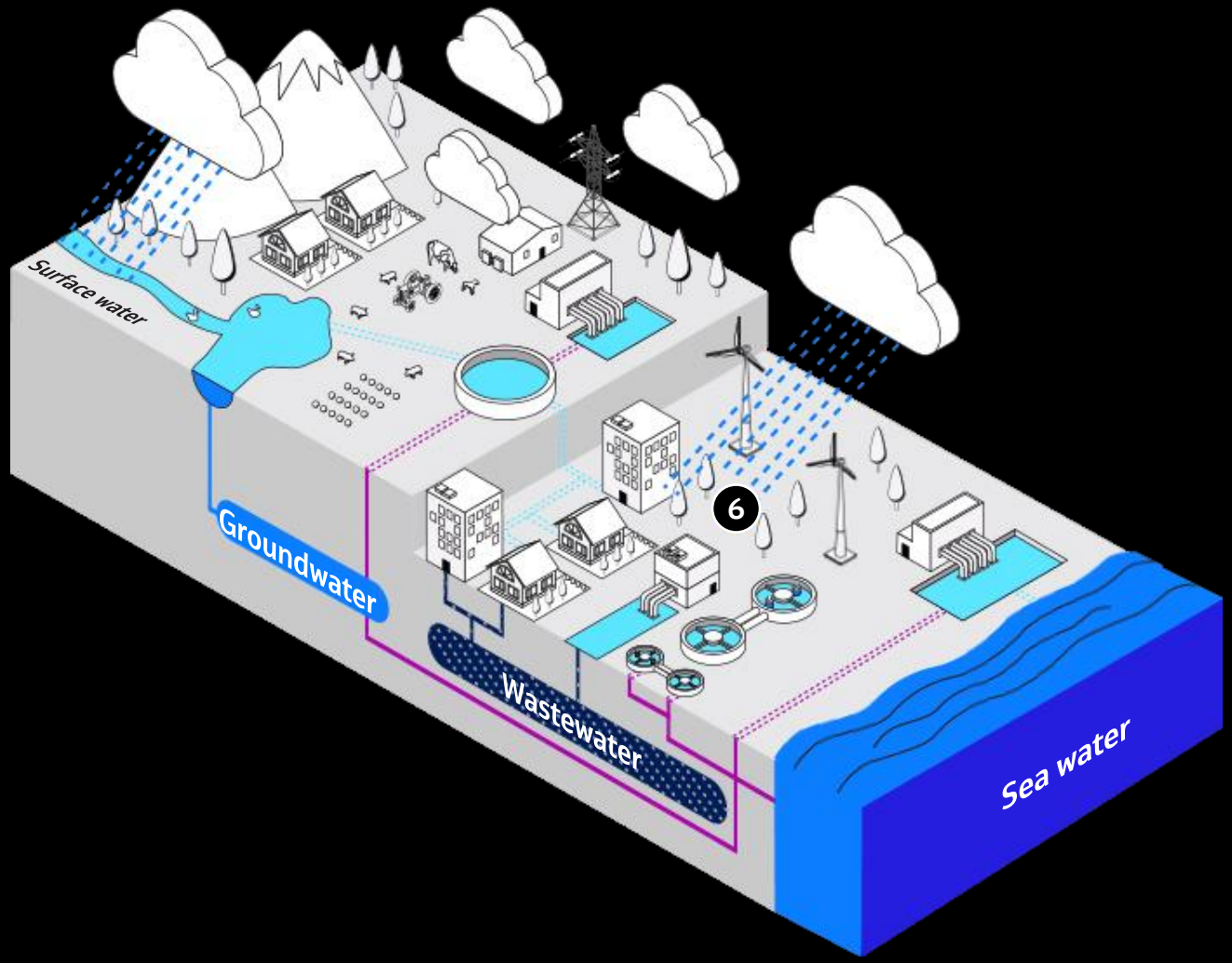
- Municipal Water Reuse | **Melanie Holmer**, Global Reuse Principal – Jacobs
- Industrial Water Reuse | **Brian Lowes**, Industrial Water Global Principal – Jacobs

Case Study: Municipal-Industrial Partnerships

- Stafford County, Virginia, USA | **Jon Brindle**, Assistant Director of Operations

Q&A

From rainfall to reuse, resilient and sustainable water management requires we look at Water as a connected, valuable resource



Utilities and industry are both responsible for water management

	Water Utility	Industry
Water is:	*A public resource / a public service*	*An operational input, ingredient, and production enabler*
Obligations are:	*Protect public health, environment, and service reliability*	*Maintain production, quality, compliance, and business continuity*
Risks include:	*Public trust, regulatory compliance, equity, long-term resilience*	*Operational disruption, product quality, cost, reputational and supply risk*
Planning horizons are:	*Long-term, system-wide, community-scale*	*Facility operations, capital cycles, market demand, and corporate targets*

Water reuse a shared resilience strategy

Water reuse is the intentional capture, treatment, and beneficial use of water that would otherwise be discharged, lost, or underused.

It is a way of turning water from a one-pass resource into part of a more resilient, circular water system.

	Water Utility	**Industry**
Water reuse benefits:	*Diversify supply, reduce discharges, improve resilience*	*Secure fit-for-purpose water, reduce risk, control cost, meet sustainability goals*

Poll Questions

Where is your organization in its water reuse journey?

1. Not currently planning or practicing water reuse
2. Exploring or assessing opportunities for water reuse
3. Planning or designing a water reuse project/program
4. Operating an established water reuse program

What is the greatest barrier to implementing or expanding water reuse?

Choose up to two options

1. Regulatory, permitting, or policy uncertainty
2. Public acceptance, trust, or perception
3. Funding, affordability, or business case
4. Technical complexity or infrastructure limitations
5. Institutional coordination, governance, or competing priorities

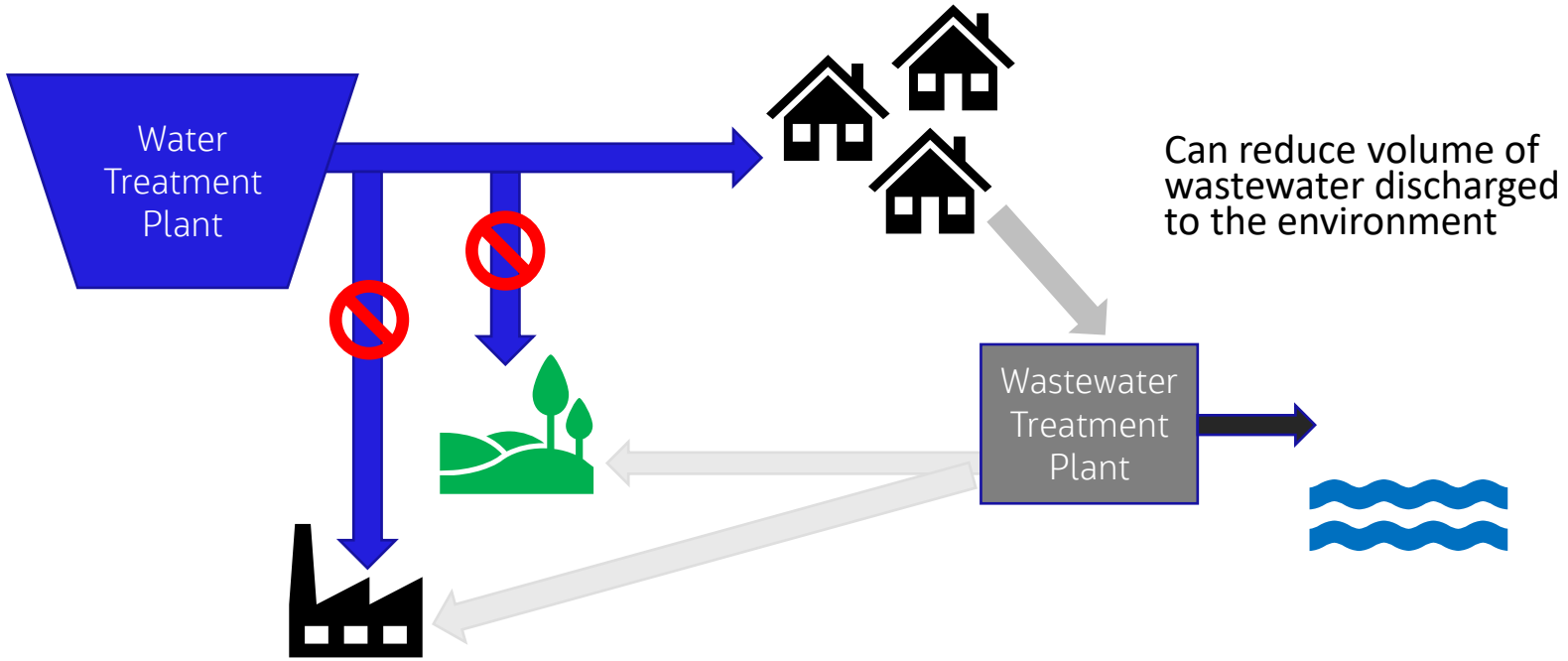
Municipal Water Reuse

Melanie Holmer

Introduction to Water Reuse

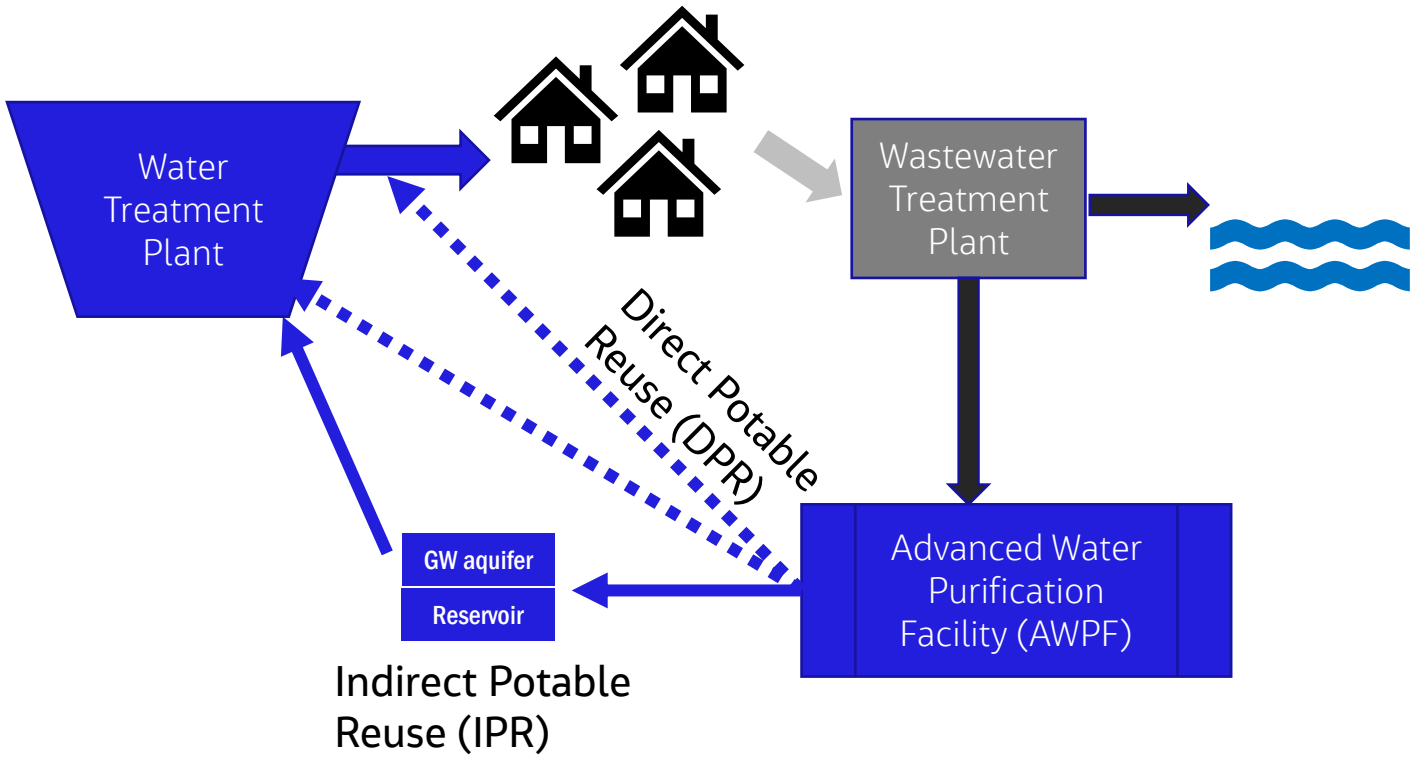
Water in the community
Non-potable reuse

Allows drinking water supplies to be focused on potable uses: i.e., irrigating parks or golf courses with recycled water instead of drinking water.



Water in the community
Potable reuse

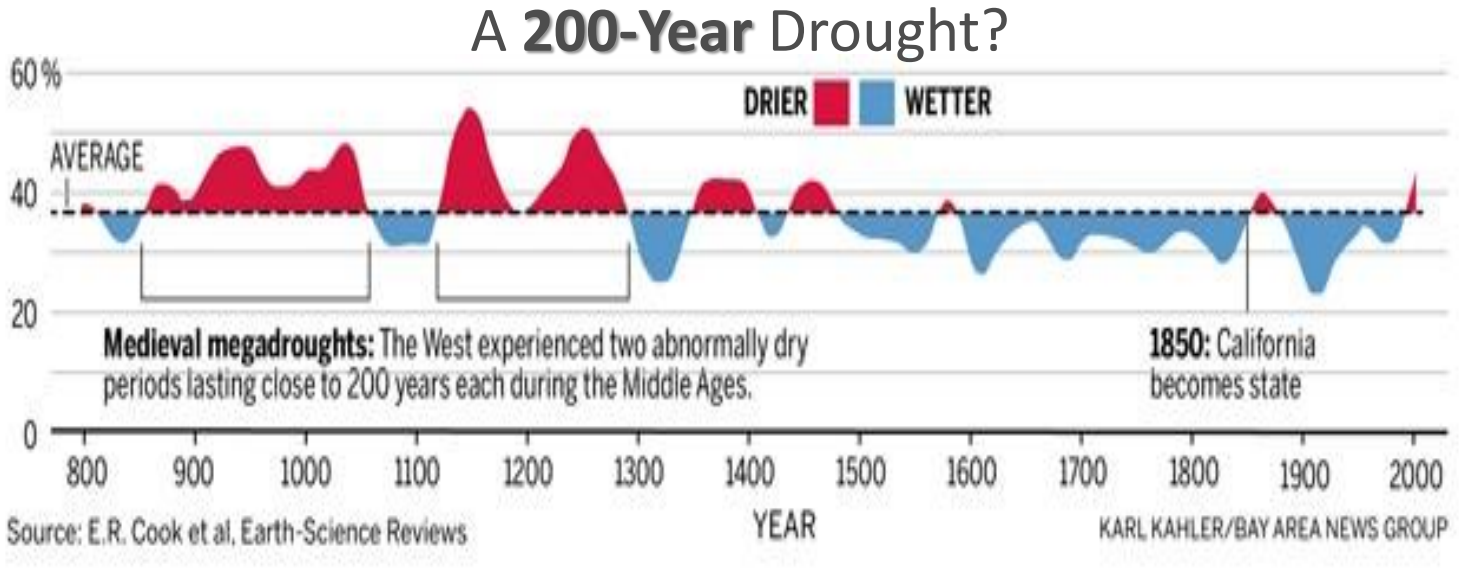
Planned introduction of advanced treated recycled water into drinking water supplies.



Market Trends and Drivers

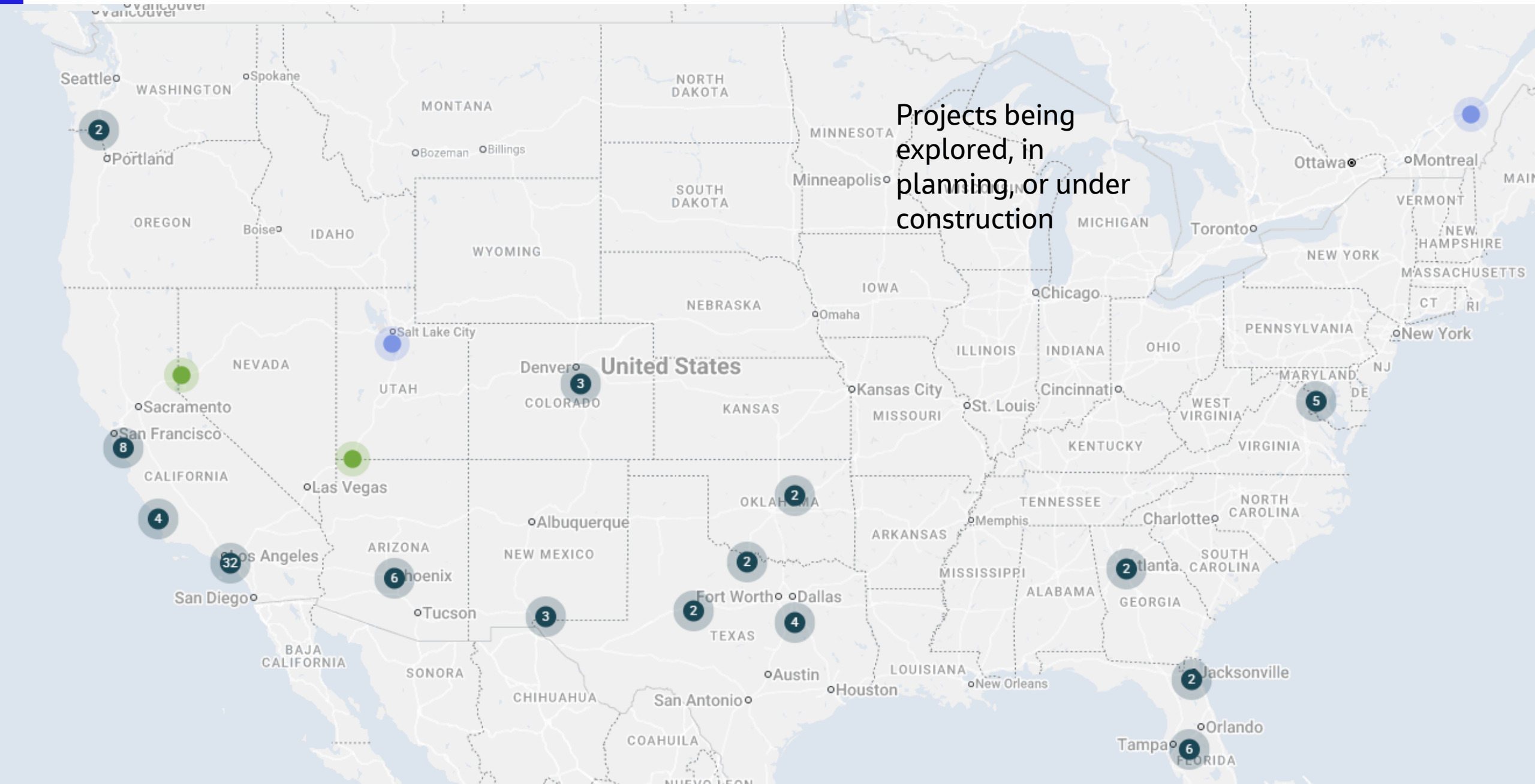
Drivers

- Climate change
- Water scarcity
  - Groundwater mining, over-allocation of rivers, population growth
- Need for resiliency
- Wastewater disposal, more stringent discharge permits



Potable Reuse Projects

https://water360.com.au/map/



Potable reuse is a major focus in California – wastewater is the new water supply

Red = Permitted groundwater augmentation - 229 MGD=867 MLD

Magenta = Permitted reservoir/surface water augn 30 MGD=114 MLD

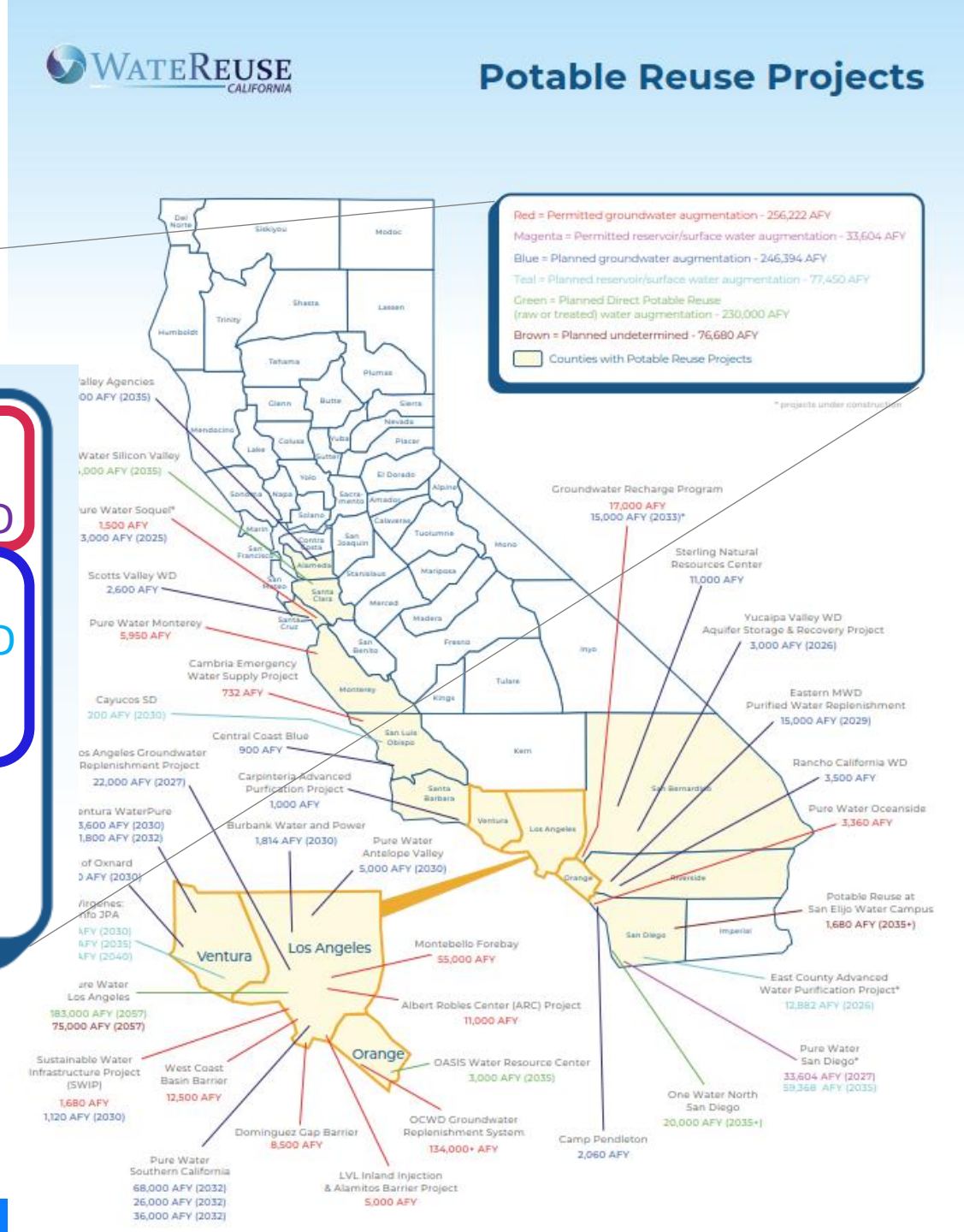
Blue = Planned groundwater augmentation - 220 MGD=833 MLD

Teal = Planned reservoir/surface water augmentati 69 MGD=261 MLD

Green = Planned Direct Potable Reuse (raw or treated) water augmentation - 205 MGD=776 MLD

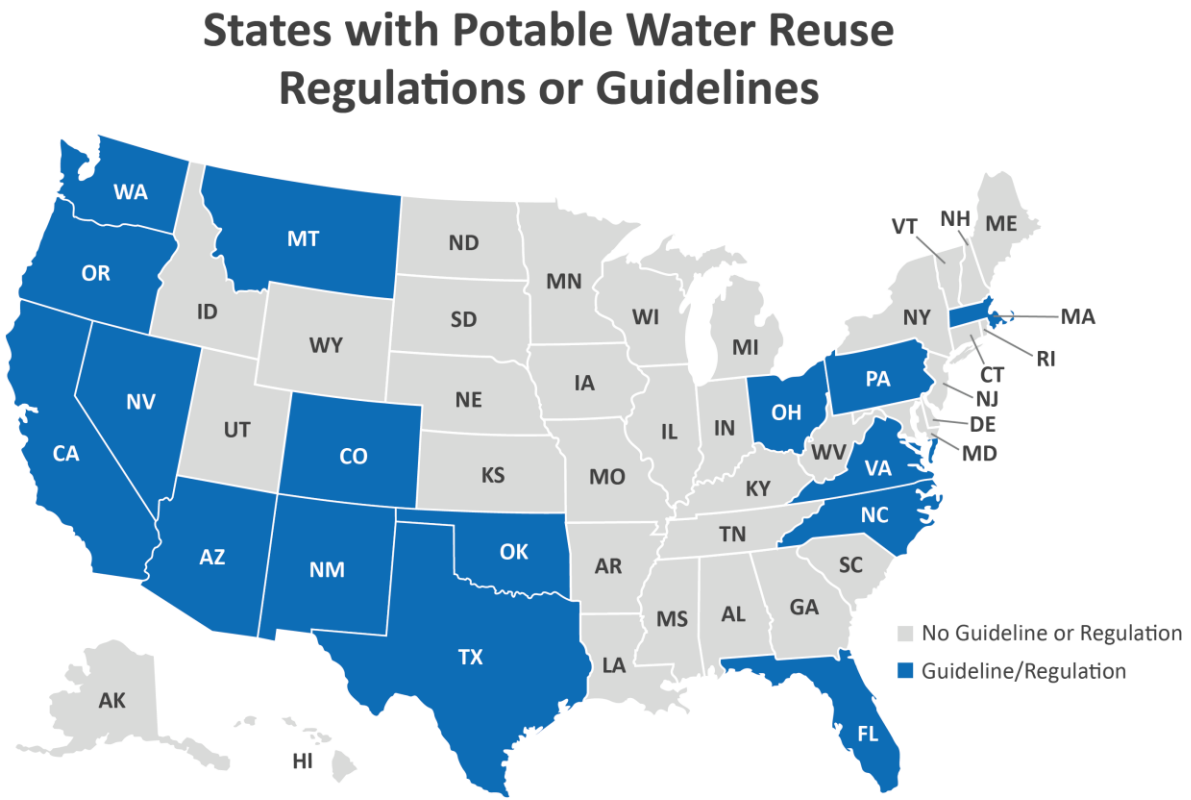
Brown = Planned undetermined - 69 MGD

Counties with Potable Reuse Projects

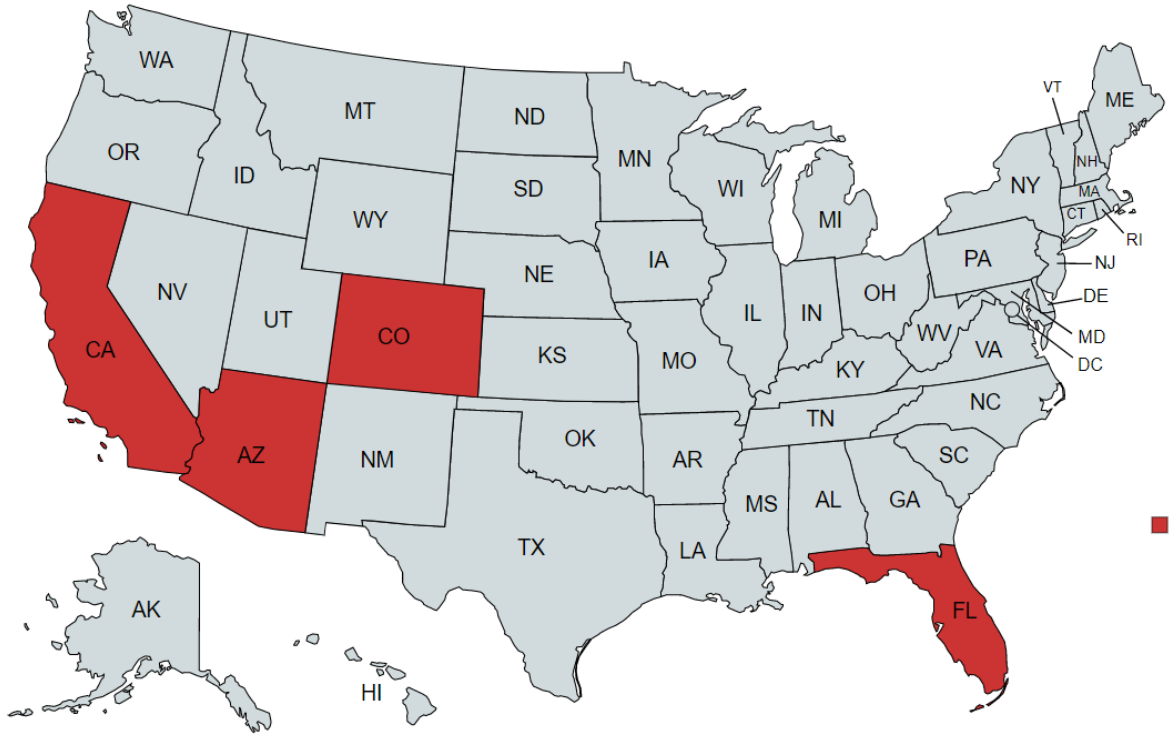


Regulatory Status – Potable Reuse

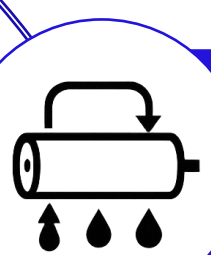
- Indirect Potable Reuse (IPR) has been practiced for decades throughout the country



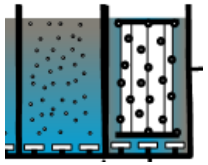
- Four states now have regulations allowing Direct Potable Reuse (DPR)
  - Colorado: 2023
  - California: 2024
  - Arizona: 2025
  - Florida: 2025



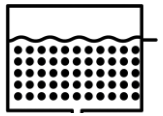
Treatment trends



High recovery reverse osmosis

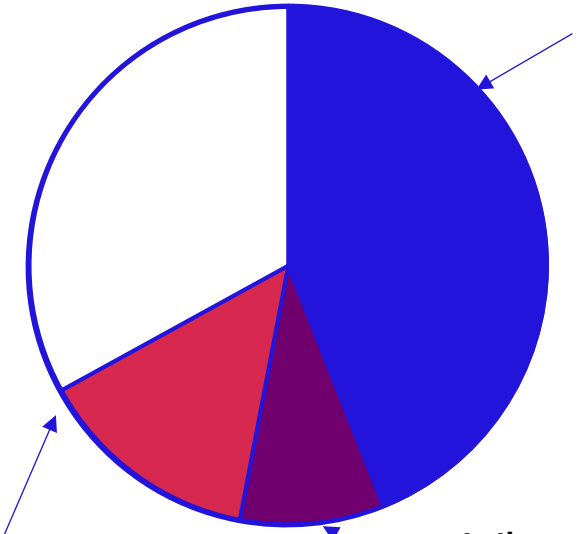


Membrane bioreactor (MBR) as part of the potable reuse treatment train



Non-RO, carbon-based treatment

Public acceptance of purified water



Close to half of participants (44%) reported that simple treated wastewater was safe for drinking

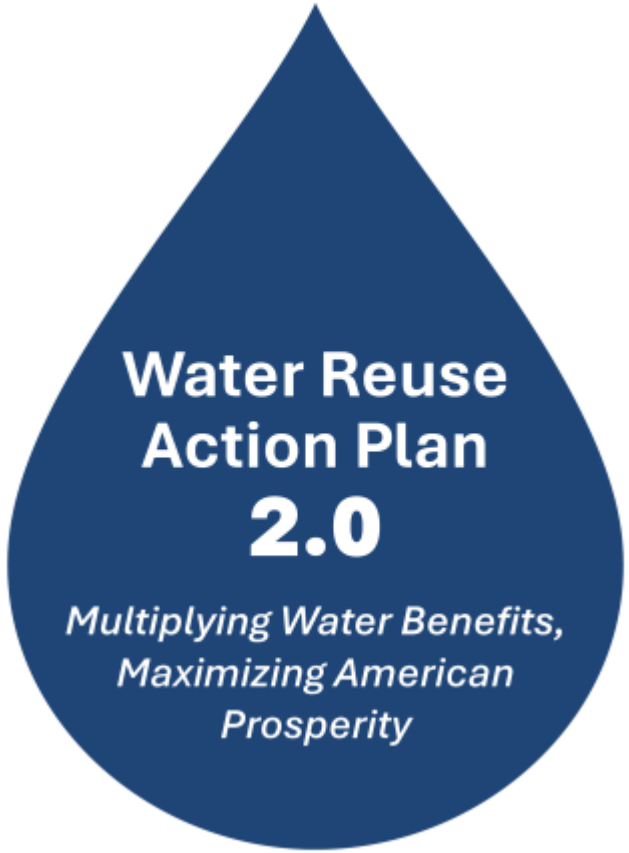
When told that WW would be treated 3 more times, that number jumped to 53%

After learning about advanced water purification steps, more than 2/3 of participants believed the water was safe for human consumption

Survey results from Water Research Foundation Project 4979, 2023

Water Reuse Action Plan 2.0 (April 16, 2026)

- Non-regulatory, national framework to accelerate water reuse and strengthen U.S. economic competitiveness, water resilience, and public health
- What's New in 2.0
  - Builds on the 2020 WRAP through voluntary, multi-sector collaboration (200+ partners)
  - Positions recycled water as a strategic economic and infrastructure asset
  - Fit for purpose water quality
  - Focus on industrial reuse, technology/data centers, and energy



Industrial Water Reuse

Brian Lowes, P.E.

Reuse Drivers for Industry

Common drivers for water reuse

- **Climate change** ⟹
- **Water scarcity** ⟹
- Population Growth
- Resilience needs
- Wastewater disposal
- **Heavy industrial users** ⟹
- **Sustainability goals** ⟹

“Industrial facilities are under increased pressure to conduct business more sustainably, particularly in water-stressed areas.”

Industrial Users Announcing Ambitious Sustainability Goals

There are not only social benefits. ESG strongly influences **performance and resilience** of investments over time as there are increased business benefits and expectations of prioritizing ESG

Environmental

Stormwater & Wastewater Management

Water Quality & Emerging Contaminants

Water Resources Management

Infrastructure & Asset Management

Energy Efficiency

Climate Action & GHG Reduction

Waste Management & Recycling

Water-Energy Nexus

Biodiversity & Land Use

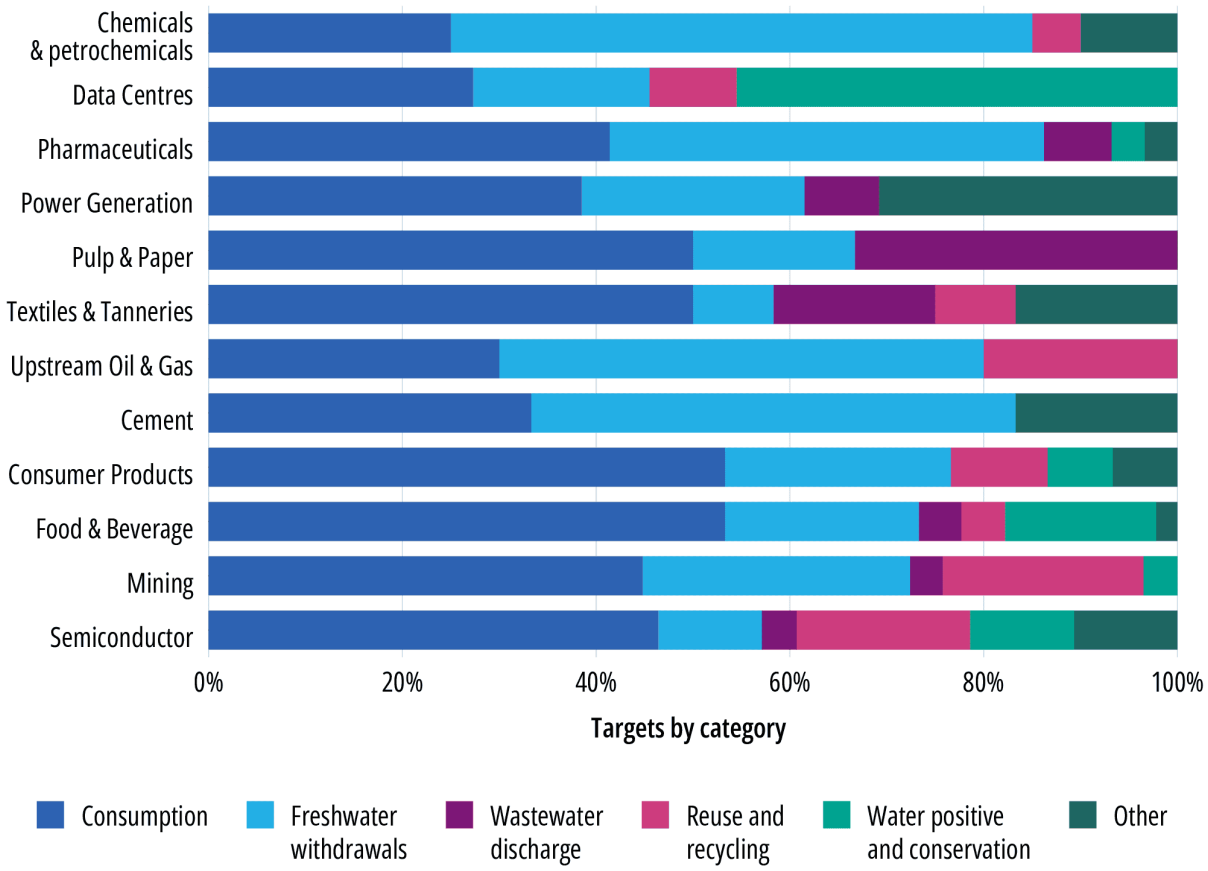
Air Pollution

Note: Key topics shown were generated from:

- ESG standards (SASB, CDP, UN SDGs)
- ESG raters (MSCI, GRESB, S&P Global)
- Industry Subject Matter Expert input

Water Goals By Industry

Water Reuse Goals



- Water consumption and freshwater withdrawals dominate areas that industries are targeting
- Reuse and Recycling are showing up strongly in some sectors
  - Large industries focus on closed loop systems
  - Circular water strategies may be insufficiently documented (lack of reporting and consensus on tracking of metrics)

GlobalWaterIntel.com, Changing trends for targets in the industrial water landscape, 2025

Water Used by “Technology Revolution” created by AI

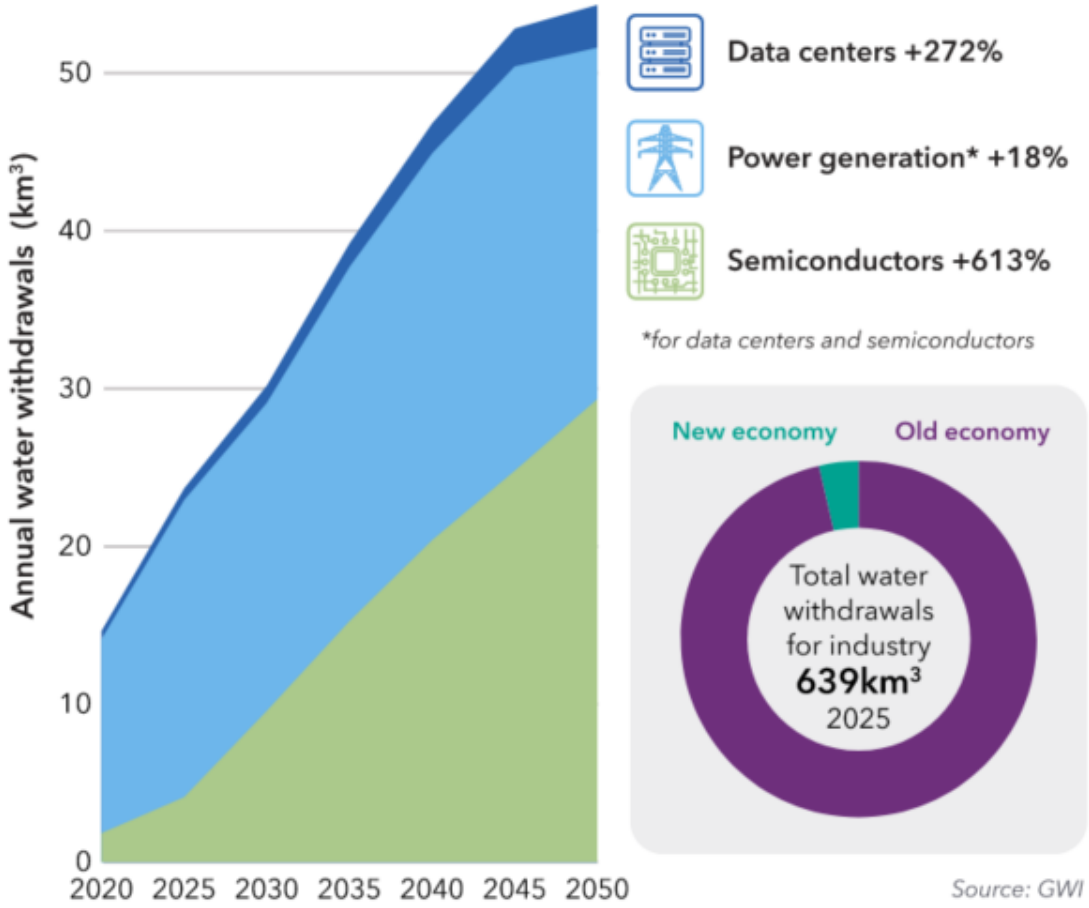
AI Technology Revolution is not just Datacenters

- Chip Manufacturing / Processing
- Power Generation
- Cooling Systems

An Industrial Boom Effects Surrounding Industry (select examples)

- Steel Manufacturing
- Construction Materials (i.e. Cement)
- Industries Supported (i.e. Automotive)
- Significant Impacts

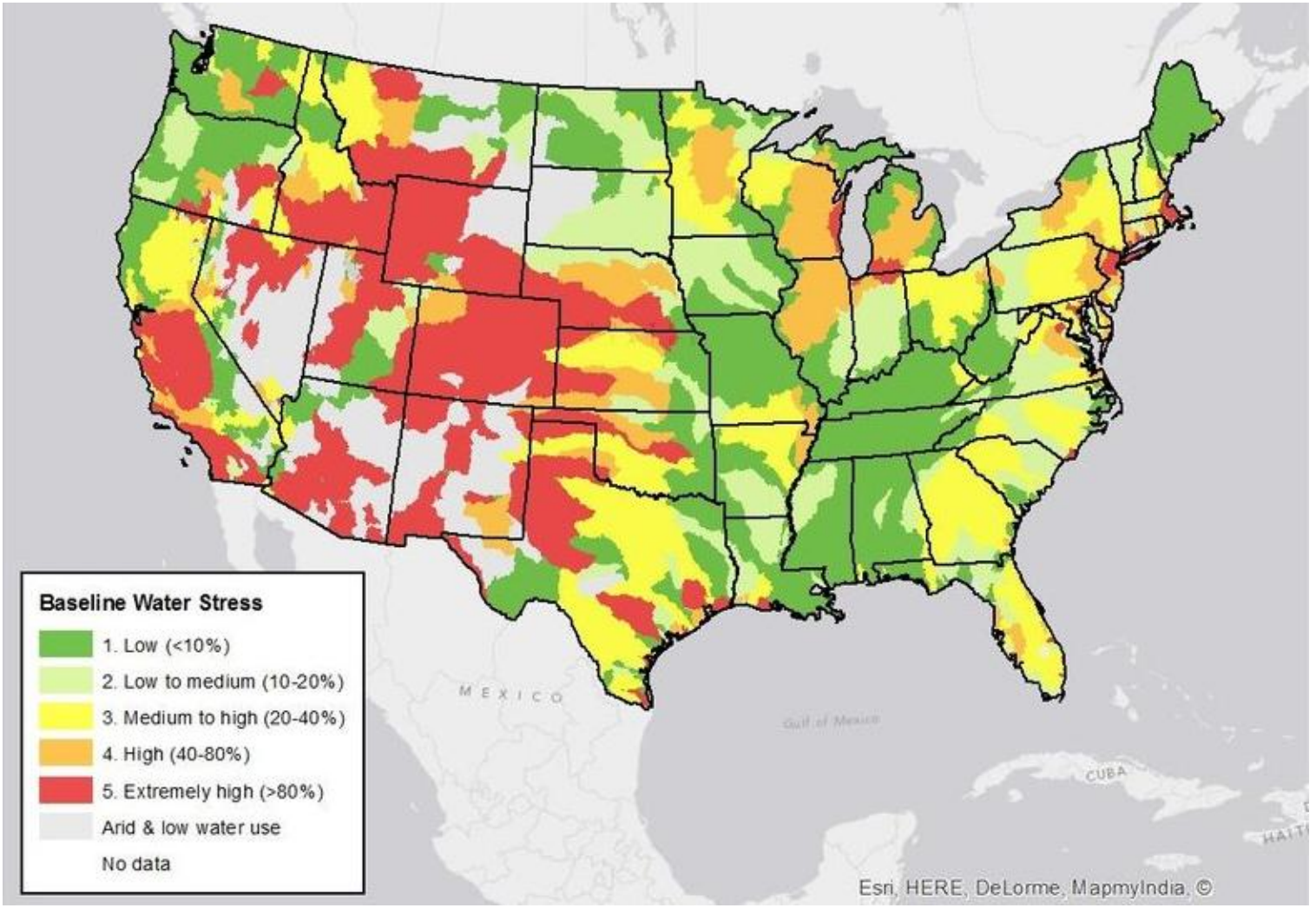
Technology Revolution Water Demands



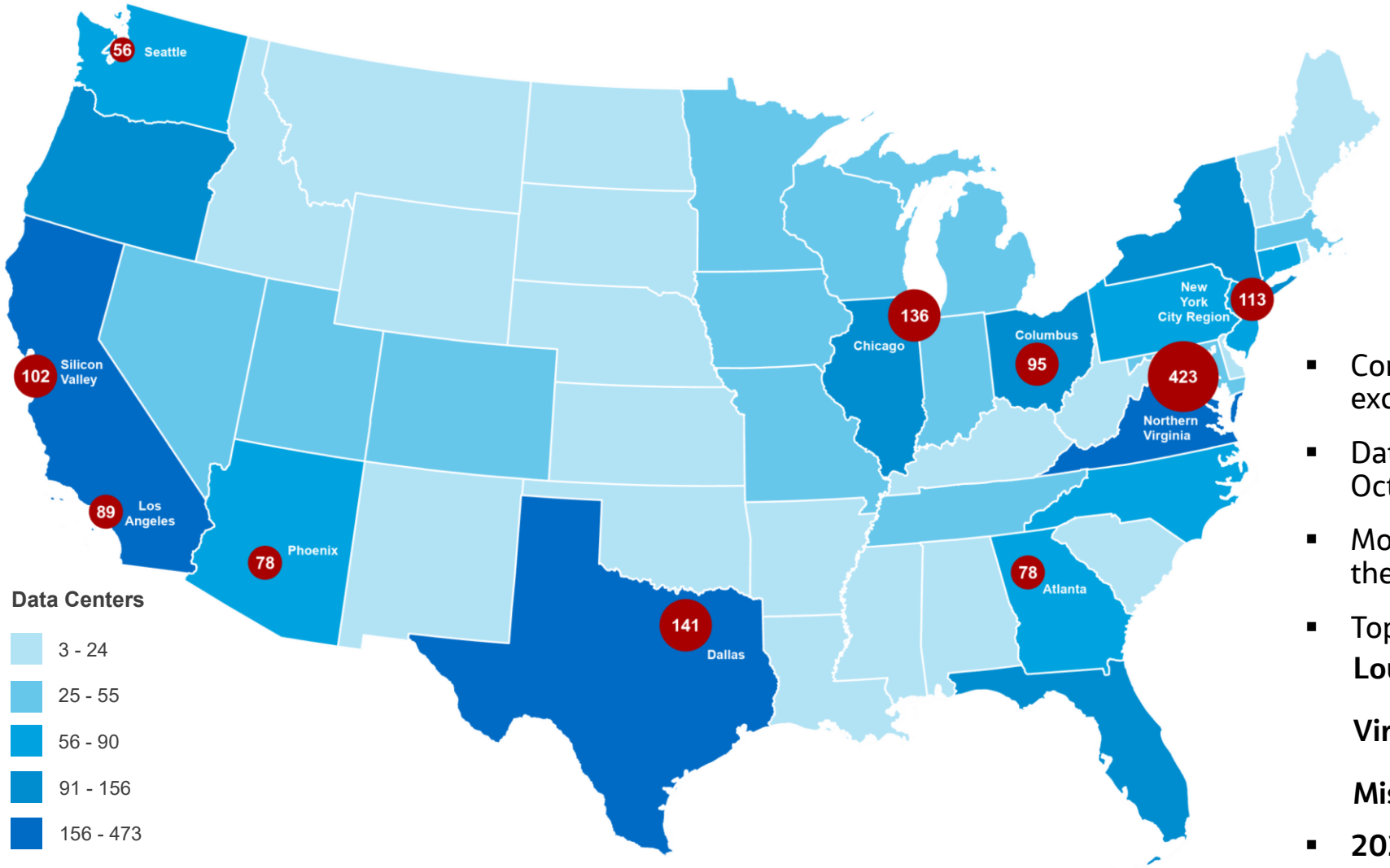
GlobalWaterIntel.com, Media Analytics Ltd in partnership with Xylem, 2026

Water Stress/Scarcity

- Common Drivers
  - Climate change
  - **Water scarcity**
  - Population Growth
  - Resilience needs
  - Wastewater disposal
  - Heavy industrial users
  - Sustainability goals



Data Centers Nationally

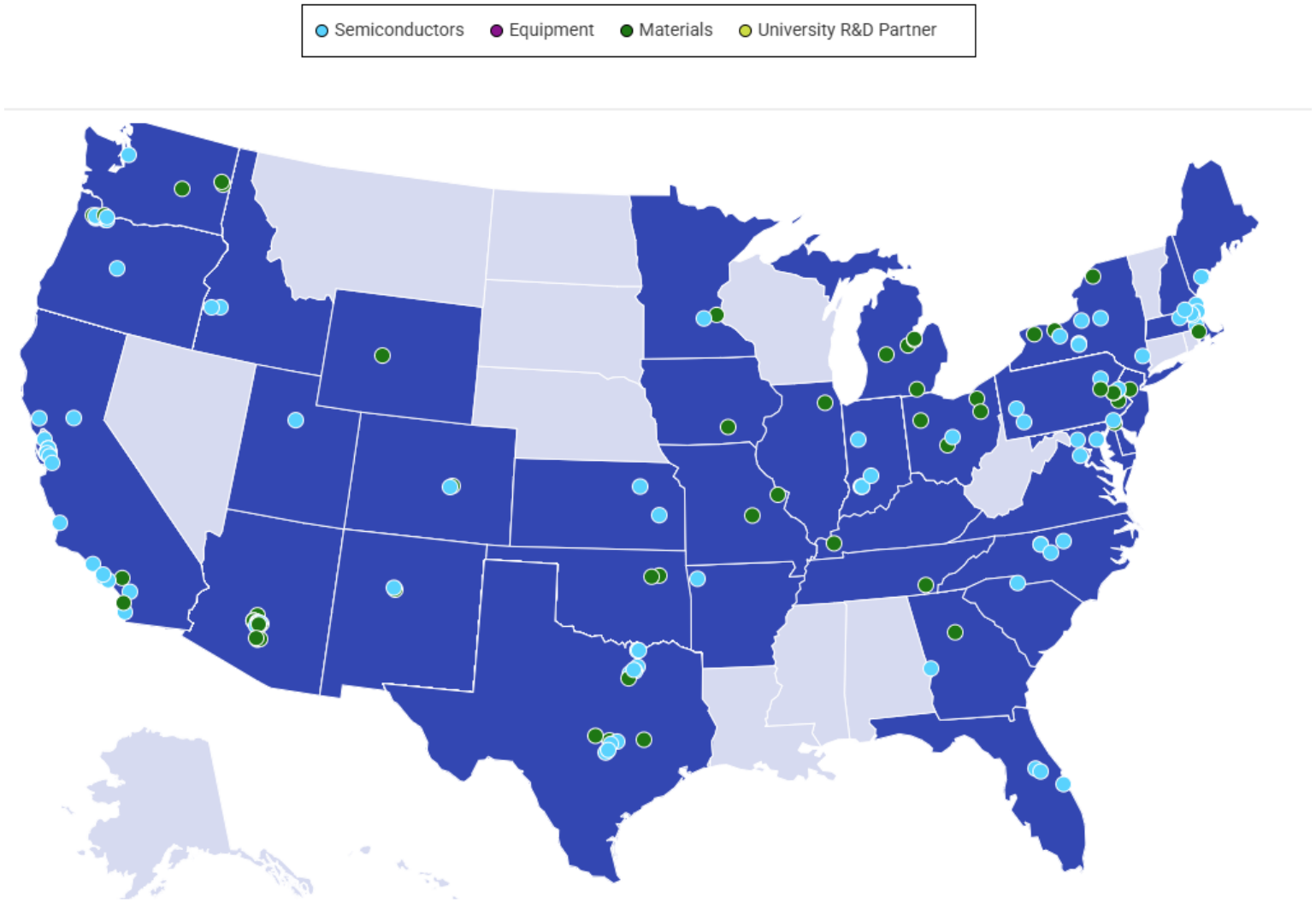


Northern Virginia is the largest data center market in the world, with over 400 data centers and an operational load of 4.7GW of power.

- Construction spending in 2025 expected to exceed $52 billion.
- Data center construction through October2025 totaled $43.8 billion,
- More than double the $19.9 billion recorded in the same period of 2024.
- Top States for Data Center Spending(2025):
  Louisiana: $12.5B **Texas: $5.7B**
  Virginia: $7.4B **Arizona: $2.6B**
  Mississippi: $6.0B
- **2026** will be different!

Sources: https://www.datacentermap.com/usa/, https://www.cushmanwakefield.com/en/insights/global-data-center-market-comparison

Chip Manufacturing Nationally

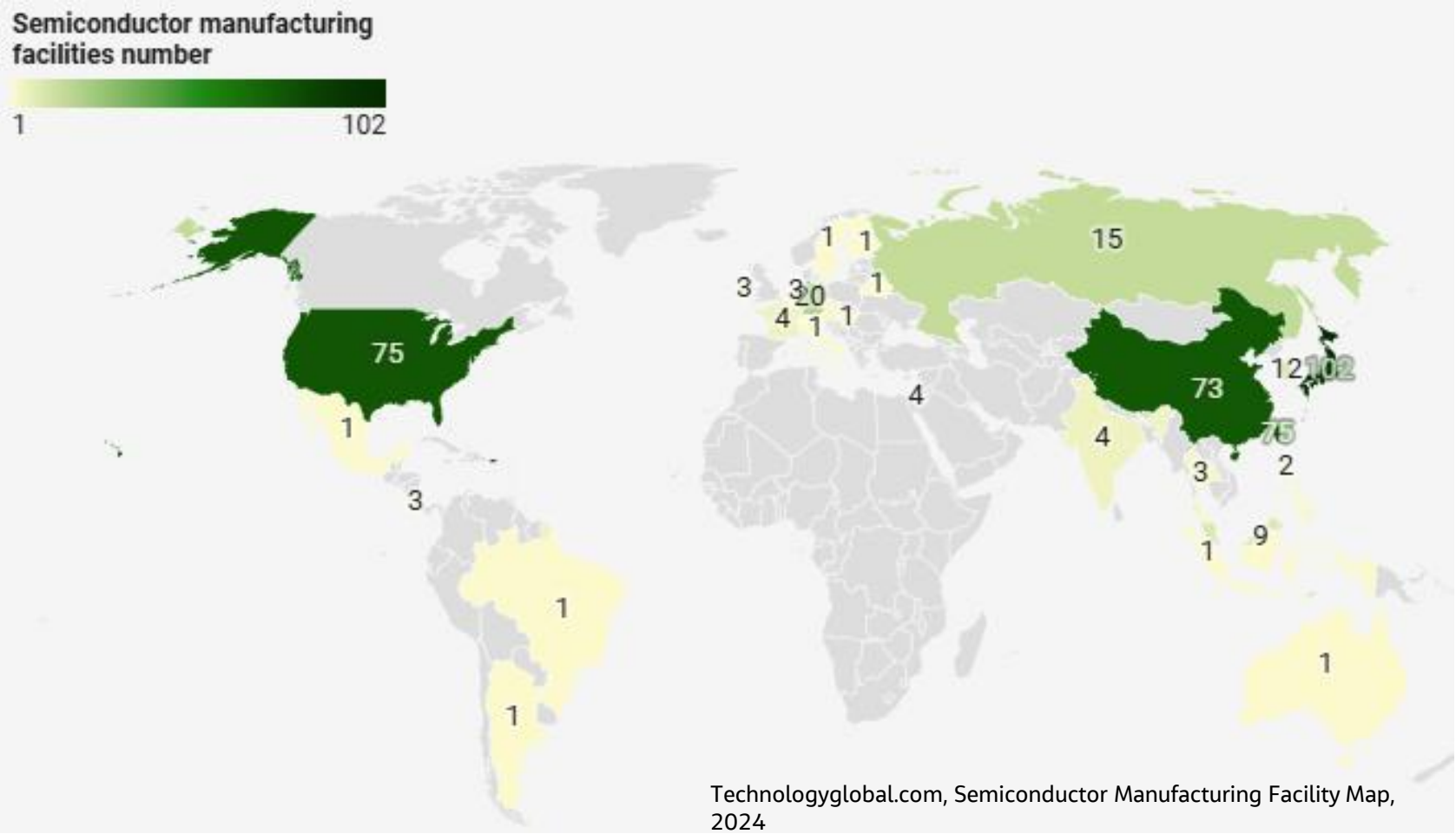


Water Reuse is prompted by water stress, sustainability initiatives, and significant demand for ultra pure water.

- Government investments have prompted significant growth (construct, expand, modernized)
- $30.9 billion in funding and loans (congress.gov)

Opportunities Globally

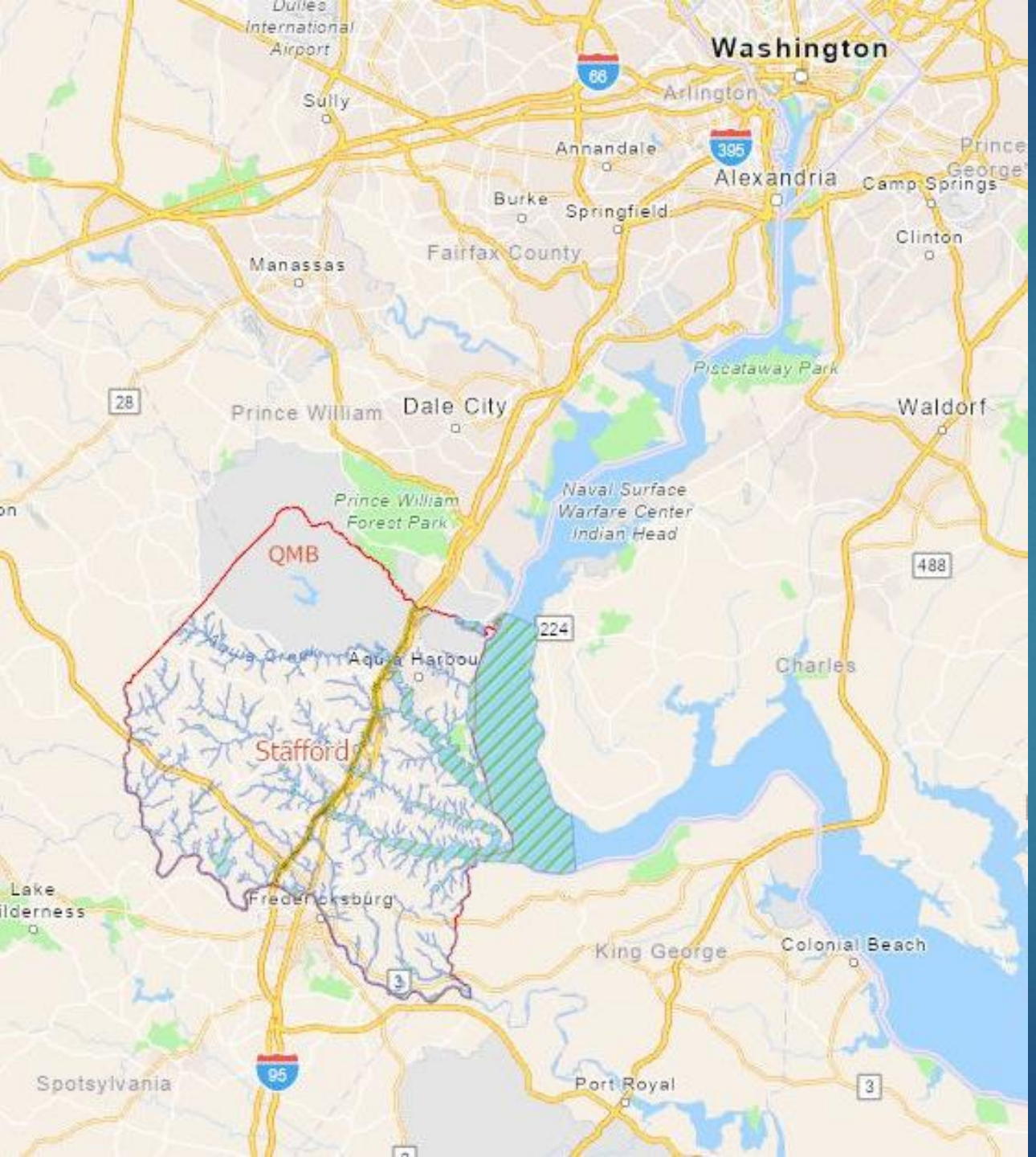
- Global semiconductor market production is evolving
- Some incentives observed for manufacturing water reuse



Technologyglobal.com, Semiconductor Manufacturing Facility Map, 2024

Reclaim System Development in Stafford County, Virginia

Presented By: Jon Brindle, Stafford Utilities



Where is Stafford?

- Halfway between DC and Richmond
- Historical Areas and New Growth
- Population of 170K (2025 est)
  - Suburban/ Commuter
  - 33% growth since 2010
  - Utility Service Area = 130K
- “Water Rich”, Between Potomac and Rappahannock Rivers

UTILITIES

STAFFORD Virginia

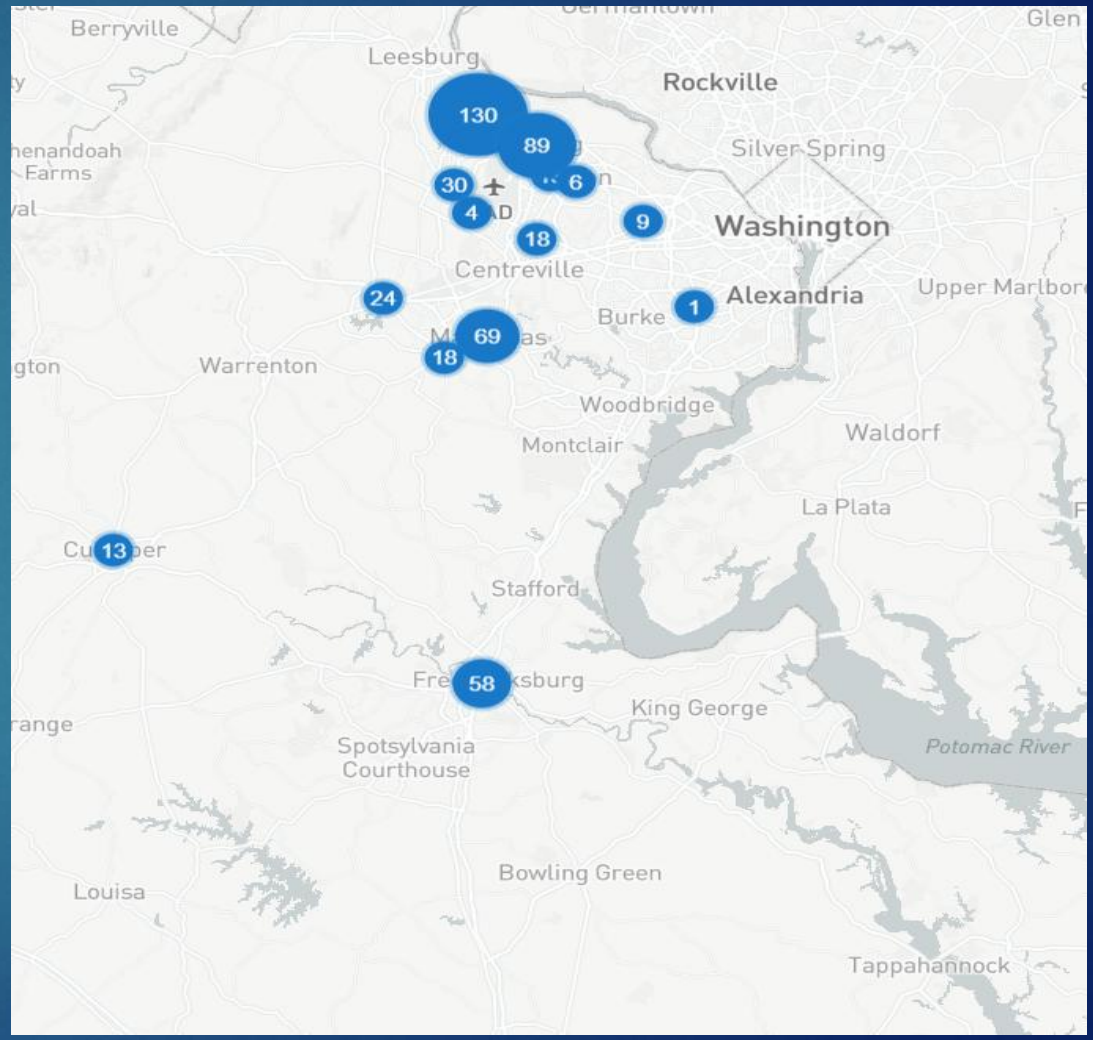
Dual Utility, Water and Sewer

- 10MGD ave, 20MGD peak day
  - 2 WTP, Smith Lake (Potomac) and Lake Mooney (Rappahannock)
  - 2 WWTP, Aquia (Potomac) and Little Falls Run (Rappahannock)
- 700 miles of water pipe
  - 14 Water Tanks
- 500 miles of sewer lines
  - 90 Pump Stations
- 150 Full Time Staff
  - +12 for Reclaim System

Why do Data Centers want to come to Stafford?

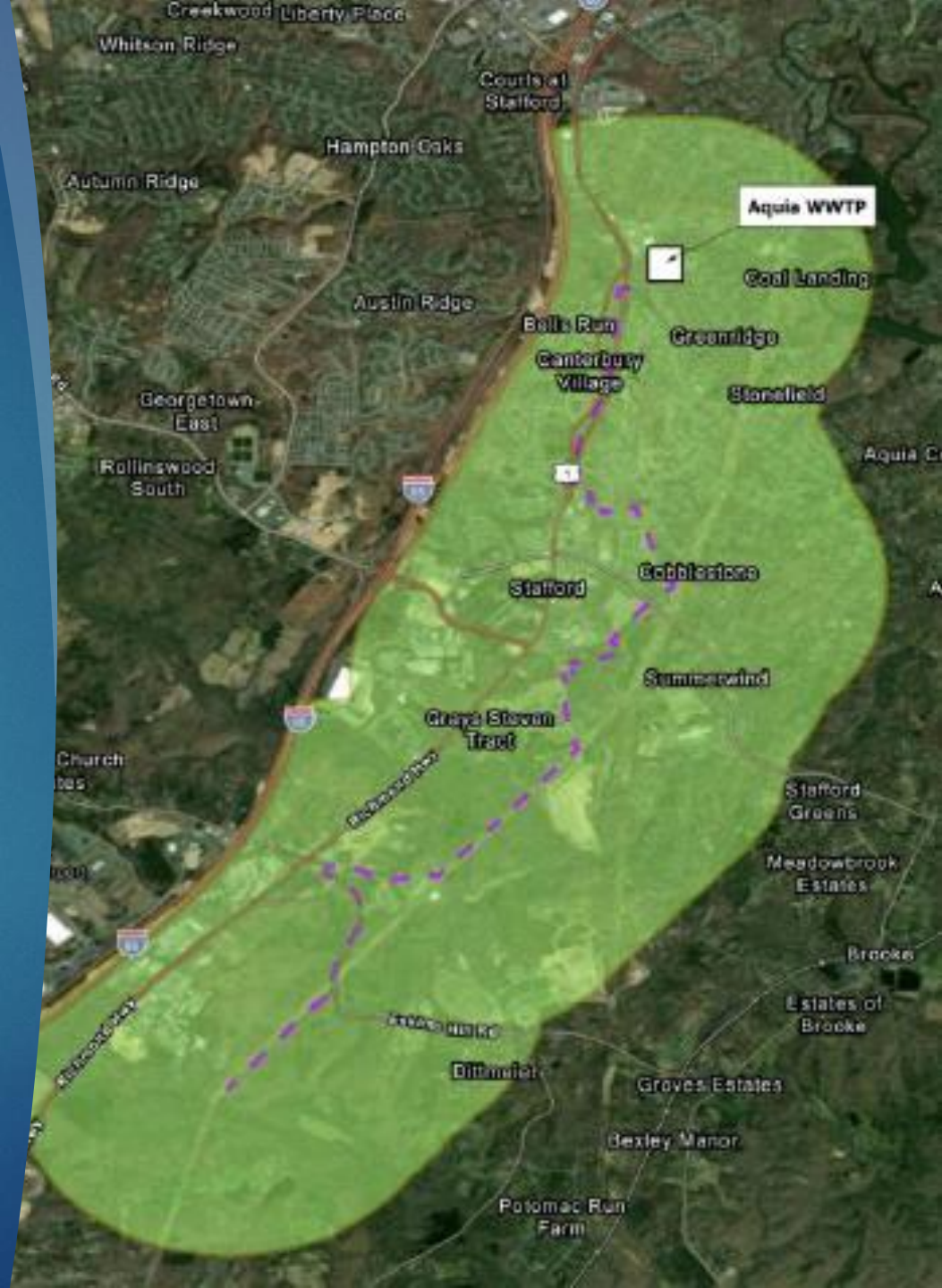
- Data Centers in Virginia
  - VA is DC capital of the world

    "Data Center Ally"
  - Land, Fiber, Electricity, Water
  - Tax Breaks
- Stafford
  - Next stop as land becomes unavailable
  - Multiple large industrial sites
  - 0 DC currently (1/1/26)
  - 100 in 10 years (14 campuses and growing)
    - 30-50 water cooled



What will the Reclaim system look like?

- Level 1 system
  - VA treatment level for human contact
  - Must discharge to sewer
- 6 MGD system from Aquia WWTP (9MGD peak flow)
  - Advanced filtration, Enhanced UV
  - 100% flow diversion at peak (no downstream impacts)
  - Influent EQ
- 12 mi purple pipe →→
- 2 MG treatment storage (WWTP effluent)
- 2 MG finish storage at WWTP, add Cl-
- 2x 2MG Tank storage near DC, more Cl-
- Phase 1 – May 27, Completion - 2029



Public - Private Partnership

- 100% Private Funded ($200 million total project cost)
  - WWTP Upgrades
  - Distribution System
  - Water Booster Station (CIP)
  - Sewer Pump Station (CIP)
- Design and Construction
  - Stafford = Everything inside WWTP fence
  - Developer = Everything Else (Distribution, Pump Station)
- Reclaim Rates
  - O&M, and 3R (No capital)
  - Reclaim < Potable
- Water Service Agreement
  - Protects the County
  - Defines $ Responsibilities
  - Increased usage tied to construction progress milestones

Challenges

- Quick Build
  - Multiple design and construction teams
  - Coordination is key
  - Bridging Phase (Potable) with Limits
- Intermittent/ Unpredictable demand
  - Use from April – Nov, Few peak times a year
  - System must be sized for peak
  - Winterization, Split Flows, Equalization
- Sewer (SIU Permit)
  - All Reclaim Users = Significant Industrial User
  - Monitoring, Sampling, and Inspections
  - Water Management Plan with "Trigger Conditions"

Public Communication Answering the Usual Questions

Public Comment and Opposition Has Focused on General Topics not Applicable to Local Projects.

- Water Supply
  - Reclaim is the Answer
  - Potable Ban for Evaporative Cooling
- Environmental Impact
  - No Surface Discharge
  - SIU Permits
- Rates
  - No Capacity Improvements, No Rate Increase
- Local Impact/ Non-Utility
  - Trees, Sound, Visual, Electricity

Lessons Learned

- Start Early
  - Concept in place before applications
  - Expect Delays and Surprises
- Know The Operator
  - Who is taking over matters
  - SIU Applications
- You Don't Get What You Don't Ask For
  - Long Term Operations
  - CIP/ Improvements
- So Many Plans, So Much Time
  - Underestimated staff time

Questions?

Joseph Danyluk
Joseph.Danyluk@jacobs.com

Melanie Holmer
Melanie.Holmer@jacobs.com

Brian Lowes
Brian.Lowes@jacobs.com

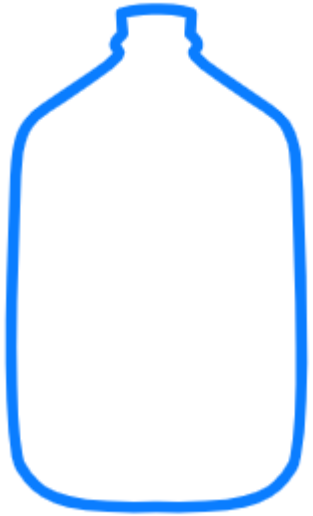
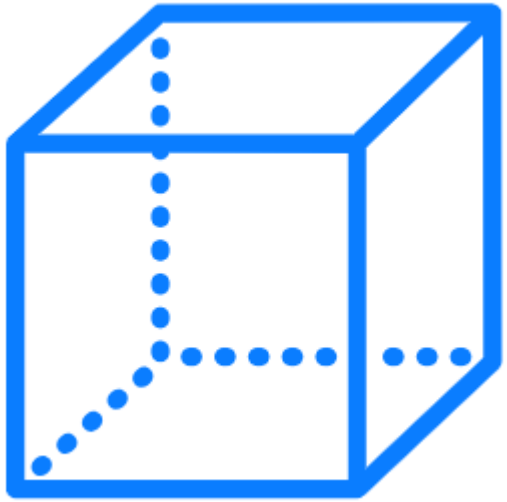
Jon C. Brindle, REM
JBrindle@StaffordCountyVA.gov
Stafford County Utilities
https://utilities.staffordcountyva.gov

Thank You

Jacobs

Challenging today.
Reinventing tomorrow.

Defining Volumes

1 US gallon	=	0.004 m^3
		
264.2 US gallons	=	1 m^3
1 MG		3 785 m^3
1 BG		3,8 Mm^3