



Clean Water State Revolving Fund: Investing in Water Innovation

CIFA Summit on Water Infrastructure

April 3, 2024



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- Environmental Engineer
- Office of Wastewater Management, Sustainable Communities and Infrastructure Branch
- Work on wastewater technologies and operations to:
 - Support small communities with limited resources
 - Better address existing challenges with nutrients
 - Meet new challenges with emerging contaminants





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Agenda

1. Innovation is an Opportunity
2. Analysis of CWSRF's Innovative Technology Investments
3. Deep Dive into Intelligent Water Systems
4. Spotlight on Emerging Contaminants



Innovation is an Opportunity

- Reduce operational costs
- Improve decision-making
- Attract technology-savvy workforce
- Leverage Bipartisan Infrastructure Law investments
- Build on broader interest:
 - Congressional request
 - National Association of Clean Water Agencies
 - States' leadership



Characterizing and Advancing Innovation

- Innovation looks different for different communities
- EPA conducted an analysis to describe and quantify CWSRF investments in innovative technologies to:
 - Educate communities on innovation funding
 - Provide resources on innovative technologies
 - Support states on the adoption of innovative technologies
 - Identify key technology areas for future work



Analysis of CWSRF's Innovative Technology Investments



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CWSRF Database Query

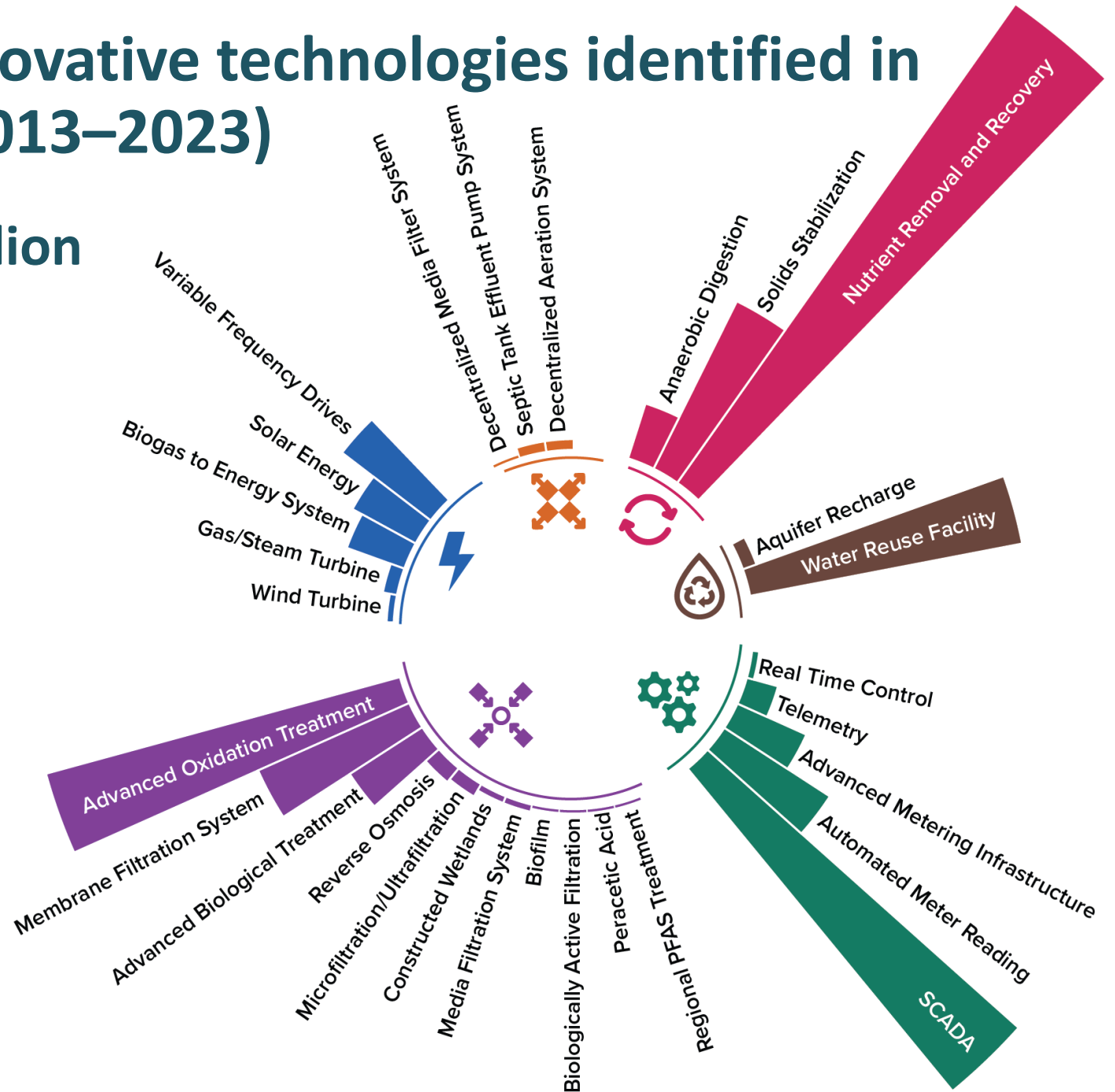
1. Downloaded data from CWSRF database for centralized/decentralized wastewater projects with signed agreements between 2013 and 2023
2. Identified key words related to innovative technology from resources like EPA's Searchable Clearinghouse of Wastewater Technology
 - E.g., Aquifer Recharge, Membrane Bioreactors, Biogas to Energy
3. Used the key words to search project descriptions
4. Grouped technologies and resulting projects

Relative distribution of innovative technologies identified in CWSRF-funded projects (2013–2023)

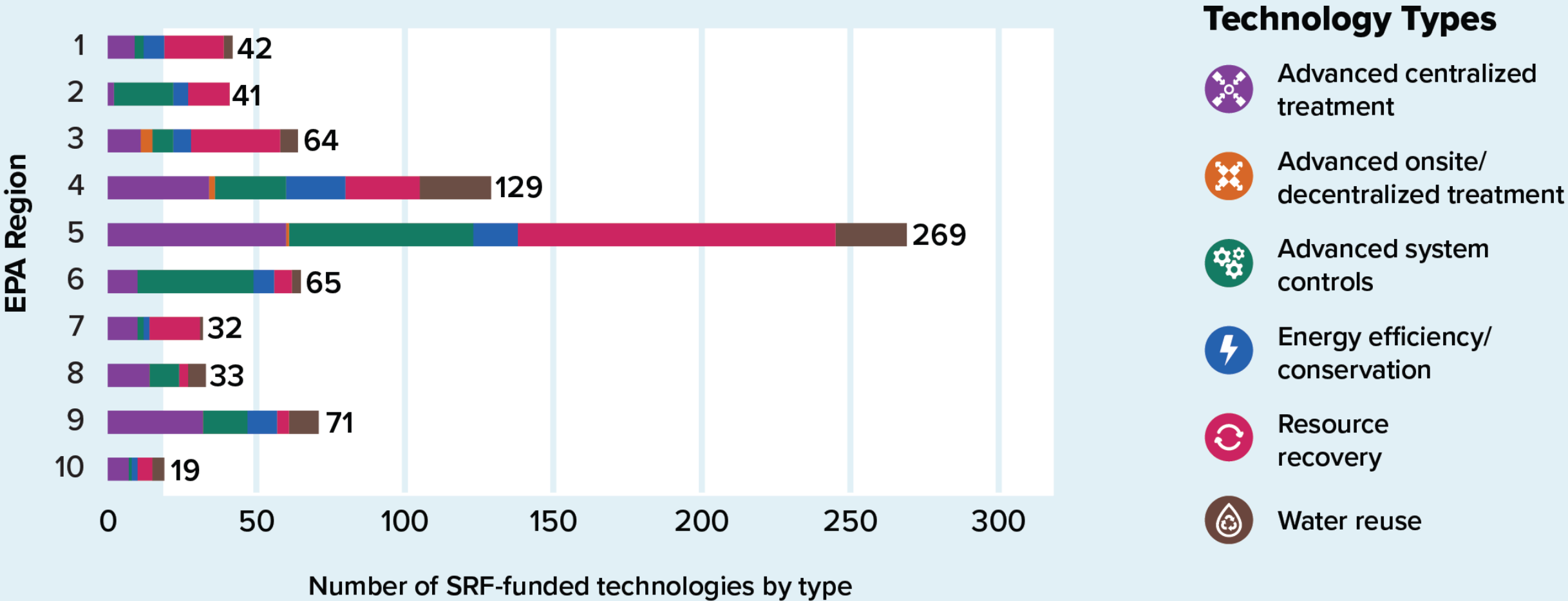
CWSRF has invested over **\$12.5 billion** in the last 10 years on projects with innovative technologies

Technology Types

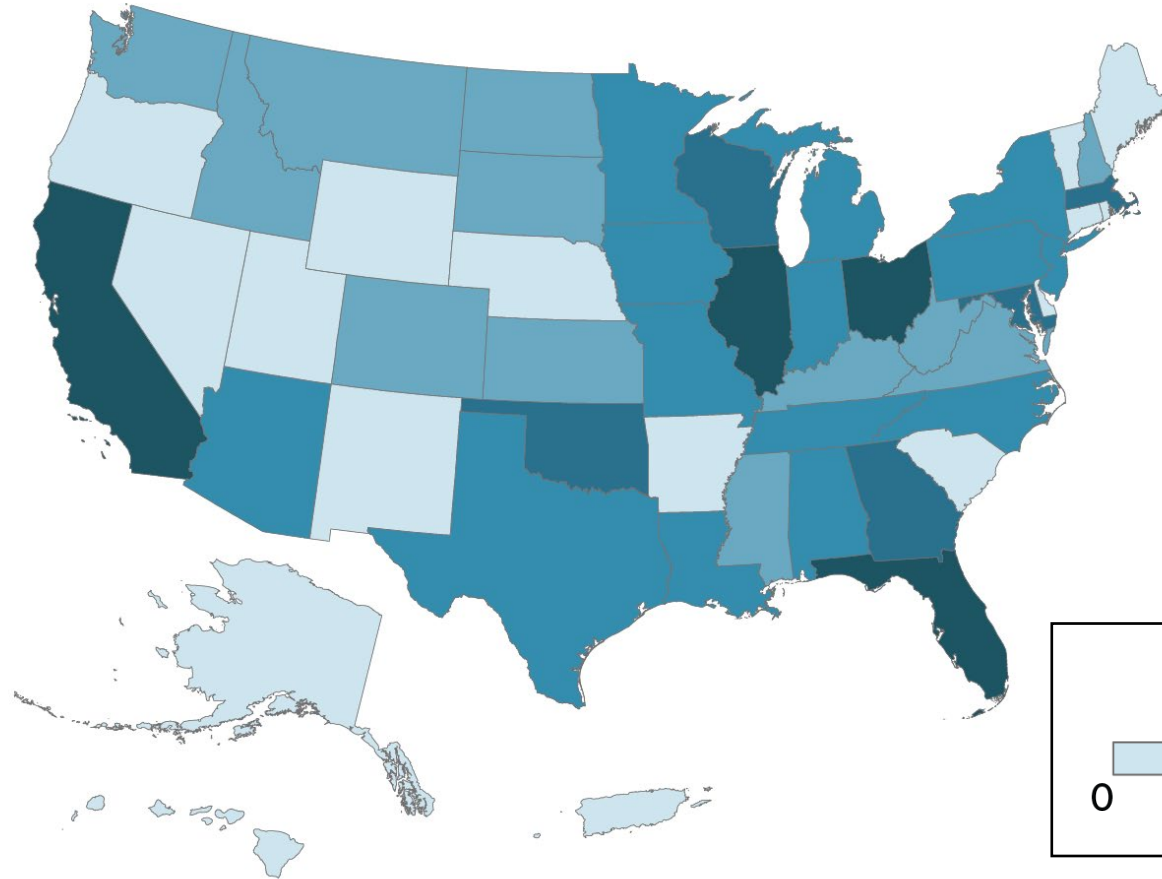
-  Advanced centralized treatment
-  Advanced onsite/decentralized treatment
-  Advanced system controls
-  Energy efficiency/conservation
-  Resource recovery
-  Water reuse



Number of CWSRF-funded innovative technologies by EPA Region and technology types (2013–2023)

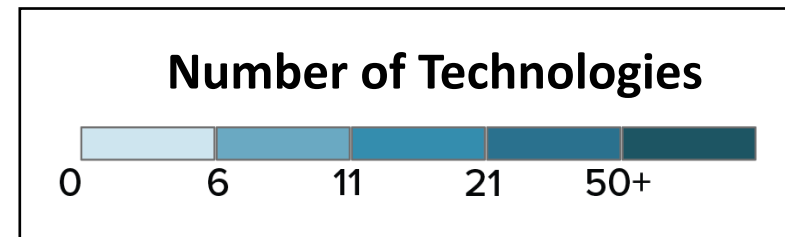


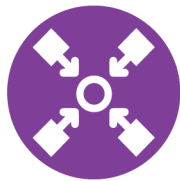
Number of CWSRF-funded innovative technologies by state, including Puerto Rico (2013–2023)



Of the communities that received CWSRF innovation investments in the last decade:

- **53%** are in **rural areas**
- **29%** are in **disadvantaged communities**





Innovation can:

- Enhance sewer collection and wastewater treatment
- Protect public health
- Reduce energy usage
- Limit water waste
- Optimize water delivery



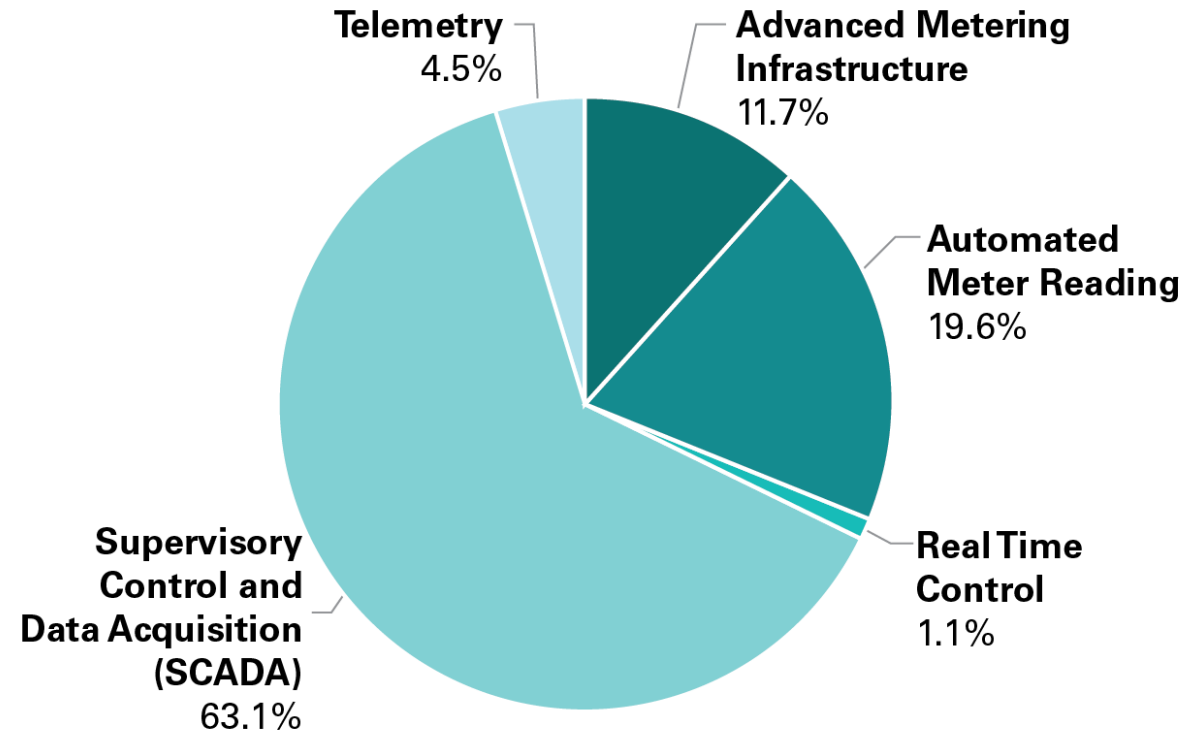
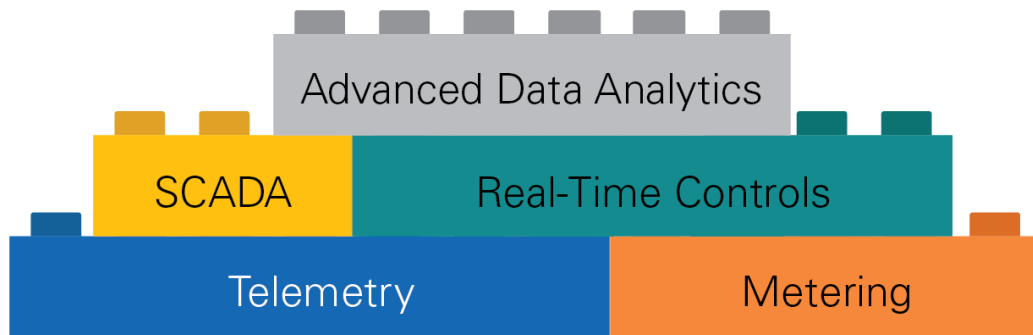
Deep Dive into Intelligent Water Systems



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Intelligent Water Systems: Building Blocks

- CWSRFs already fund a variety of intelligent technologies
- Technologies **build** upon each other and integrate into an intelligent water system



Proportion of 179 projects by intelligent technology type that utilized CWSRF funds between 2013 and 2023.

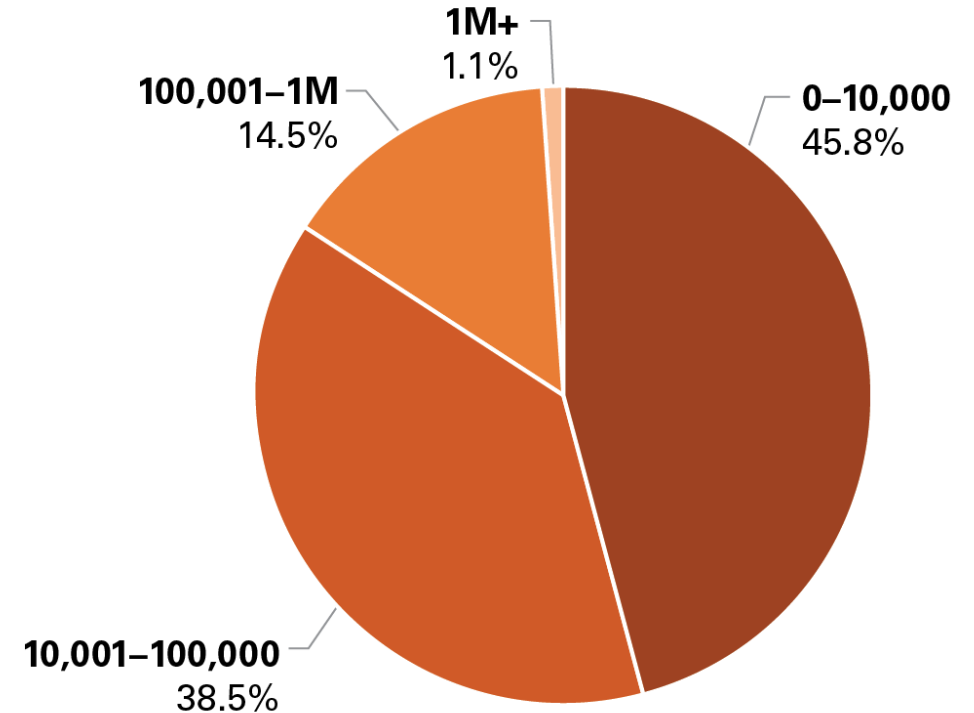
Metropolitan Sewer District (MSD) of Greater Cincinnati: Real-time controls reduce CSO volumes

- MSD is building a "Smart Sewer" system that is helping to reduce sewer overflows into creeks and rivers
- **2017 – 2019:** MSD used Ohio SRF financing to address discharges from a large Combined Sewer Outfalls
- **Real Time Control:** gates and bending weirs automatically controlled by local and remote temporarily store excess flows
- **Impact:** MSD estimates that this facility reduced discharges from this outfall by 557 million gallons annually—a 61% reduction



Intelligent Water Systems: Communities of All Sizes

- Available, well-established, and widely implemented
- Offer automated access to data and information that utilities can use to improve decision-making, reduce operational costs, and address workforce challenges



Population size of project locations and relative percentage of the 179 communities that installed intelligent technologies between 2013 and 2023 using CWSRF.

Oklahoma Water Resources Board (OKWRB): Funding intelligent technologies to promote water efficiency

- Oklahoma statewide goal of consuming no more fresh water in 2060 than was consumed in 2012
- **Since 2015:** highlighted eligibility under Green Project Reserve, encouraged municipalities across Oklahoma to apply, and awarded additional points for Water for 2060 goals
- **Advanced metering infrastructure / Automatic meter reading:** loans for over 20 projects with intelligent technologies to address water efficiency
- **Impact:** to aid in early leak detection, generate revenue for the utility, and help reduce the demand on the workforce

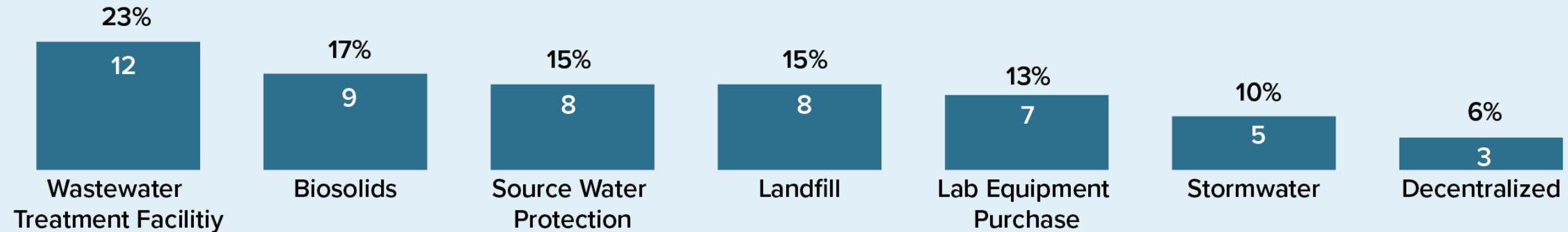
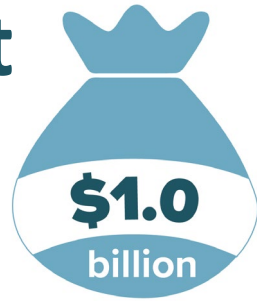


Spotlight on Emerging Contaminants



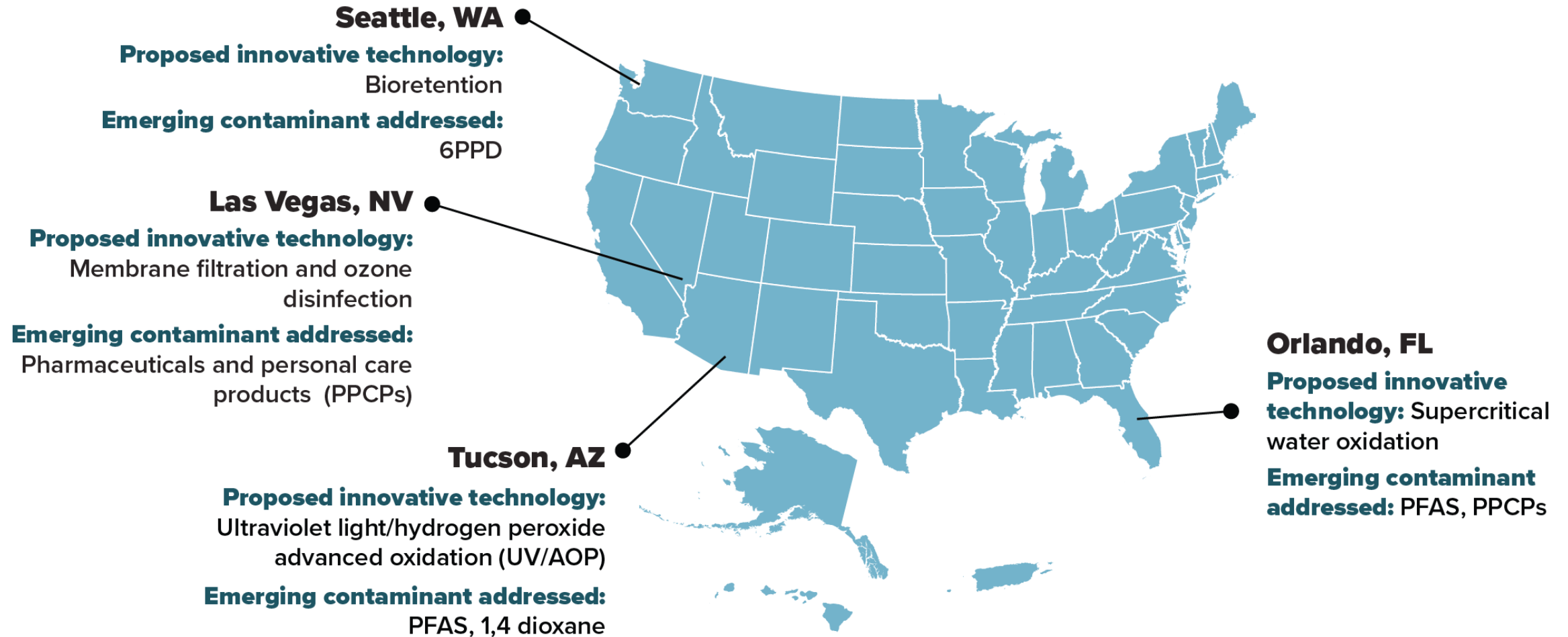
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Project Types from CWSRF Emerging Contaminants First Year of Funding



There were 52 planned projects in Federal Fiscal Year 2022. EPA identified these projects from the Intended Use Plans published by states and Puerto Rico.

Examples of Emerging Contaminants Projects Driving Water Innovation



CWSRF Emerging Contaminants
Project Case Studies:





Conclusion

- Over the last 10 years, the CWSRF invested over **\$12.5 billion** in projects with innovative technologies
- Each CWSRF program is investing in **different technologies** that are best for their communities' needs
- EPA is committed to supporting the innovation necessary in areas like **intelligent water systems** and **emerging contaminants** to address tomorrow's water challenges

Questions & Resources

Email: strathearn.heather@epa.gov



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Clean Water Technology Center:



CWSRF Innovative Projects:

