# Governing California's Urban Water in the 21st Century

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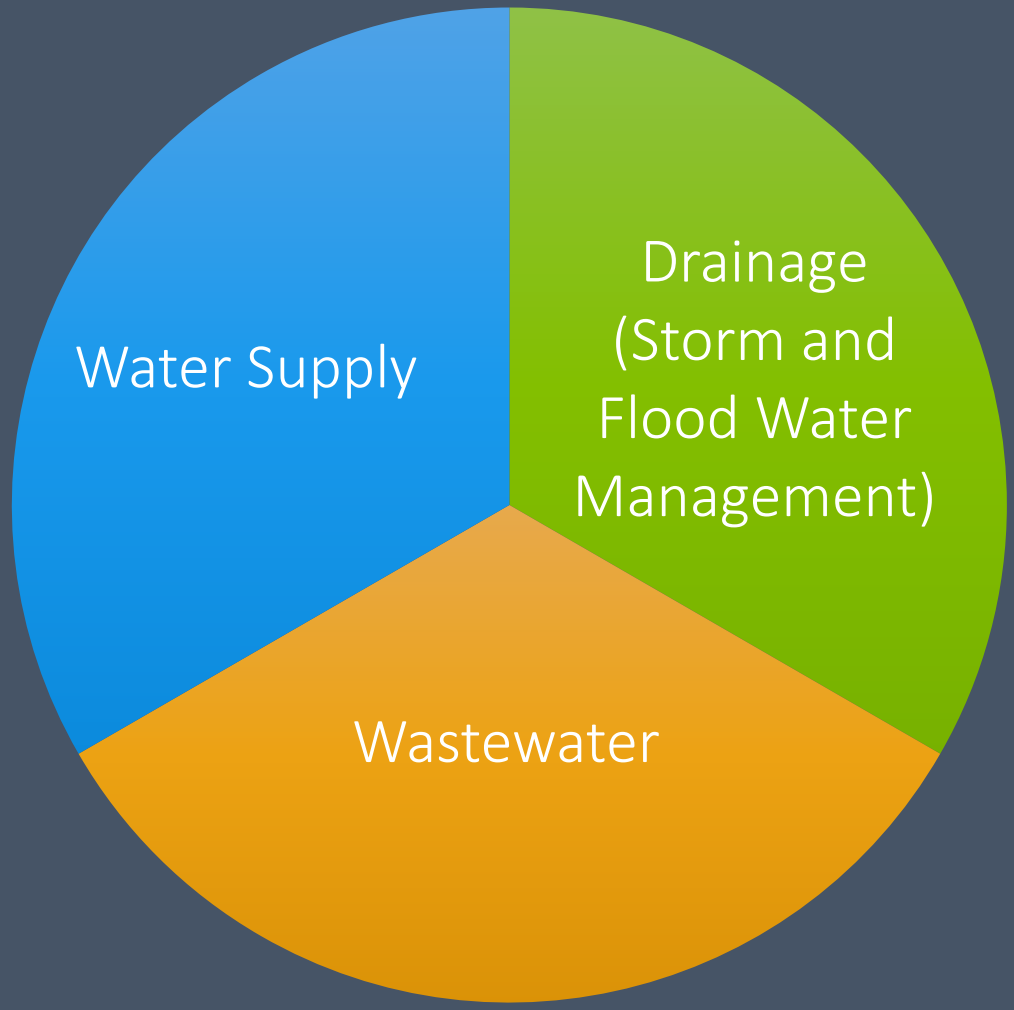
California Water Boards Science Symposium:
Adapting in the Face of Disruptive Landscape Change
June 20-21, 2018

# Early 20th Century Urban Water Use Cycle

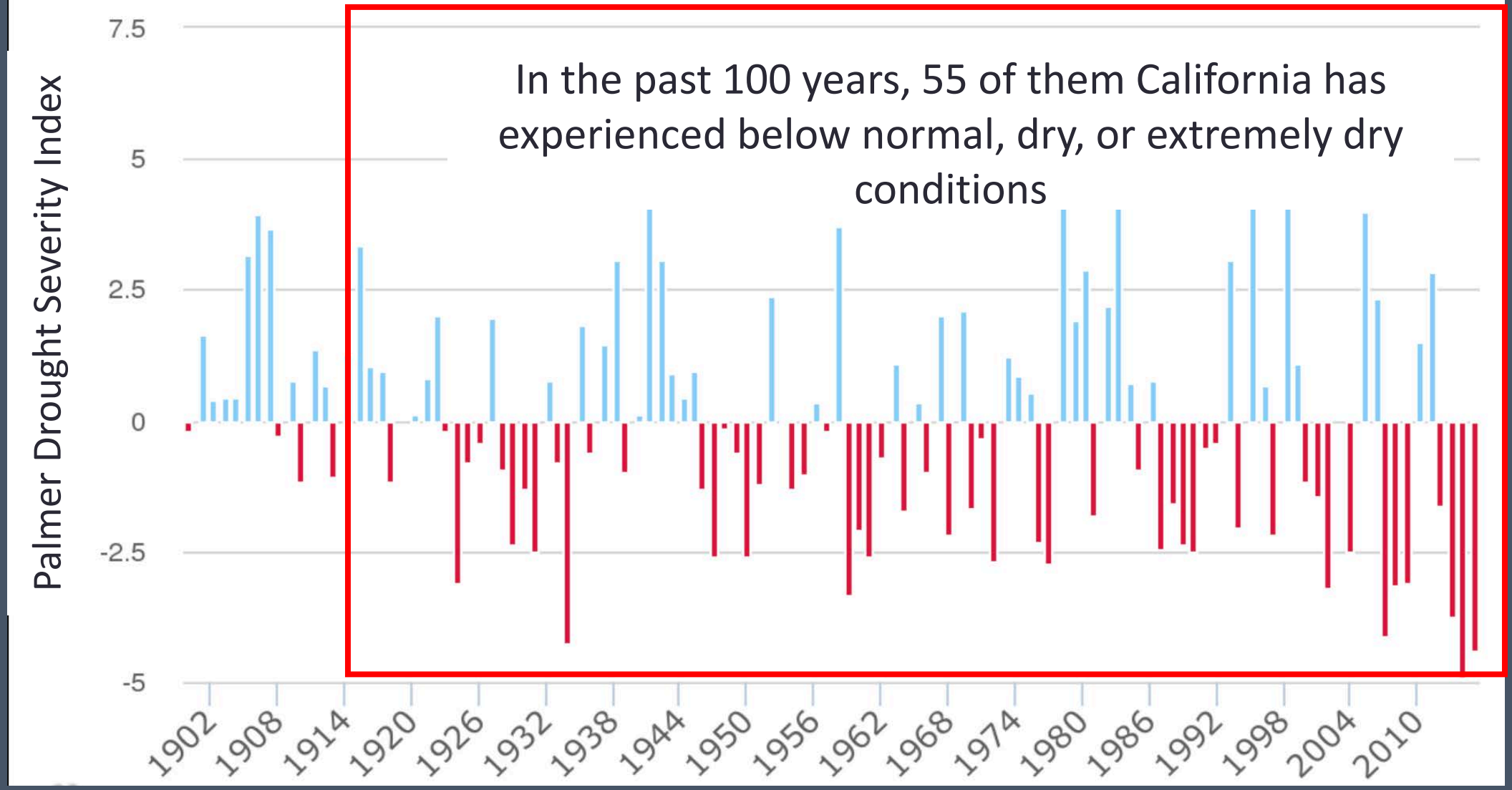
Principles of Urban Water Cycle:

- Enable growth and economic development
- Build large scale centralized assets
- Deliver clean potable water
- Manage Wastewater
- Drain stormwater and floodwater
- Design a ***once through system***
- Assume ***abundance***
- Develop a *top-down governance structure*



# History of Droughts in California

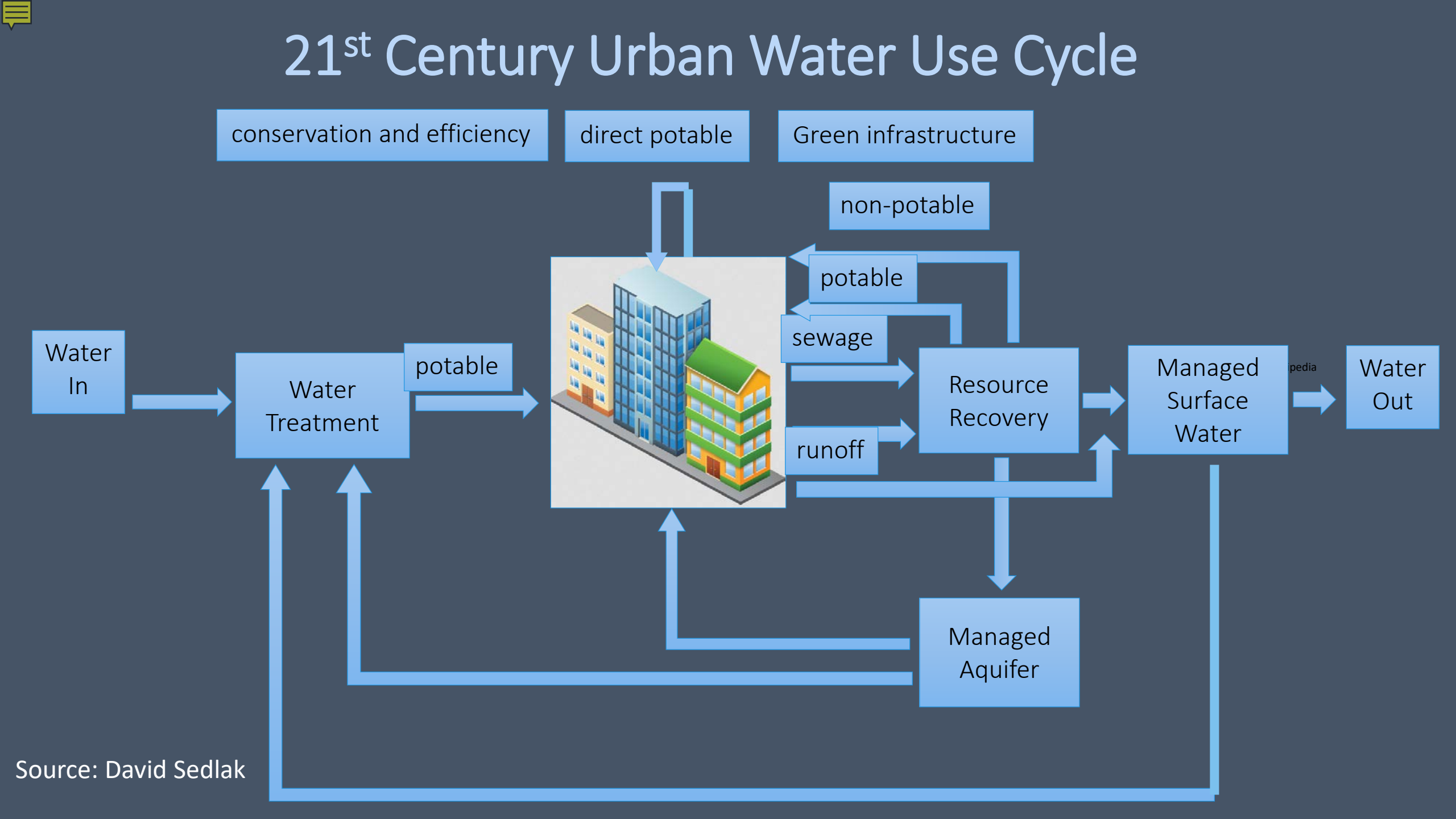
Source: West Wide Drought Tracker




Climate Change
Urbanization
A changing urban water cycle requires new approaches to urban water management
To reinvent our systems, we must know how much water is needed when and where
Aging Infrastructure
Environmental Externalities

# The Paradigm Shift

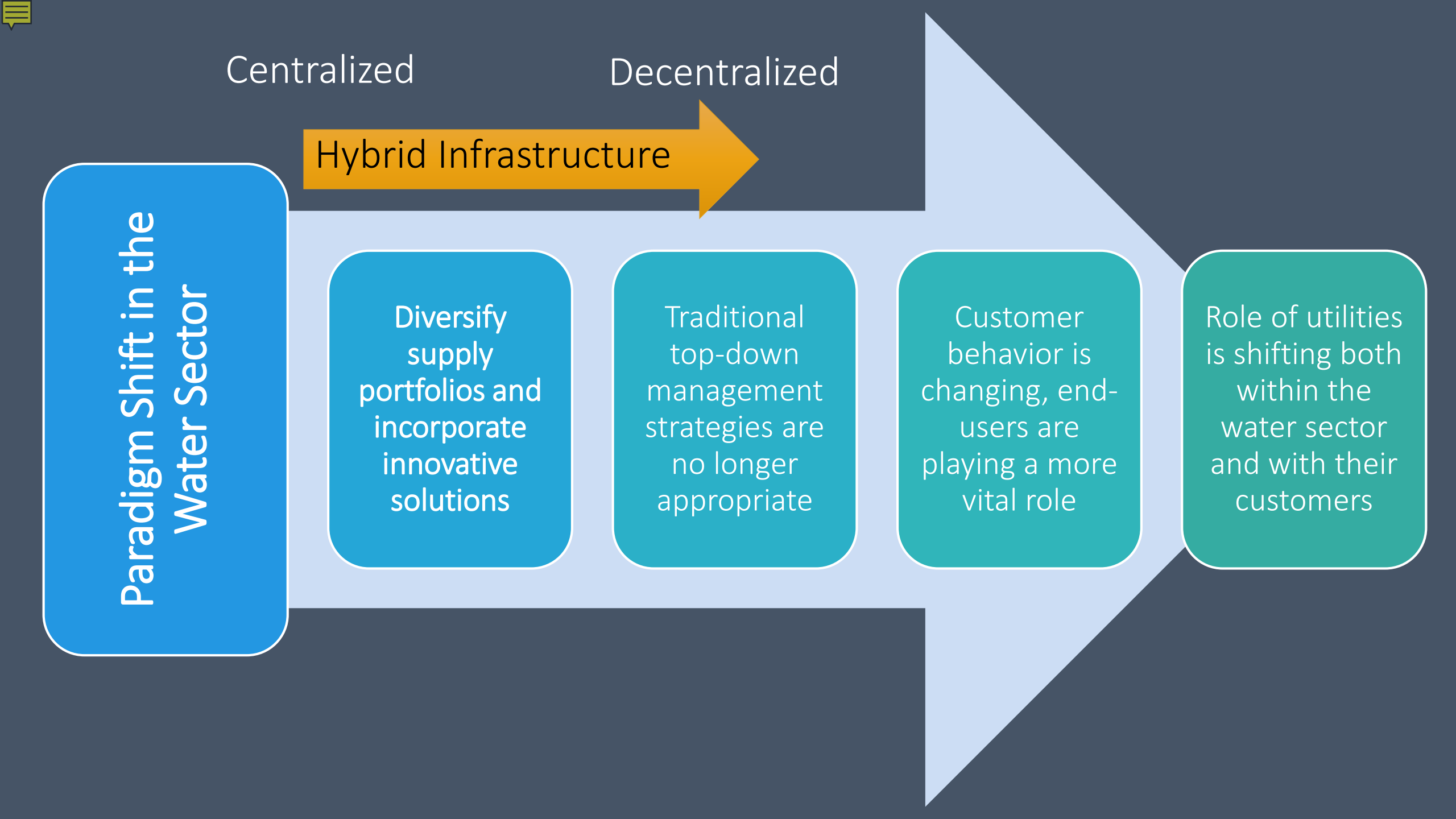
# 21st Century Urban Water Use Cycle



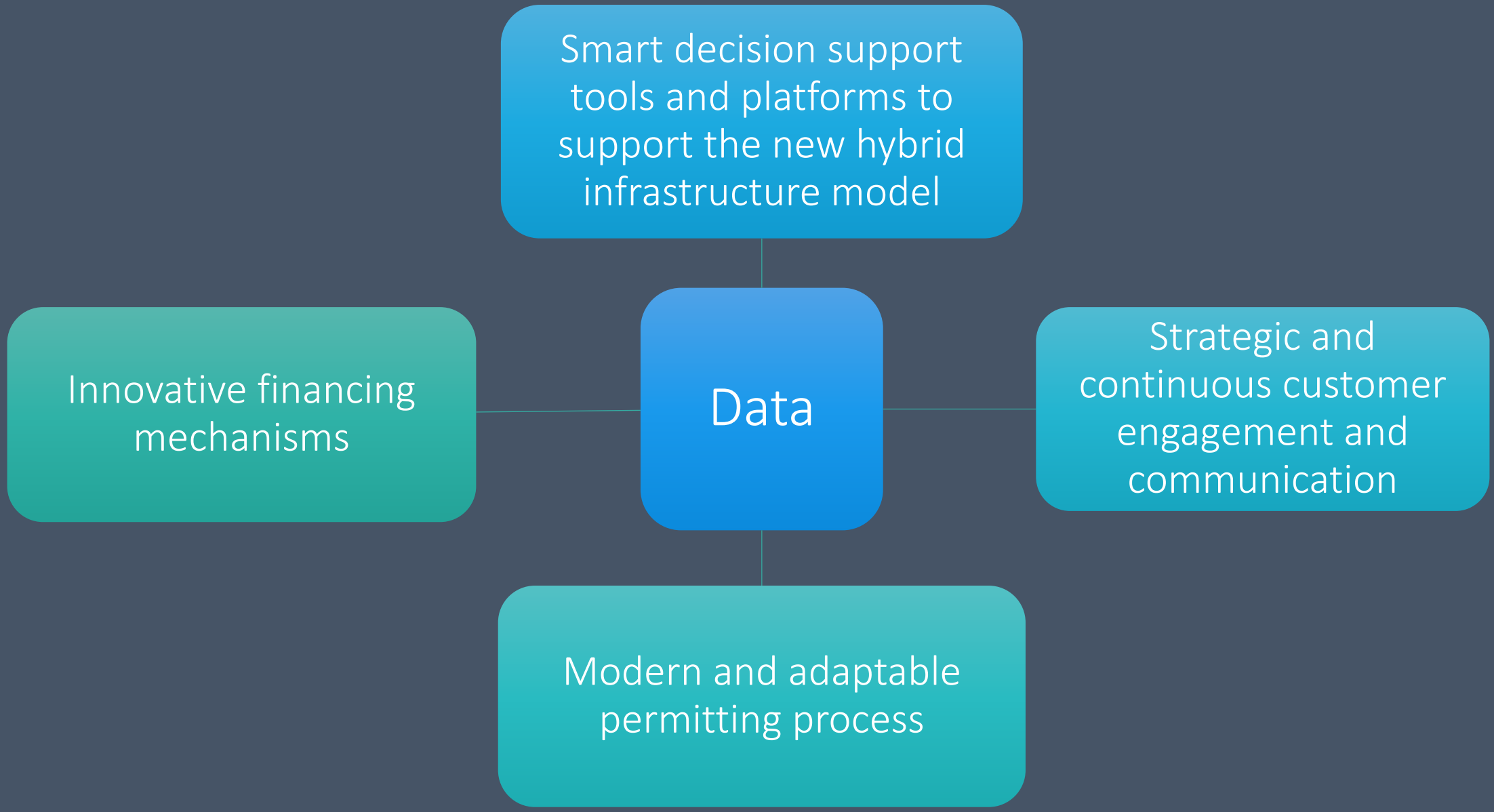

Source: David Sedlak

# Distributed Water Solutions

- Flexibility
- Resiliency
- Reliability

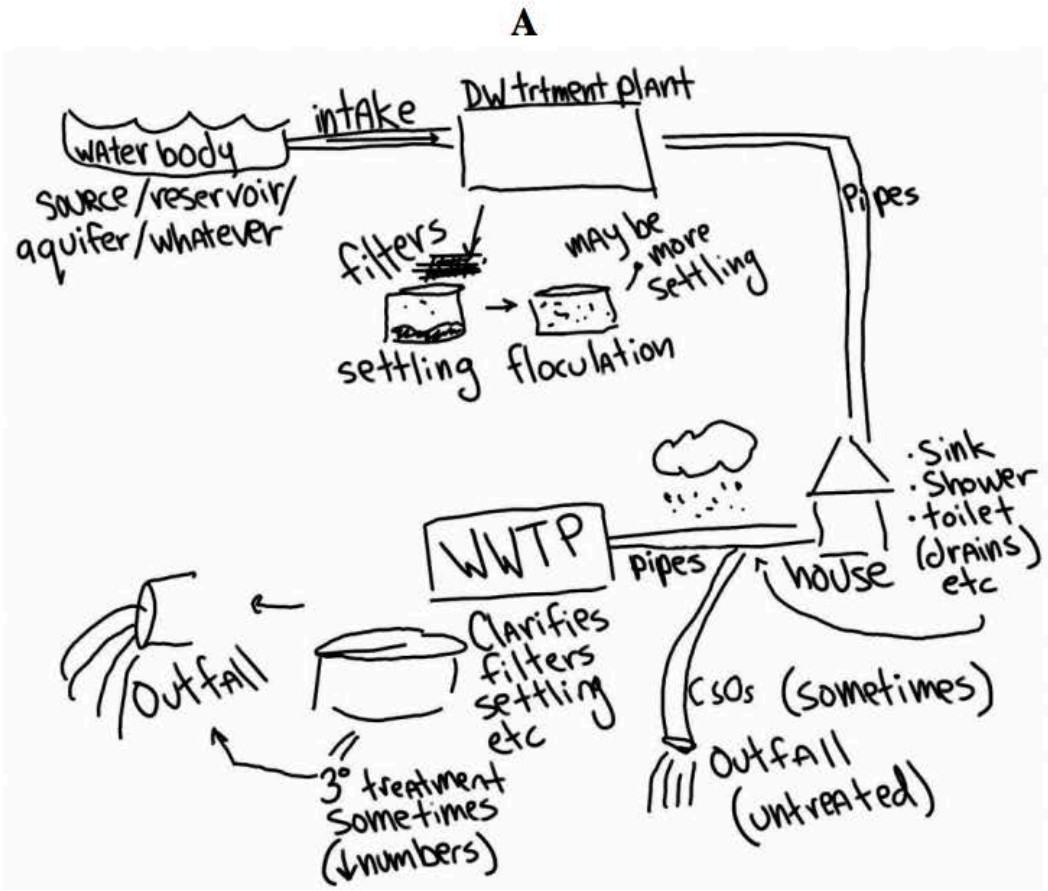

Centralized
Decentralized
Hybrid Infrastructure
Paradigm Shift in the Water Sector
Diversify supply portfolios and incorporate innovative solutions
Traditional top-down management strategies are no longer appropriate
Customer behavior is changing, end-users are playing a more vital role
Role of utilities is shifting both within the water sector and with their customers

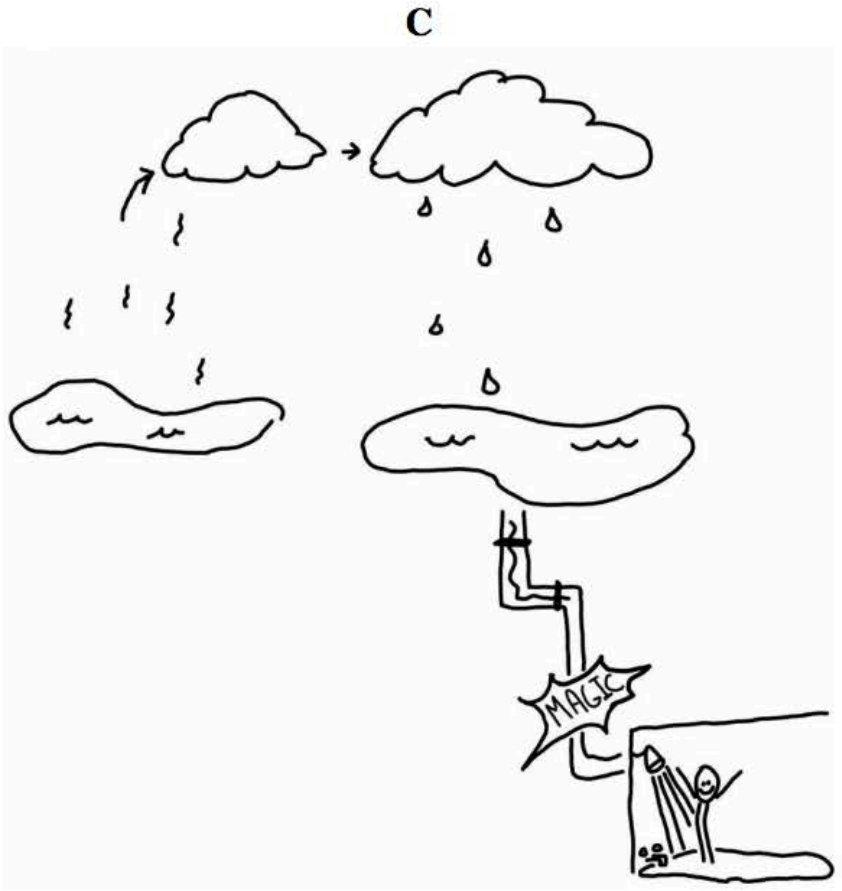
# A New Governance Regime for the Evolving Urban Water Infrastructure

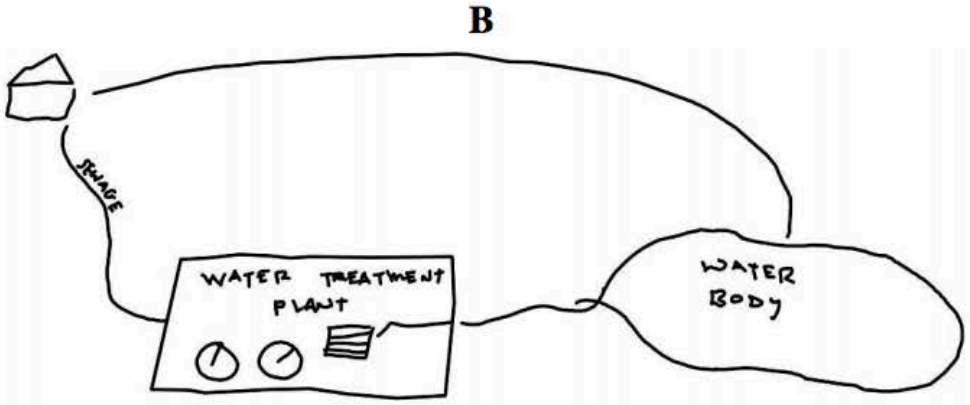



Communication

# Perceptions of Water Systems

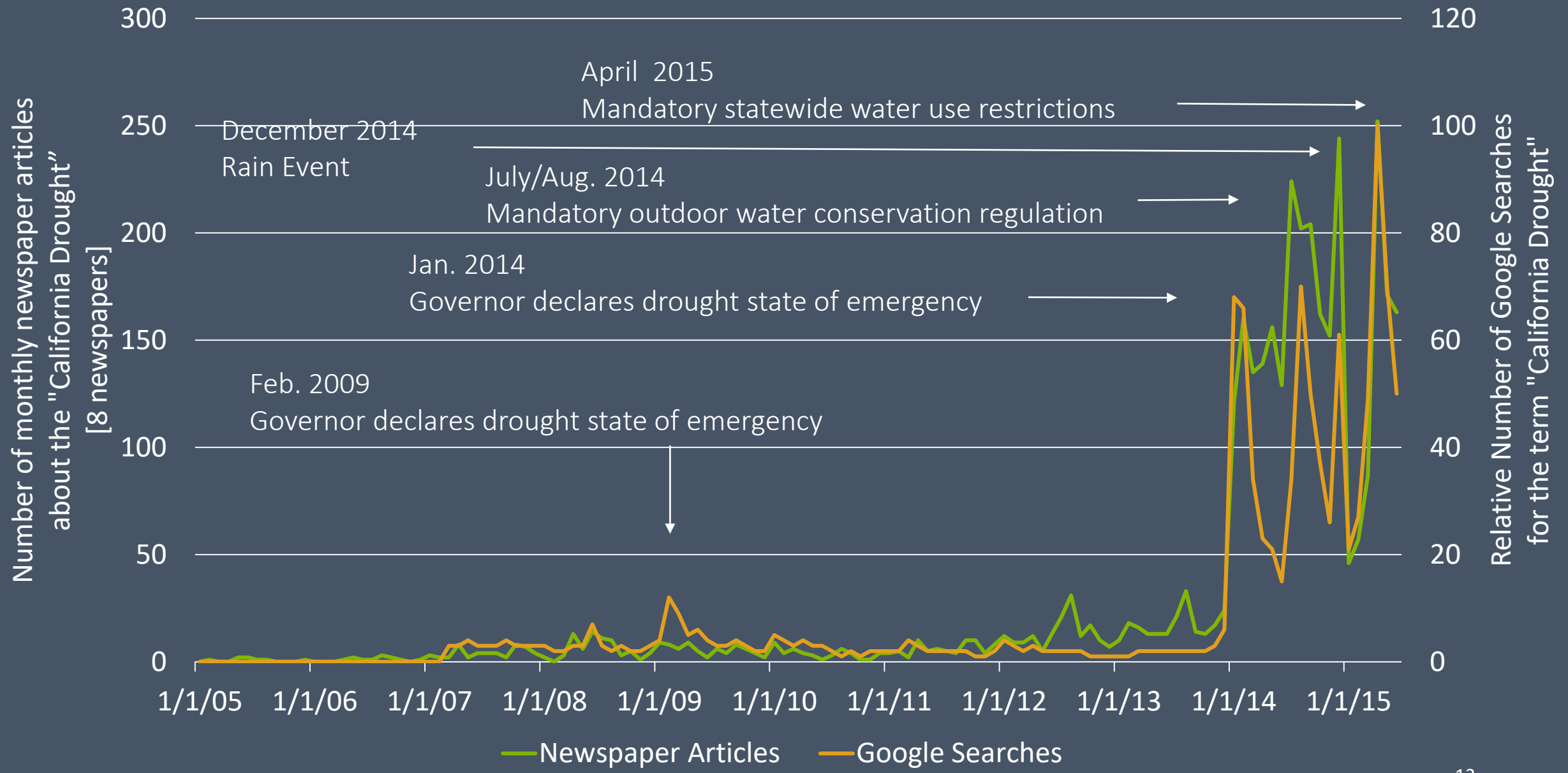


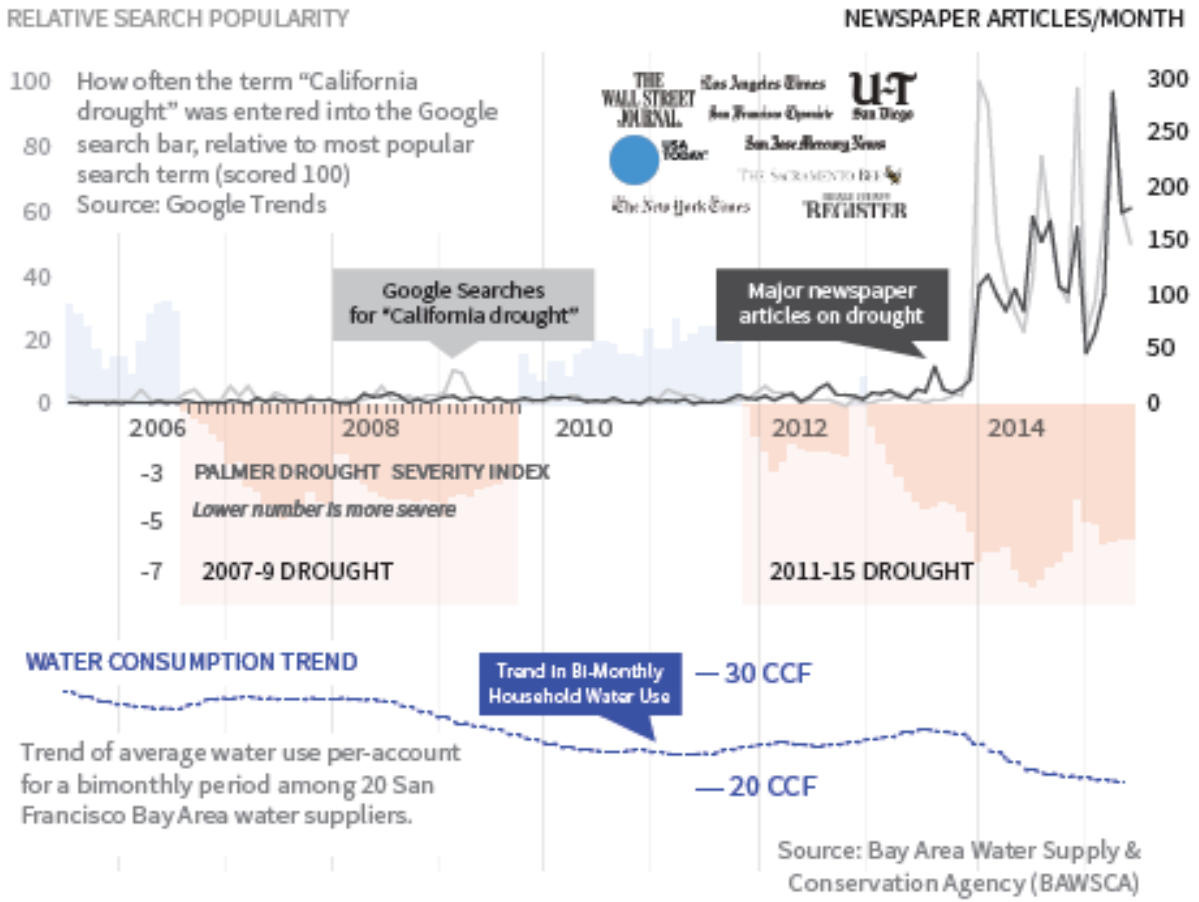

Attari et al. 2017

# News Media Coverage and Public Interest



# Media and Water Use

## Looking at Two Droughts, Models Suggest That News Media Coverage Is a Driver of Water Conservation




OTHER VARIABLES IN THE MODELS, NOT SHOWN

- Temperature
- Precipitation
- Median household income
- Water Price
- Unemployment Rate

*Research Paper: K. J. Quesnel, N. K. Ajami, Changes in water consumption linked to heavy news media coverage of extreme climatic events. Sci. Adv. 3, e1700784 (2017).*

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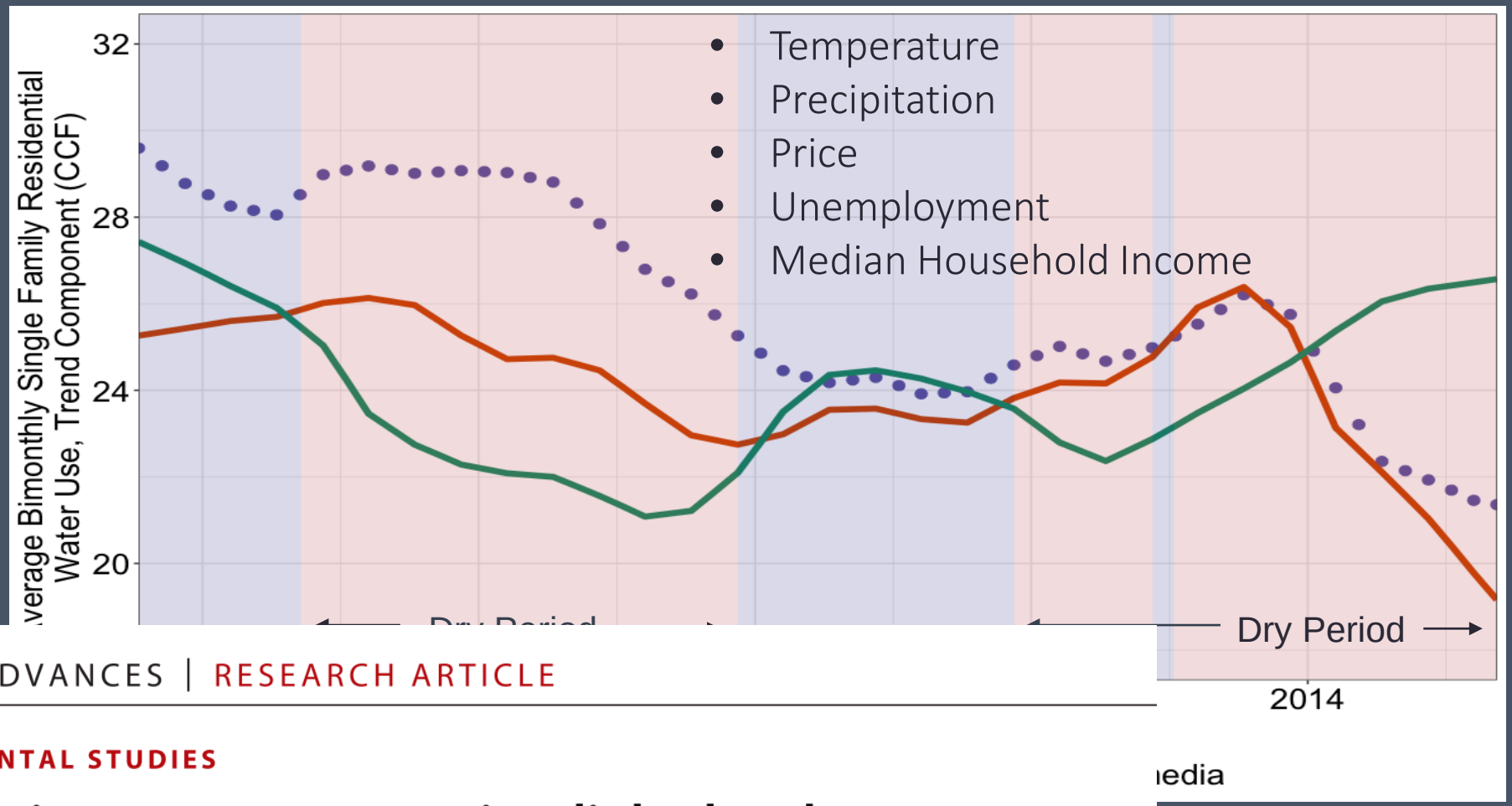
# A counterfactual scenario shows that media has a significant impact:

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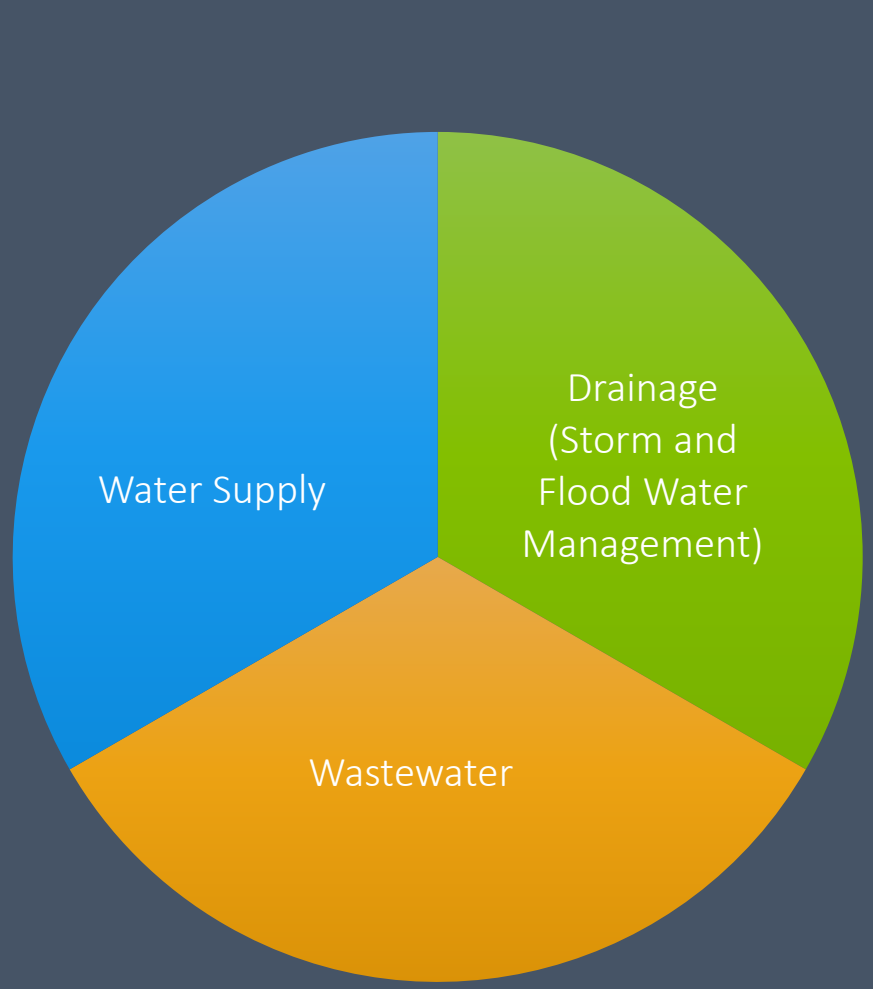
ENVIRONMENTAL STUDIES

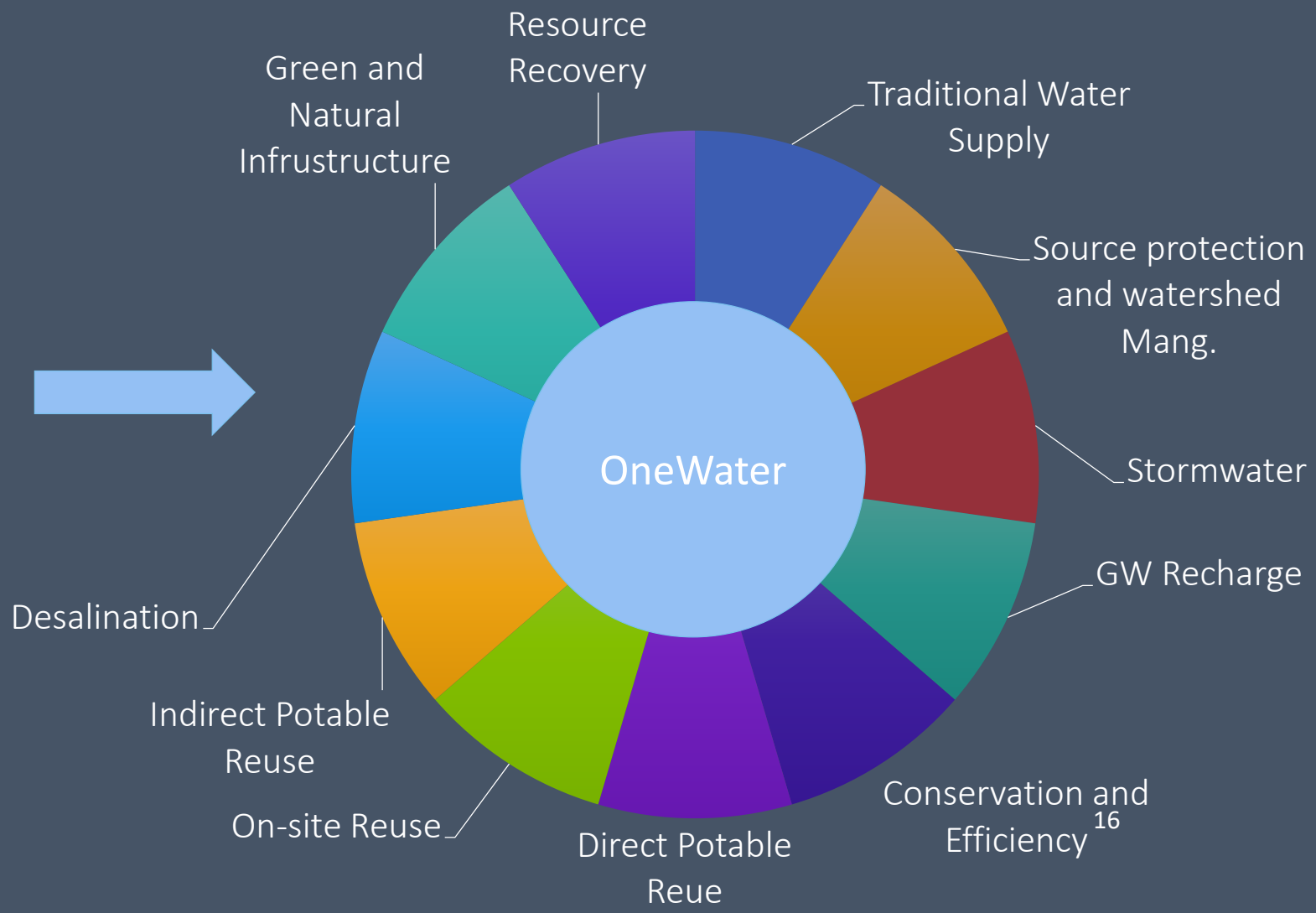
## Changes in water consumption linked to heavy news media coverage of extreme climatic events

Kimberly J. Quesnel[1,2] and Newsha K. Ajami[2,3]*


Governance

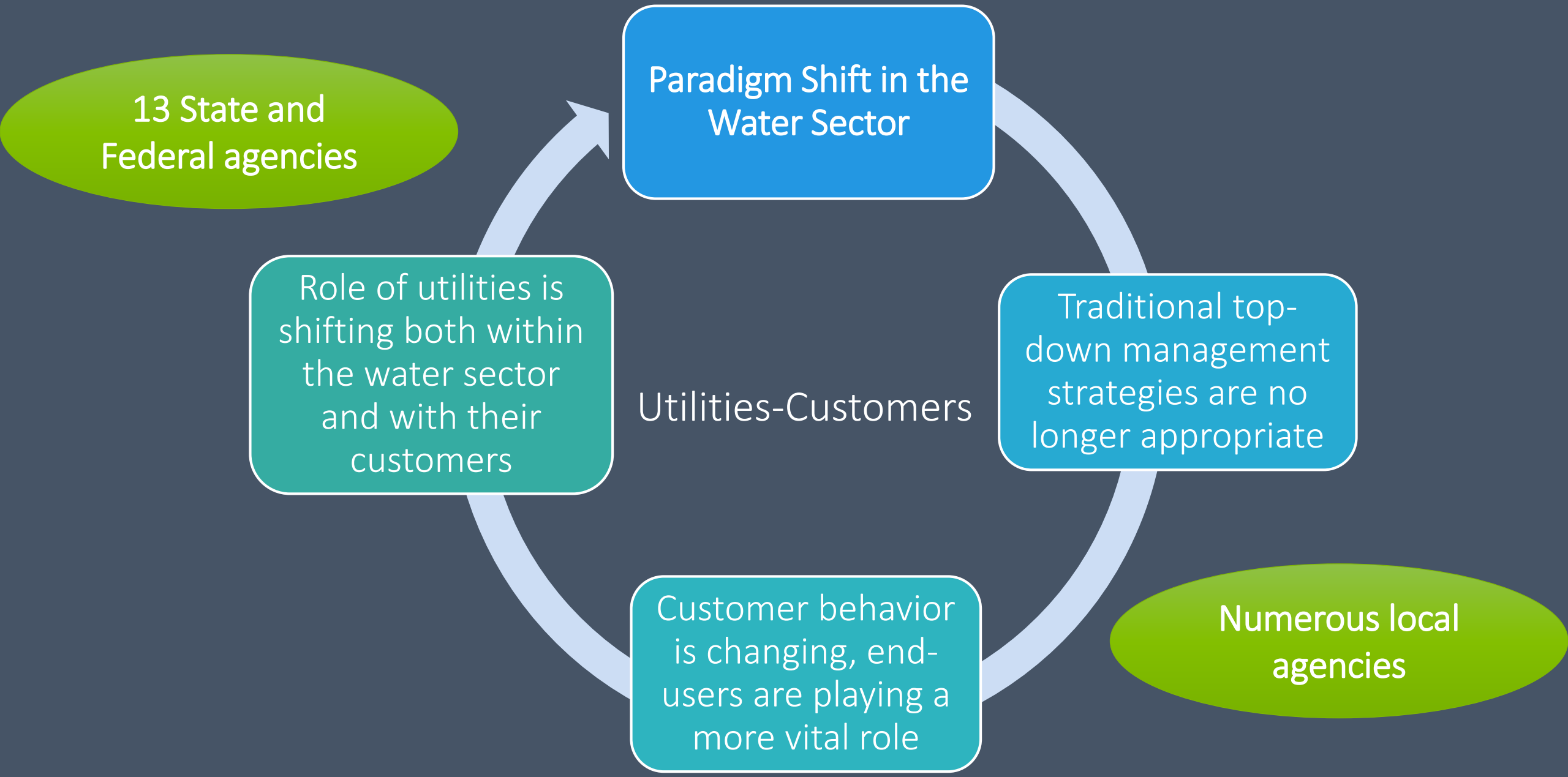
# Regulatory and Institutional Fragmentation

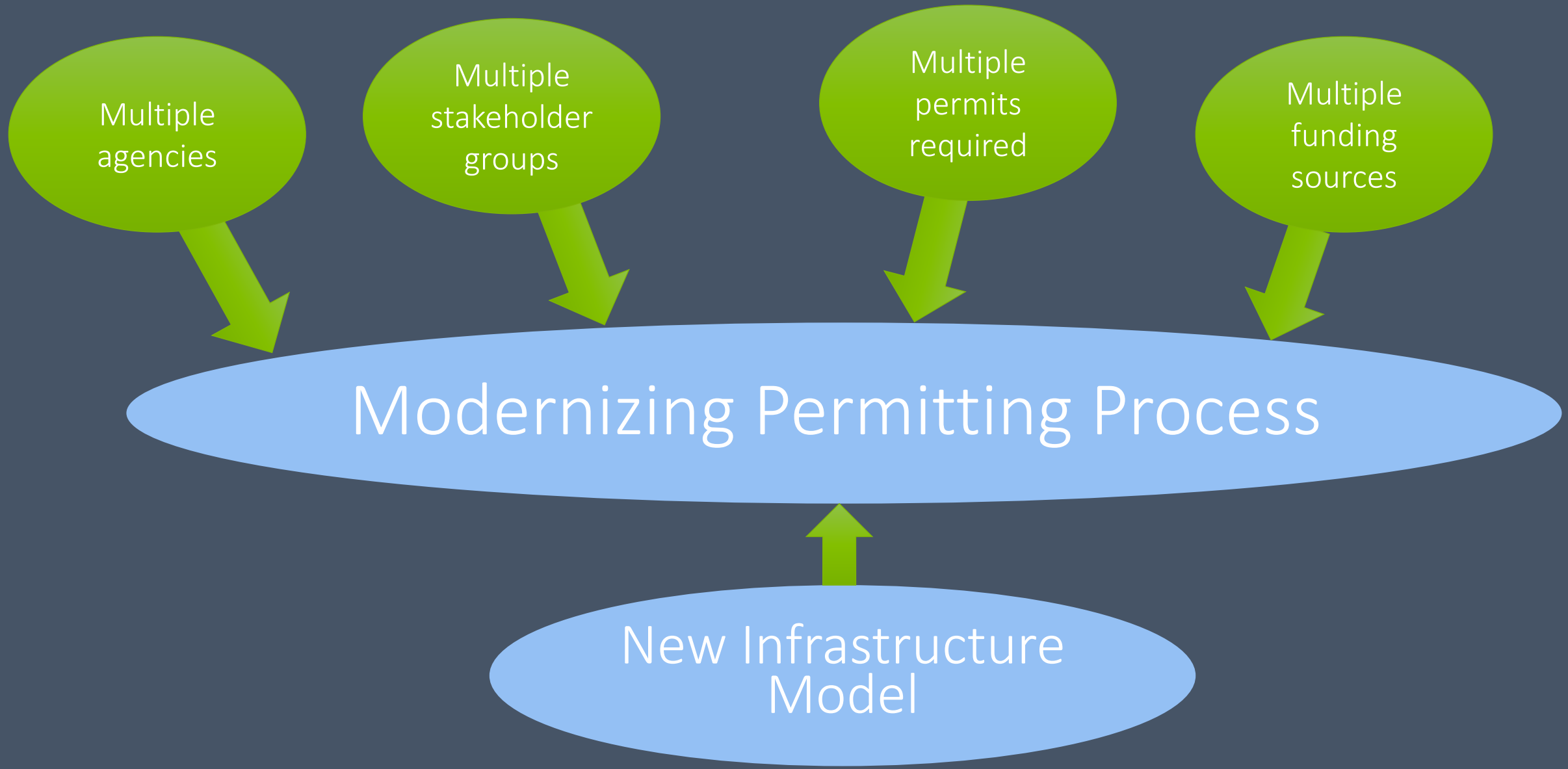



Credit: Steve Moore, 2017

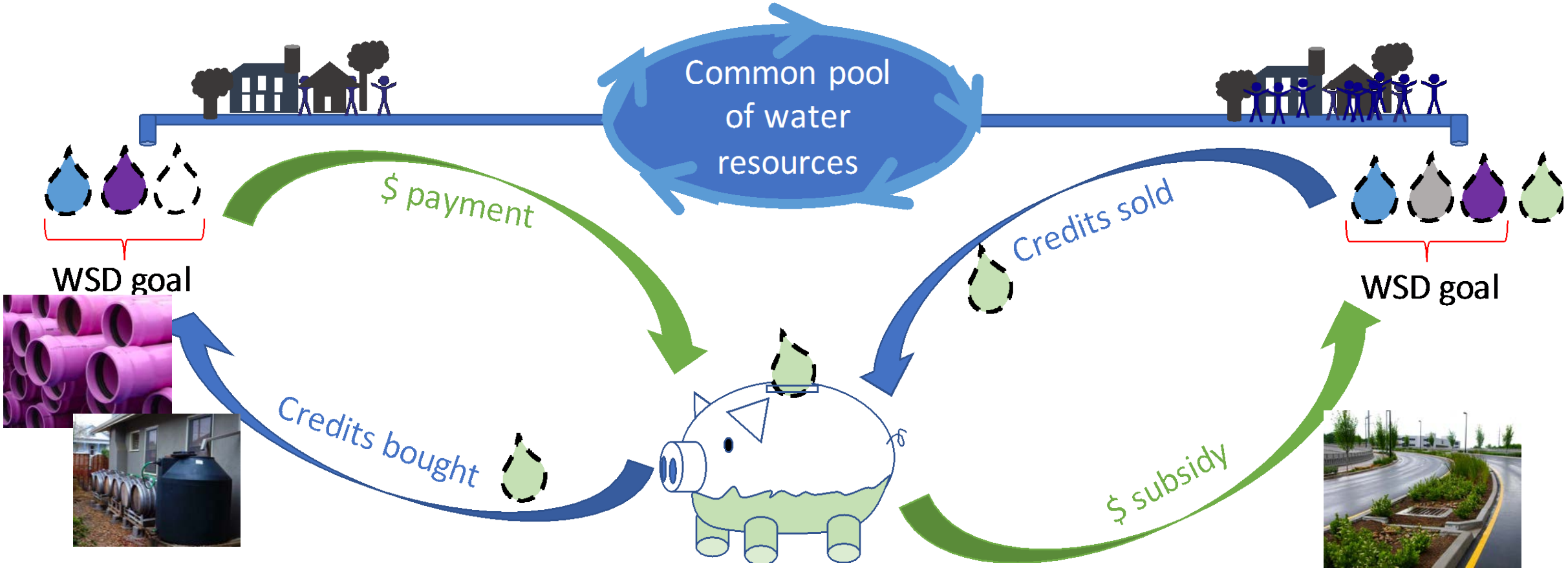
# How is top-down fragmented management working for you?




Multiple agencies
Multiple stakeholder groups
Multiple permits required
Multiple funding sources
Modernizing Permitting Process
New Infrastructure Model

# Smart water trading platforms

- To enable regional collaboration and partnership to meet **Conservation** or **Water Supply Diversification** targets:




Finance

Regional Partnership and cross sectors co-operation

Regional Water Portfolio Diversification

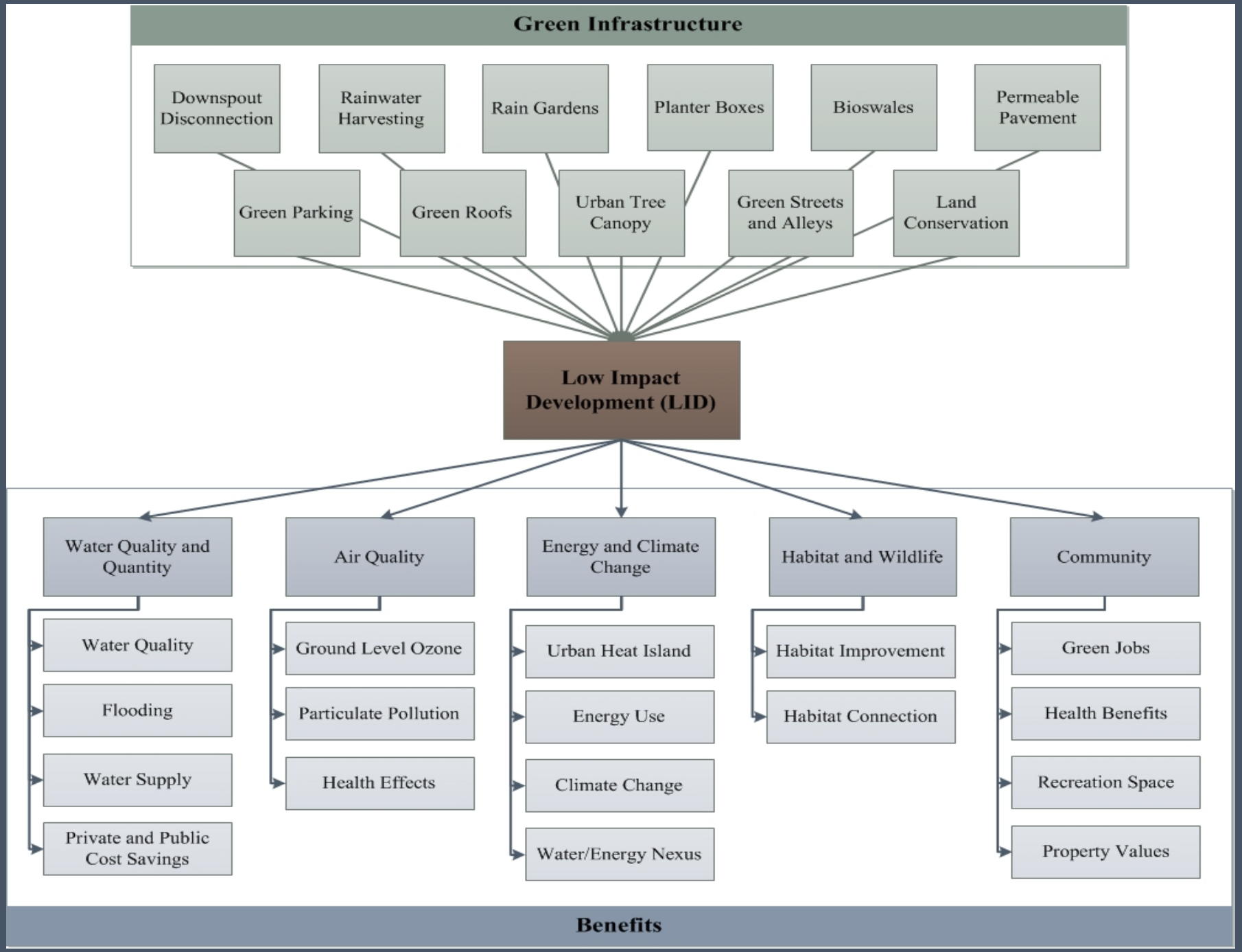
Increase access to capital

Increase regional resiliency

Reduce risk

# Green Infrastructure


Gordon, Quesnel, Abs, and Ajami, 2018. "A Case-Study Based Conceptual Model for Multi-Sector Green Infrastructure Performance Assessment", Journal of Environmental Management.


Green Infrastructure
Downspout Disconnection
Rainwater Harvesting
Rain Gardens
Planter Boxes
Bioswales
Permeable Pavement
Green Parking
Green Roofs
Urban Tree Canopy
Green Streets and Alleys
Land Conservation
Low Impact Development (LID)
Water Quality and Quantity
Air Quality
Energy and Climate Change
Habitat and Wildlife
Community
Water Quality
Flooding
Water Supply
Private and Public Cost Savings
Ground Level Ozone
Particulate Pollution
Health Effects
Urban Heat Island
Energy Use
Climate Change
Water/Energy Nexus
Habitat Improvement
Habitat Connection
Green Jobs
Health Benefits
Recreation Space
Property Values
Benefits

# Crowdsourcing and Peer to Peer Learning Platforms:
# Living Map of Innovative Financing


Environmental Management
November 2017, Volume 60, Issue 5, pp 867–881 | Cite as

## Accelerating the Integration of Distributed Water Solutions: A Conceptual Financing Model from the Electricity Sector

Authors | Authors and affiliations

Kimberly J. Quesnel, Newsha K. Ajami, Noemi Wyss

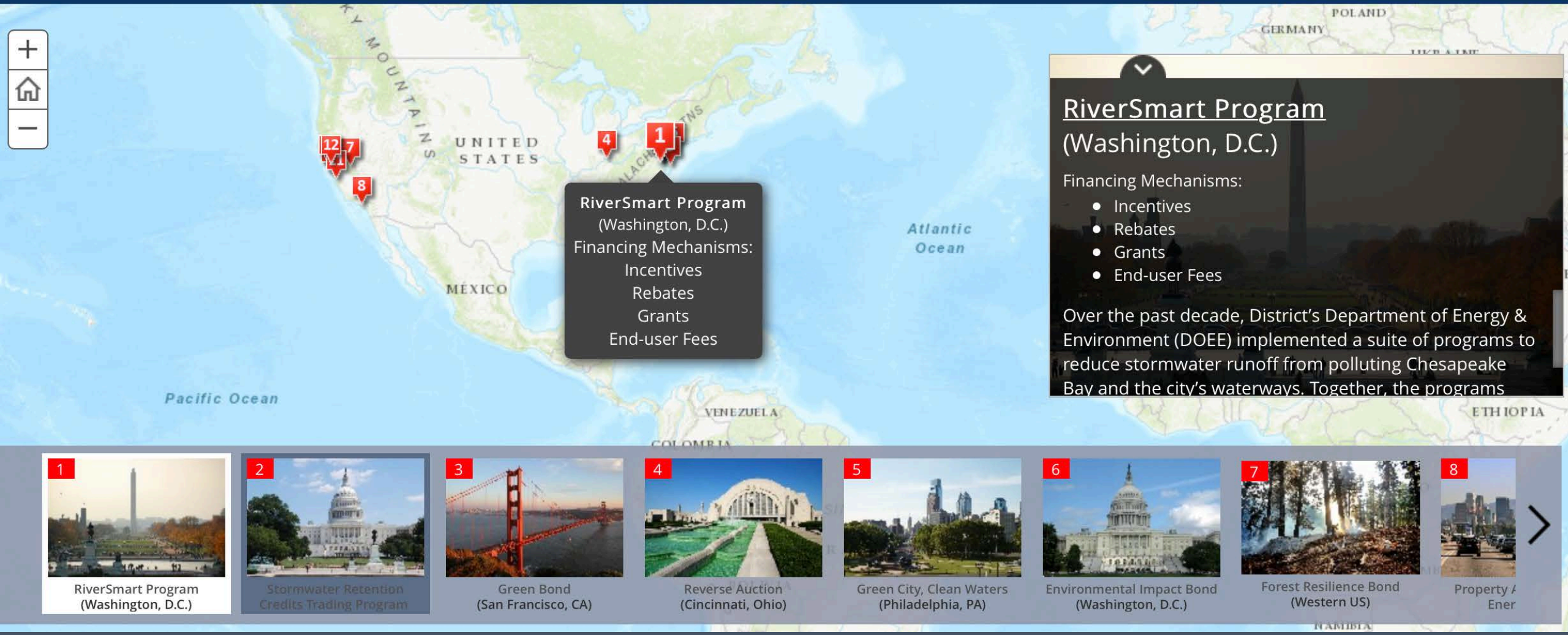
# Living Map of Innovative Water Financing Mechanisms in the United States

by Newsha Ajami (newsha@stanford.edu), Thomas Ng, Kim Quesnel, and Robin Abs

About Water in the West

Stanford | Water in the West

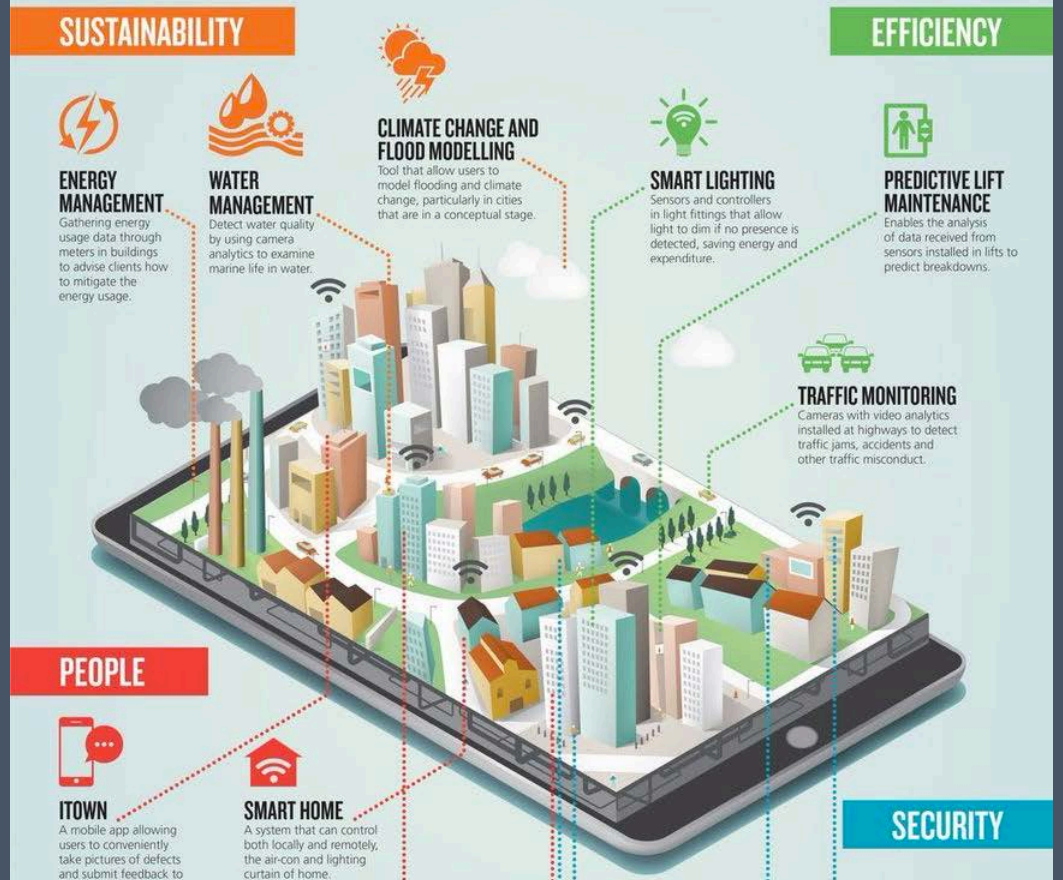
ReNUWIt Re-inventing the Nation's URBAN WATER INFRASTRUCTURE

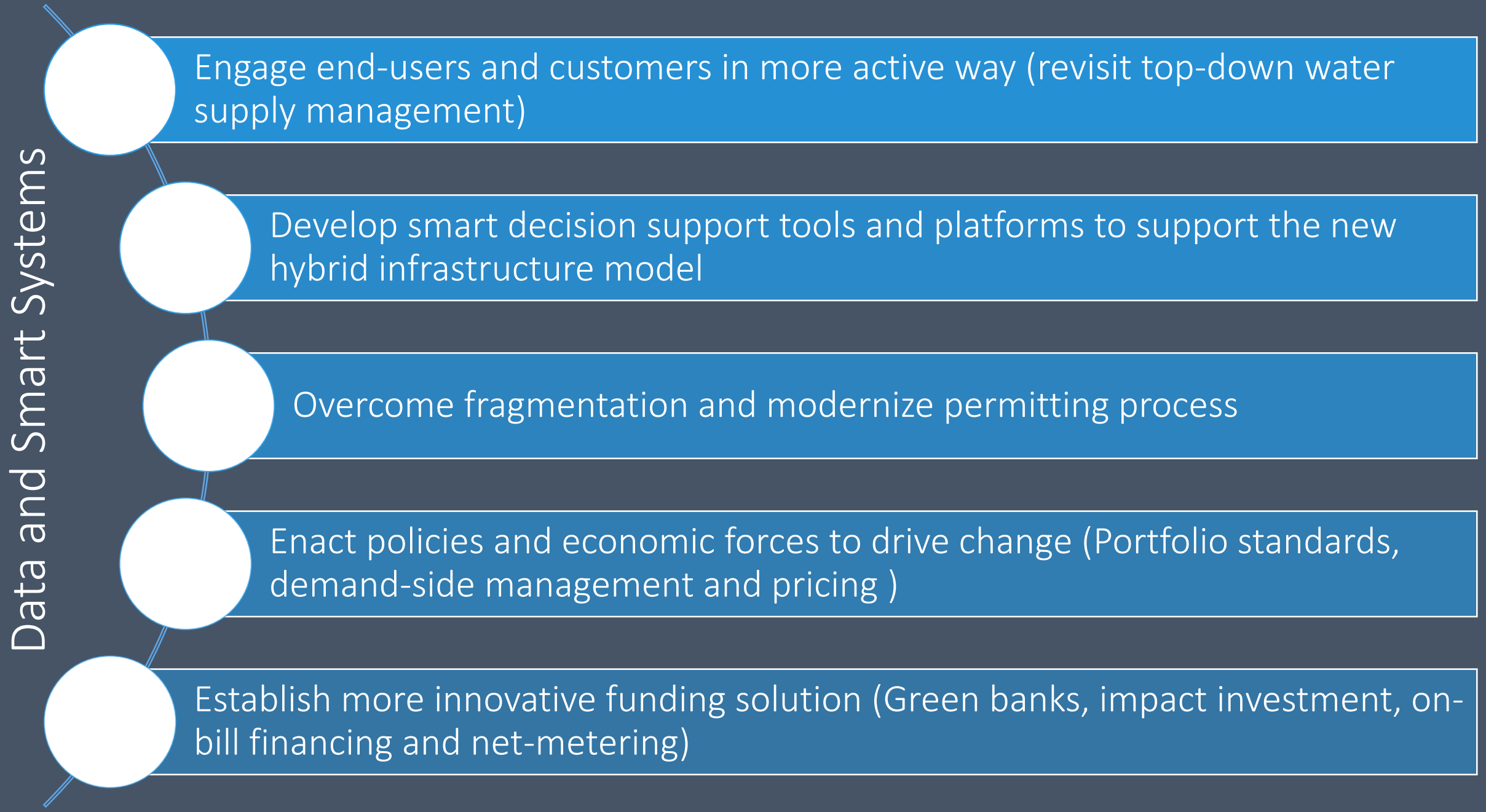


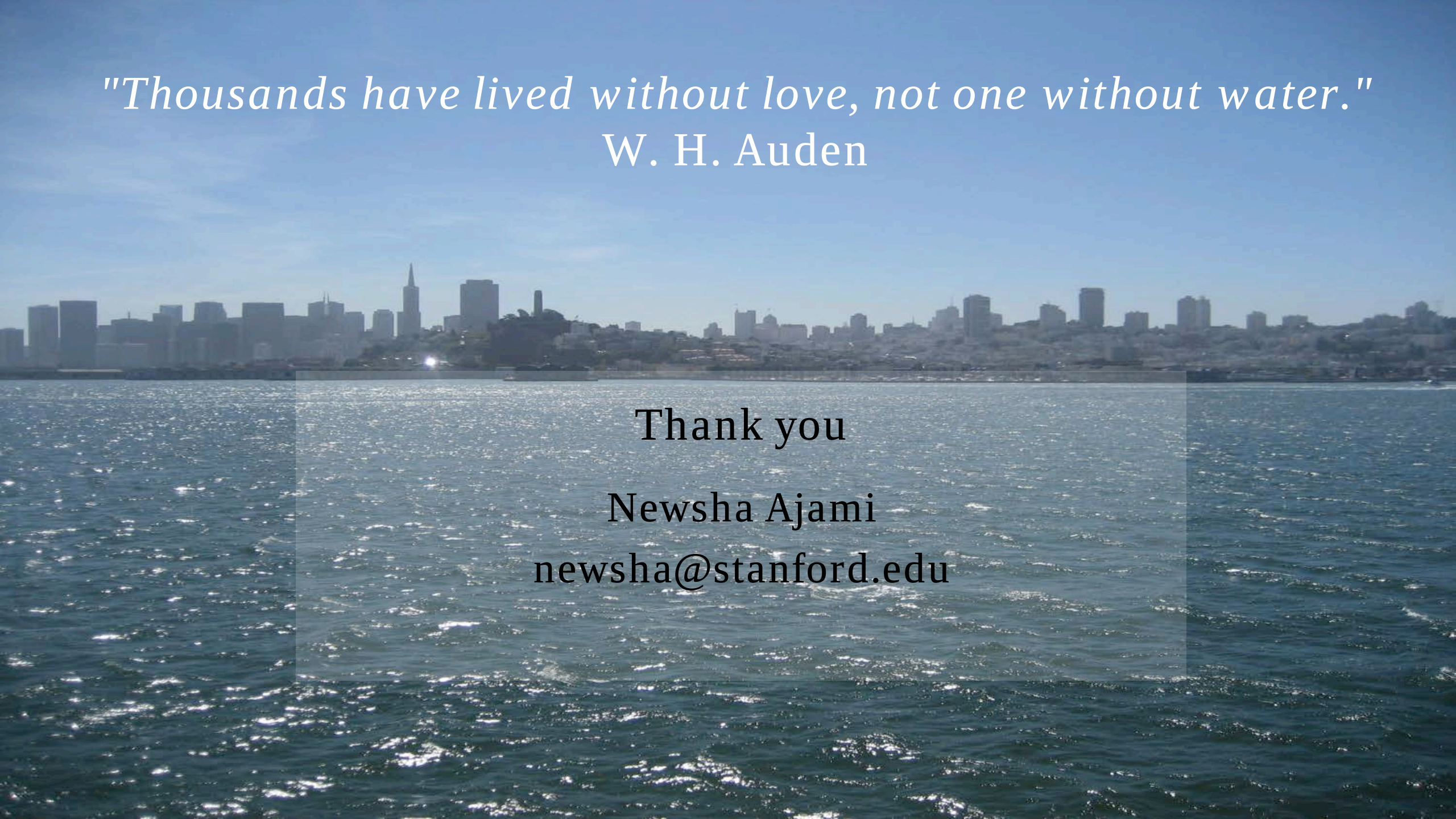
We still have a long way to go!

# SMART CITY IN A BOX

**SJ has developed a set of apps based on the four pillars of a Smart City - Sustainability, Efficiency, People and Security. These apps can be used independently or in conjunction with other apps for a seamless monitoring and management.**




Data and Smart Systems
Engage end-users and customers in more active way (revisit top-down water supply management)
Develop smart decision support tools and platforms to support the new hybrid infrastructure model
Overcome fragmentation and modernize permitting process
Enact policies and economic forces to drive change (Portfolio standards, demand-side management and pricing )
Establish more innovative funding solution (Green banks, impact investment, on-bill financing and net-metering)



*"Thousands have lived without love, not one without water."*
W. H. Auden

Thank you

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