WATER AFFORDABILITY & EQUITY:
RE-IMAGINING WATER SERVICES

A REPORT FROM THE 2020
ASPEN-NICHOLAS WATER FORUM

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The **Aspen Institute** is a global nonprofit organization committed to realizing a free, just, and equitable society. Since its founding in 1949, the Institute has been driving change through dialogue, leadership, and action to help solve the most critical challenges facing communities in the United States and around the world. Headquartered in Washington, DC, the Institute has a campus in Aspen, Colorado, and an international network of partners.

The **Aspen Institute Energy and Environment Program** challenges thought leaders to test and shape energy, conservation, and environmental policies, governance systems, and institutions that support the wellbeing of both nature and society. The program addresses critical energy, environmental, and climate change issues through non-partisan, non-ideological convening, with the specific intent of bringing together diverse stakeholders to improve the process and progress of policy-level dialogue. The program's core strategy focuses on mitigating the effects of climate change, adapting to the inevitable impacts of climate change, and building relationships needed to achieve these goals.

The Nicholas Institute for Environmental Policy Solutions at Duke University improves environmental policymaking worldwide through objective, fact-based research to confront the climate crisis, clarify the economics of limiting carbon pollution, harness emerging environmental markets, put the value of nature's benefits on the balance sheet, develop adaptive water management approaches, and identify other strategies to attain community resilience. The Nicholas Institute is part of Duke University and its wider community of world-class scholars. This unique resource allows the Nicholas Institute's team of economists, scientists, lawyers, and policy experts not only to deliver timely, credible analyses to a wide variety of decision makers, but also to convene these decision makers to reach a shared understanding regarding this century's most pressing environmental problems.
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The US Water Alliance advances policies and programs to secure a sustainable water future for all. Our membership includes water providers, public officials, business leaders, environmental organizations, community leaders, policy organizations, and more. A nationally recognized nonprofit organization, the US Water Alliance brings together diverse interests to identify and advance common ground, achievable solutions to our nation's most pressing water challenges.
http://uswateralliance.org/

The 2020 Virtual Aspen-Nicholas Water Forums represent the ninth water forum in the Aspen Institute and Nicholas Institute partnership. The first, in 2005, on water, sanitation, and hygiene in the developing world, produced *A Silent Tsunami*, which made a material contribution in advancing priorities in U.S. foreign assistance for basic water services. The report ultimately helped spur passage of the Paul Simon Water for the Poor Act. The third forum, in 2015, on water and big data, catalyzed a dialogue series that led to the 2017 report: Internet of Water: Sharing and Integrating Water Data for Sustainability whose recommendations are being implemented by the Internet of Water project at the Nicholas Institute. This year we partnered with the US Water Alliance to explore issues of affordability and equity. This topic is incredibly timely with a global pandemic that has amplified inequities and brought greater challenges of affordability for our water systems. The COVID-19 pandemic resulted in a series of virtual forums rather than a single in-person forum. This report is a compilation of those conversations. The success of these endeavors provided the impetus for additional forums focused on water concerns in the United States.
https://www.aspeninstitute.org/programs/energy-and-environment-program/aspennicholaswaterforum

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PREFACE

The 2020 Aspen-Nicholas Water Forum explored what constitutes good water governance through the lenses of affordability and equity, a topic that was made ever more prescient given the circumstances of the year. 2020 has been a year overwhelmed by a global public health crisis, political and social unrest, and natural disasters. In March of this year, the World Health Organization identified the global outbreak of COVID-19 as a pandemic, a declaration, and escalation which underscored the critical importance of water and sanitation for public health. Amidst immense economic disruption and skyrocketing unemployment in the U.S., many states passed shut-off moratoria, so those who lost their jobs could still access water. States and local governments diverted Coronavirus Aid, Relief, and Economic Security (CARES) Act funds to utilities to aid in revenue losses from nonpayment and decreased water use from closed businesses. For the first time, the nation began to grapple in a significant way with how many people lack access to water and how many more cannot afford their water. In May, a national conversation around race erupted after the police killing of George Floyd created socio-political reverberations around the globe, further shining a light on water system inequities. The marks of systemic racism are embedded in water systems that were constructed during the era of redlining and unfair housing policies and have left a legacy of unequal water access and unfair shut-off practices in communities of color. Finally, in the fall, the western U.S. struggled to control immense fires, with 4% of California burning, while the Gulf Coast repeatedly braced themselves against tropical storms. The intersecting public health, unemployment, racial justice, and climate crises have revealed deep, systemic fault lines in our society, and exacerbated health and financial disparities across racial, gender, and geographic lines, making the topic of this year's forum critically relevant.

The Aspen-Nicholas Water forum convenes thought leaders in different sectors of the water industry to consider and imagine what good water governance means for a particular topic. Participants come from the private sector, government, academia, and non-governmental organizations—representing expertise in industry, finance, philanthropy, government, academia, agriculture, food and technology companies, investors, and entrepreneurs. Topics discussed include big data, innovative financing, groundwater, reaching scale to address geographically expansive challenges, water quality, and now equity and affordability.

This vision and leadership are needed now more than ever to explore the challenges and opportunities that are emerging amid so much disruption. The pandemic also reorganized our traditional in-person Water Forum from a single event in May to a series of virtual meetings that allowed us to engage in conversation to envision a better future as events took place. Our last virtual session focused on how the water sector could position itself within a new administration's priorities around (1) the pandemic, (2) the economic recession, (3) racial inequality, and (4) climate change. All four priorities have incredible relevance to water, and we have an opportunity to advance policies and change to ensure good governance for water equity and affordability.

The 2020 Aspen-Nicholas Water Virtual Forums explored water equity and affordability prior to the pandemic, the response of urban and rural utilities to the pandemic and their financial resiliency, as well as the roles and responsibilities for federal, state, and local governments to ensure the affordability of water services. The central question was that given that water is essential for public health, **what must be done to ensure**

that these life-sustaining services are affordable and accessible to all households and the utilities providing those services are financially resilient?

Each year, the Nicholas Institute and Aspen Institute coauthor a summary of the forum. Not all views were unanimous nor were unanimity and consensus sought. Forum participants and sponsors are not responsible for this summary's content. Given the virtual format, which broke the forum into distinct meetings, the final summaries for each meeting can be found here:

- Long-term water affordability & financial resilience
- Equity and affordability in rural communities and tribal nations
- Building a federal water assistance program: What we can learn from federal programs that protect low-income families
- Local insights on renewing a cross-government for water affordability
- State insights on renewing a cross-government for water affordability
- Reflections on the past year and looking forward to the next administration

We thank the following sponsors for their generous support of the forum: Esri, Mott Foundation, Schlumberger, S.D. Bechtel, Jr. Foundation, Spring Point Partners, Van Ness Feldman, Xylem Inc. This gratitude is especially important this year as the circumstances required agility and flexibility from our sponsors and participants in moving to a digital forum that allowed us to continue to engage in conversations around race, equity, and affordability as a community. We were awed at the dedication and response of local utilities to continue providing reliable services in the pandemic and the dedication of elected officials to engage with and advocate on behalf of, their communities. We were humbled by the immensity and complexity of challenges that governments must address and how carefully they must hold different concerns in balance. We were inspired by new ideas and insights brought forth by participants. Finally, we were grateful for the candid conversations that continually push us to reimagine how we could "do water" today with greater equity.

VISION

The fundamental question at each Aspen-Nicholas Water Forums is "what constitutes good governance for water?" What does water governance look like in terms of balancing equity and liberty with efficiency and community (**Figure 1**)? What is the legacy of these broad ideas on water governance, and what do we want our future to be? For instance, the provision of drinking water in the United States historically prioritized liberty and efficiency, resulting in a multitude of independent water systems with wide variation in the safety of the water provided. In response, the federal government established the Safe Drinking Water Act to apply uniform drinking standards across all water systems. In essence, the federal government shifted governance towards community and equity and initially provided funding to help address affordability and equity challenges.

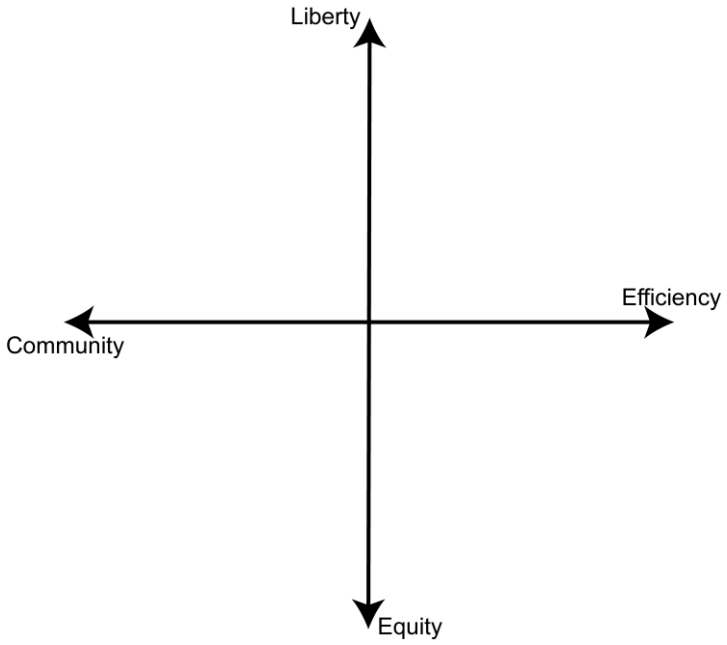

Figure 1. Adopted from *The Executive's Compass: Business and the Good Society*, James O'Toole, 1993.

The 2020 Aspen-Nicholas Water Forum focused on the equity portion of the diagram. Inequities in water systems are rooted in a legacy of social and policy movements in the U.S. that shaped the construction of water and wastewater systems during the 19th and early 20th centuries. Now, *most* people have access to water, *most* tap water is drinkable, *most* dams are secure, *most* farms can grow more with less water, and *most* rivers are cleaner than they were 50 years ago. Most does not mean *all*. Does equity in water mean *all*? Before the pandemic, an increasing number of Americans were losing access to safe drinking water and sanitation—and others never had it. While equity challenges exist beyond utilities, the immediacy of the pandemic and its impacts on public health have focused our attention on utilities, particularly on issues of affordability and financial resilience.

UTILITY SHORT-TERM RESPONSE TO THE PANDEMIC

The COVID-19 pandemic created significant disruptions to everyday life, and yet the nation's water and wastewater utilities continued to operate and provide critical public health services to keep communities safe. The importance of water for public health grew while the ability to pay for those services shrunk. Businesses closed, unemployment skyrocketed, and the nation entered an economic recession. Households and businesses lost sources of income and financial stability.

In response, utilities dipped into reserves and spent resources to adapt operations and support their customers. First, utilities prioritized the safety of their employees by implementing new protocols, such as limiting workers on sites, providing personal protective equipment, and developing measures to adapt to decentralized operations. Second, many state and local utilities enacted shut-off moratoria for the first few months of the pandemic to ensure households unable to pay for water services continued to have access. Many more restored connections from previous shutoffs. Third, utilities developed effective public messaging, particularly about clogged drains during the toilet paper shortage ("keep the wipes out of the pipes") and reassurance that water remained safe to drink. While some utilities had already adopted digital technologies, others had to modify paper-based workflows. There has been a tremendous effort by utilities to adapt while continuing to provide reliable water and wastewater services.

Utilities are taking on the financial shortfalls of their customers so they can meet critical public health needs. As statewide shut-off moratoria expire, utilities must choose between doing what is best for public health and their struggling customers and the long-term health and financial resiliency of themselves and their paying customers. (Box: Benefits and Challenges of Shut-offs).

Benefits and Challenges of Shut-offs

Shut-offs, or the threat of shut-offs, are a well relied on tool for utilities to ensure payment for services. This enforcement mechanism provides a level of assurance to investors and rating agencies that a utility can collect the revenue needed to pay its debts. If shut-offs become politicized and outlawed, investors and rating agencies may lose confidence that utilities can pay their debts, which may lead to higher interest rates and a greater financial burden for utilities and their customers. At the same time, inequitable shut-off practices have disproportionately affected African American neighborhoods across many cities in the U.S., raising questions and concerns about how these practices might exacerbate poverty and reinforce systemic societal and economic inequities. Utilities are searching for new ways to incentivize payments while assuring equitable and affordable water provision for all its consumers.

The COVID-19 pandemic is creating an acute financial crisis for some water utilities. Proposed COVID-19 stimulus packages only covered infrastructure projects and have not addressed revenue losses that jeopardize utility operations today. The water community needs to help policymakers understand the importance of utilities receiving revenue now so that they can take care of their systems properly and continue to provide safe, reliable water and sanitation services. In rural America, cooperatives may give voice to these concerns and advocate on behalf of their communities and members. A voice also needs to be given to those communities that have been left behind, without infrastructure or revenue, and who are experiencing

incredible hardship from lack of access to water and sanitation. This hardship has been amplified during the COVID-19 pandemic, as water and sanitation have been critical to public health. New policies and programs will be more successful in dismantling the systems in place that keep these communities from accessing water and wastewater services if they first acknowledge these inequities. While a quick response is necessary to address the current crisis, greater restructuring continues to be necessary to address underlying racial disparities and environmental justice.

EXECUTIVE SUMMARY

The first section addressed utility response to the pandemic. The remaining report describes the chronic underlying affordability and equity challenges plaguing water systems. Below we synthesize key takeaways in the following report chapters. To learn more, read the full chapter.

Water equity - an aspiration and a legacy:

- Intersecting forces of structural racism and poverty have embedded inequity in our water infrastructure, shaping who has access to water and grants and influencing the costs of water. There are social and environmental justice issues as communities of color are more likely to have their water shut-off for nonpayment and reside in poor quality housing, which is more likely to have issues such as leaking pipes that result in higher bills. Communities of color are also more likely to live in areas prone to flooding or frequently exposed to other hazards.
- To protect public health, the federal government created water quality regulations that were reliant on specific, centralized treatment technologies and initially provided the grants necessary for local governments to subsidize the costs of building this infrastructure. In the mid-1980s and 1990s, grants transitioned to loans with funding steadily decreasing since. The burden falls on local utilities to finance expensive treatment technologies and replace aging infrastructure.
- The primary sources of funding for local utilities are their customers (residents and businesses). As the federal government has decreased funding, the financial health of utilities has become increasingly dependent on the number of customers and their financial health.
- Water can be a public good, a commodity, and a right. With financial costs falling increasingly on the shoulders of households and businesses, water services have predominantly been financed as a commodity.

Water affordability for utilities and households:

- There are two types of affordability: (1) household affordability – the ability for households to afford water services, and (2) utility affordability – the ability for a community to afford their utility.
- Financially strained utilities must make trade-offs between their three primary financial goals: (1) ensuring water is affordable for households (household affordability), (2) ensuring their fiscal health to continue operating reliably (utility affordability), and (3) investing in infrastructure to ensure they meet regulatory requirements and provide safe water.
- Unfunded regulatory requirements contribute to trade-offs, and trade-offs can result in public health crises that erode trust and further undermine affordability.

How can local, state, and federal governments work together to ensure affordability:

- Federal governments set regulatory standards for water treatment nationwide. They traditionally provided funds to subsidize building infrastructure and consequently ensure utility affordability. While regulatory requirements have remained, financial support has diminished. Households and businesses do not have enough money to finance existing infrastructure, let alone rebuild it. The federal government should provide the necessary financial resources and/or offer increased flexibility

so utilities can meet regulatory requirements apart from specific treatment technologies. There is also growing support for a federal water assistance program to support household affordability.

- State governments shape equity and affordability with how they implement federal regulations, set policies for, and engage with local utilities. To ensure household affordability, states could update policies and legislations that are barriers to local governments setting rates or financing customer assistance programs. To ensure utility affordability, states could adjust State Revolving Fund allocations to be more equitable and so that they might be used for human and technological purposes. States could provide financial incentives to regionalize physical or human capital and work with utilities to holistically address water quality problems.
- Local governments are the gateway for household affordability. The most direct ways that utilities can address affordability challenges are by (1) implementing income-based or variable rate structures and/or (2) creating customer assistance programs. Customer assistance programs often have limited success because utilities often do not have direct access to low-income households (e.g., multi-family housing units typically have a single meter), state policies make it difficult to finance, or the system lacks the resources to develop a program. Utilities with customer assistance programs often partner with local organizations that are already working with families struggling with poverty. Local utilities would be the ideal administrators of a federal water assistance program.

A future federal water assistance program:

- The federal government has a long history of providing subsidies that offset the costs of essential services such as food, heating, health insurance, and housing so that families in need can save resources to further their own economic growth.
- Federal programs for energy, food, and taxes were explored to identify the strengths and weaknesses of these programs and create a blueprint for a federal water assistance program. A federal water assistance program should:
    - Develop an entitlement program that allows program funding to grow and shrink with need, rather than seeking annual allocations from Congress.
    - Streamline eligibility to reduce application costs for families to apply for water assistance by making households automatically eligible if they are already participating in another low-income federal assistance program. This streamlining and coordination will be incredibly important for water since many water providers do not have individual meters for multi-family homes and struggle to reach those eligible for customer assistance programs.
    - Ensure the benefits from the program exceed application costs.
    - Design and implement the program to address inequities, such as the disproportionate number of shut-offs impacting households and communities of color.
    - Develop partnerships with local nonprofit organizations that help families struggling with poverty. There is an immense opportunity for a federal water assistance program to collaborate with already existing federal programs and partners.
    - Allow flexibility spending so funds can be used to better address the inability to pay bills, meet community needs, and prevent high bills, which are often a comorbidity with old homes and leaking toilets or pipes.
    - Provide clear, consistent communication to create buy-in and reduce stigma.

Rethinking water services

- Compounding problems and challenges, ranging from acute crises (such as infrastructure failures, floods, and water contamination) to long-term sustained pressure (such as climate change, emerging contaminants, and aging infrastructure) are outpacing advancements in technologies, policies, and partnerships for water.
- The water community must rethink its provision of services so that it can get ahead of these challenges. The electricity grid went through a data revolution that transformed how they manage energy. The water sector needs a similar transformation. One idea is for a new water grid to allow utilities to use decentralized treatment technology. Decentralized treatment would be more affordable for small utilities but would present data and administrative challenges to ensure water remains safe.

Advancing water priorities with a new administration:

- The Biden-Harris administration will start in 2021 with a focus on four priority areas: the COVID-19 pandemic, economic recovery, racial equity, and climate change. The water community must consider how to position water within the new administration's priorities.
- **COVID-19 pandemic:** Many utilities established shut-off moratoria in the pandemic despite increased delinquencies, both of which have a negative impact on utility revenues and financing. Future COVID-19 relief packages must include grants earmarked directly for water and wastewater utilities, and not just for local governments. Any relief package must provide guidance on how to distribute money to ensure it reaches the utilities that need it most. Many under-resourced and marginalized communities will need assistance to apply for stimulus money. The federal government could establish water as a human right, which would create common grounds for prioritizing water accessibility and affordability among state and local governments. If there is a human right to water, then water becomes a high priority. If water is considered a public good, like roads, for example, then it might be paid for as part of the tax base, rather than as a commodity, like a bottle of water).
- **Economic Recovery:** The pandemic has elevated national awareness of water's importance to public health. Widespread unemployment, stagnating income, and rising rates have made it impossible for some homes to afford water services. Shut-offs from nonpayment have cascading consequences with children removed from families, large fines, and loss of homes. This elevated awareness may present a window of opportunity to generate bipartisan support for a federal water assistance program. The federal government also needs to help modernize the water grid. Ratepayers do not have the funds necessary to cover projected infrastructure costs. The costs of a modern water grid could be less expensive if it was rebuilt differently. Envisioning a new water grid requires identifying what does and does not work with the current system. This will need to include revisiting plumbing codes, fire suppression systems, and centralized treatment technologies. The water sector must take this opportunity to shift the water paradigm before spending trillions of dollars to rebuild a water grid that struggles to meet the needs of the 21st century.
- **Racial Equity:** In many instances, systemic racism has been a driving force for water insecurity in communities of color. Any proposed infrastructure packages should be earmarked for utilities and consist primarily of grants that will improve infrastructure in historically underserved areas. These packages should include guidelines that ensure underserved areas can access and use funds. New policies must also address the legacy impact of communities historically excluded from receiving

support. Special attention needs to be given to Tribes that are prohibited from financing utilities through fees and yet do not receive adequate financial support to build and maintain water infrastructure. Tribes and minorities must have a seat at the table to help craft solutions. Ensuring that the people living with the problem day-to-day are included and find value in the solution will ensure that the problem is well-defined, affordable, and can be sustained in the long-term.

- **Climate Change:** The intersection of climate change, water shortages, and water contamination have resulted in numerous conflicts and high-profile lawsuits between states sharing river basins and aquifers. There is growing bipartisan support for federal involvement to ensure domestic water security through infrastructure investments, technology development, conservation management, inter-agency collaborations, and policy changes. Support has only grown as the pandemic has further revealed the implications of limited to no water access and the critical importance of proper sanitation for communities, especially tribes and communities of color.

WATER EQUITY: AN ASPIRATION AND A LEGACY

Water equity, as defined by the U.S. Water Alliance, is present when *all* communities:

(1) have access to safe, clean, affordable drinking water and wastewater services;
(2) are resilient in the face of floods, drought, and other climate risks;
(3) have a role in decision-making processes related to water management in their communities;
(4) share in the economic, social, and environmental benefits of water systems.[1]

Water equity is difficult to achieve for many reasons. First, the costs to access and treat water depend on the availability, distance, and quality of water. Two communities with identical demographic and economic characteristics may have very different costs to access and treat water to safe standards. Similarly, the risks to floods, droughts, and sea-level rise are geographically dependent. Those that can least afford to be resilient to, and recover from, disasters are often placed in high-risk areas. The warming climate is changing the patterns of water in certain landscapes and creating higher risks in new areas.

A second challenge is righting the legacy of policies and decisions made by the majority in power that have kept communities of color in the margins. These policies, or at least their implementation, have limited some individuals, neighborhoods, and communities from having a voice in water management or from benefiting from their water systems. Some communities were denied connections to nearby water systems while other communities were located others in areas vulnerable to climate risks. Let us trace a legacy of policy choices that have embedded inequities within water infrastructure.

Tracing water inequity through our water infrastructure[2]

Housing policies have contributed to racial inequity in water systems

Market incentives and local entrepreneurs characterized the Industrial Era, encouraging a focus on maximizing economic development, often at the expense of entire social and ethnic groups and environmental health.[3] Cities were born as industrialization demanded infrastructure increases to house laborers, create energy, and supply water and sanitation. Private companies could afford to build water infrastructure when cities could not, even though the health of a city was "*intimately connected"* to water services and *"municipal authorities should rank this among the most important of their public duties*…".[4] Once local governments could take on funded debt through municipal bonds, there was a trend towards public ownership of waterworks with most systems publicly owned by 1910. At this point, the major cities had established water and sewer systems serving their entire cities. Housing was not as segregated in 1910, and the risk of epidemics spread by water-borne diseases, such as cholera, was so great that a city had to provide services to *all*

[1] US Water Alliance. 2017. An Equitable Water Future: A national briefing paper.
[2] Patterson & Doyle. 2020. Water Affordability and Equity Briefing Document.
[3] Collin & Collin. 1994. Where did all the blue skies go? Sustainability and Equity: The New Paradigm. *J. Env. Law and Litigation. 9*: 399 – 460.
[4] Montag. 2019. Water/Color: A study of Race and the Water Affordability Crisis in America's Cities.

customers, regardless of race.[5] Early water and sanitation systems nearly eradicated these diseases, improving the public health and economic outcomes of cities.

Segregation in water systems occurred after federal housing policies promoted physical segregation. Rapid population growth in the 1920s led to a National Mortgage Crisis in the 1930s. In 1934, the Federal Housing Administration (FHA) was created to respond to the crisis. From 1934 to 1968, FHA policies and practices created segregated communities. For example, the FHA guaranteed the loans of white Americans, making homeownership possible, while explicitly refusing to guarantee loans to African Americans or areas with high African American populations.[6] The systematic denial of various services to residents of specific, often racially determined, communities is "redlining" (Figure 2). Local policies and practices promoted the use of racially restrictive covenants in deeds to prevent the sale of homes to African American families, while private real estate agents used "blockbusting" to convince white families to flee communities with growing African American populations at a premium and then resold those homes to African American families at inflated prices.[7]

"White flight" to suburbs occurred as the African American populations concentrated in cities became poorer due to redlining policies that kept wealth outside their boundaries.[8] The ensuing disparity continues today. Incomes within African American communities are on average 61% of their white counterparts and their wealth is only 5% of their counterpart white wealth.[9] Most middle-class families gained their wealth from home equity, homes they were able to purchase through FHA policies decades earlier. African American families had no way to accrue this same wealth because they were prohibited from buying homes, buying homes with good interest rates, or buying homes in desirable locations. While the 1968 FHA technically allowed African Americans to buy homes anywhere, many homes remained unaffordable to those who lacked wealth (even if they had comparable incomes to their white peers).

Racial segregation at the scale of neighborhoods and census tracts had implications for the development of water and wastewater utilities after World War II. As residential segregation increased, municipalities could more easily exclude communities of color from water and sewer services through a practice known as "under-bounding," whereby municipalities selectively annexed white neighborhoods into the town's official boundaries while ignoring African American neighborhoods.[10] For instance, Zanesville, OH did not construct municipal water lines in African American neighbors in the 1950s; Roanoke, VA did not extend water and sanitation lines to the nearby predominantly African American town of Hollins; and in Central Valley, CA rural Latinx communities were discouraged from incorporating and did not receive infrastructure funds available to neighboring towns.[11] A 2018 study examined the relationships between race, access to water, and sewer services in areas bordering 75 municipalities in North Carolina. They found the two most unserved groups were: (1) low-income African American populations excluded from municipal services and (2) higher-income white populations who could afford well and septic systems.[12] Cities could choose where to provide services since areas affected by water-borne diseases from poor sanitation would be concentrated within

[5] Troesken, W. 2004. Water, Race, and Disease. MIT Press. 288 pp.
[6] Madrigal, A.C. 2014. The racist housing policy that made your neighborhood. *The Atlantic*.
[7] Montag. 2019. Water/Color: A study of Race and the Water Affordability Crisis in America's Cities.
[8] Ibid.
[9] Economic Policy Institute. 2010. State of Working American: African Americans.
[10] Montag. 2019. Water/Color: A study of race & the water affordability crisis in America's cities.
[11] DigDeep & U.S. Water Alliance. 2019. Closing the water access gap in the United States.
[12] Leker, H. & J. Gibson. 2018. Relationship between race and community water and sewer service in North Carolina.

certain communities. Additionally, rich suburbs could afford to build their own water systems, removing wealth from the nearby city-system. Many of these smaller, suburban systems were built quickly and require rebuilding when consolidated.[13]

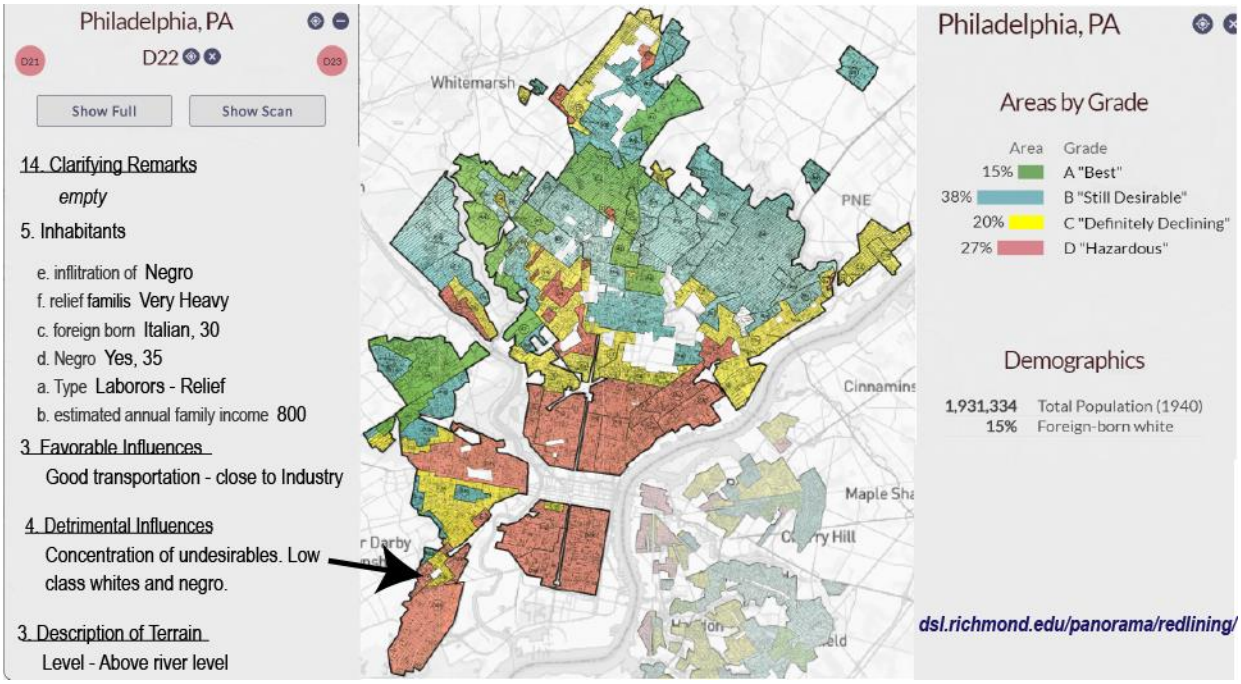

Figure 2. Home Owner's Loan Corporation assigned grades to communities that reflected their mortgage security. Residents in red (redlining) zones were ineligible for government-insured loans. Comments often reflect racial reasons as shown for D22 above.[14]

Federal regulations protect public health and make water infrastructure prohibitively expensive

Federal and state governments have continuously negotiated roles and responsibilities in overseeing water resources. While states took early responsibility for water rights, many did not take the lead on ensuring water quality. Public health and environmental consequences from poor water quality led to federal oversight with the passing of the Clean Water Act (CWA; 1972) and the Safe Drinking Water Act (SDWA; 1974).[15] The CWA protects the quality of surface waters by regulating pollutant discharges and the SDWA protects public health by setting and enforcing standards for drinking water quality. Both acts required utilities to use specific, expensive centralized technologies to ensure adequate treatment. As such, both acts included significant

[13] AWWA. 2001. Dawn of the Replacement Era: Reinvesting in Drinking Water Infrastructure.
[14] Interactive maps are available here: http://dsl.richmond.edu/panorama/#maps
[15] Aspen-Nicholas Forum Report. 2019. Ensuring Water Quality.

federal funding through grants to finance the infrastructure needed for local governments to meet these new regulations.

In the 1980s and 1990s, the federal government shifted from grants to loan programs administered by states. Since the 1990s, federal funding has declined, and state governments have not been able to fill the funding gap. Local governments, and by extension, their customers are increasingly shouldering the financial burden to pay for operations and maintenance, as well as replace or build new infrastructure that complies with regulations. Additionally, federal and state allocation policies can inhibit those dollars from reaching the communities most in need. For example, The American Recovery and Reinvestment Act of 2009 earmarked money for "high priority" projects that were "shovel ready", criteria that are out of reach for most under-served communities.[16] While the federal government allows states to use up to 30% of capitalization grants to provide loan subsidies for low-income communities, only a fraction do so.[17] Tribal communities, rural regions, and low-income areas—especially if they are communities of color—have the added burden of not having their initial infrastructure subsidized, have more difficultly accessing low-interest capital, and have a reduced capacity to recover costs.

Chronic discriminatory practices have brought us to a place of unequal access and unaffordable services

There are communities across the U.S. that still do not have access to drinking water or wastewater services because of the intersecting forces of structural racism, poverty, and inequitable access to subsidies. For example, an estimated 30-40% of the Navajo Nation does not have access to drinking water within their homes. The lack of access to running water, a necessity during a pandemic to disinfect and clean surfaces, contributed to the high infection rates per capita in the Navajo nation compared to other states.

Historically, policies designed to provide funding and support to water and wastewater utilities either did not have inclusive language for rural communities or the designed solutions were unaffordable to those communities (Box: Wastewater in Lowndes County, AL). While the federal government has subsidized capital infrastructure in many communities, long-term operation and maintenance rely on fees paid by customers. The cost of maintaining specific treatment technologies is greater than a small community can afford because they cannot attain economies of scale to cover the fixed price of accepted, centralized technologies (Figure 3). Disparities between utilities grow as local governments become increasingly responsible for financing water systems because the financial health of these systems is more and more reliant on the financial health of mobile populations and businesses.

[16] Balazs, C. and I. Ray. 2014. The Drinking Water Disparities Framework: On the Origins and Persistence of Inequities in Exposure. *American Journal of Public Health* 2014: 603-611.
[17] Vanderwarker. A. 2012. Chapter 3: Water and Environmental Justice in A Twenty-First Century Water Policy.

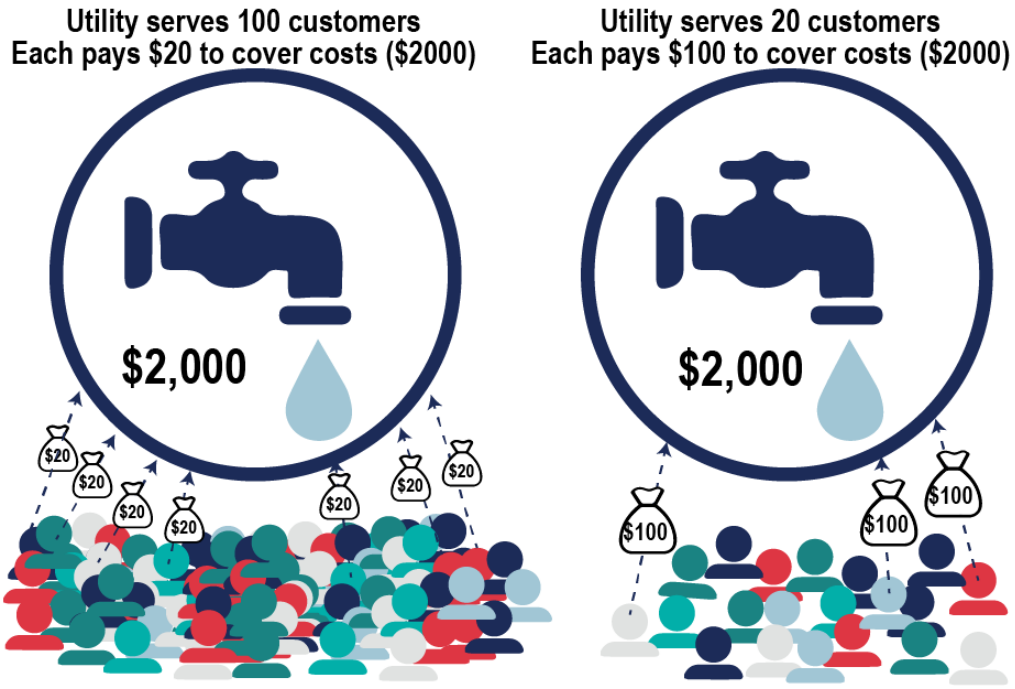

Figure 3. It is easier for large communities (left) to afford their utility (e.g. 100 people paying $20 each) than it is for small communities (right) to afford their utility (e.g. 20 people paying $100).

Wastewater in Lowndes County, AL

Many African American communities in Lowndes County, AL do not have access to centralized wastewater services and must instead rely on individual septic systems. The soil and high water tables in many parts of the county make it expensive, or impossible, to use septic systems. Septic systems cost ~$28,000, which is more than the median annual household income in the county. Individual septic systems are not a financially viable solution. Widespread poverty in a community has big implications for access to water and sanitation and may preclude their ability to operate and maintain a centralized wastewater system.

The unspoken shift to financing water as a commodity

There is a long-standing debate around whether water is a public good or a commodity, and consequently whether all people in a community should be guaranteed access to water or if they must buy access. Water behaves as both a public good and a commodity. Water is a public good because it is essential for life and economic prosperity. Water is a commodity because it can be finite, excludable, and dispersed geographically. Large-scale water infrastructure (e.g., dams and levees) provide public goods such as navigation, flood protection, water supply, and recreation. The benefits from large-scale infrastructure are non-excludable, meaning the population writ large benefits (e.g. everyone downstream of a dam benefits from flood protection). Because of these broadly distributed benefits, the federal government often subsidizes this infrastructure.

In contrast, the beneficiaries of drinking water and sanitation infrastructure are constrained at the scale of a city, county, or community. Only houses connected to the system receive benefits and as such, others can be excluded from these benefits. The beneficiaries (customers) fund drinking water and wastewater infrastructure based on the services provided. Since benefits and funding are localized, the geographic, demographic, and economic differences create disparities in cost and affordability. Here, water services are a "local public good" because they are provided to the community often by public utilities (public good) but are funded through direct payment from customers (commodity). Households or individuals without access to public systems rely on bottled water (solely a commodity), private wells, and septic systems (Figure 4). Water as a commodity is very expensive. As customers move towards paying the full cost of water services through their utility, water is financed more like a commodity.

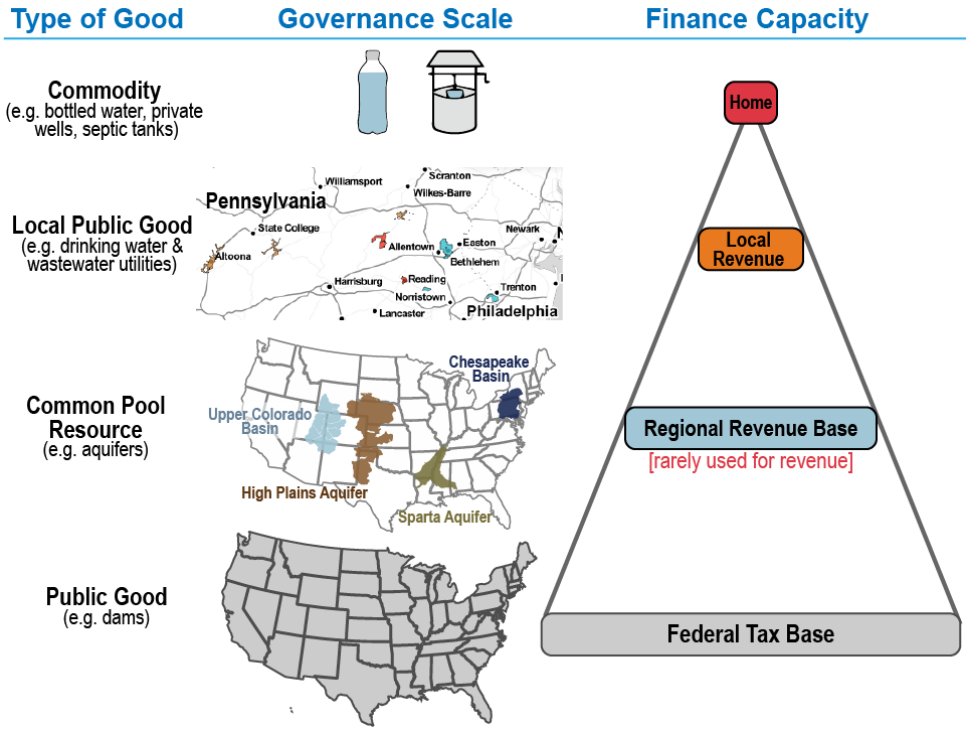

Figure 4. The scale of governance and financial capacity influences where water falls on the spectrum between public good and commodity.

The "right" to access water also has financial implications. Water as a right is familiar to those in the western U.S. where water is akin to a property right through the doctrine of prior appropriation. Water as a human right is becoming a popular perspective, particularly in the pandemic. In 2010, the United Nations formally recognized that access to safe and clean drinking water and sanitation is a human right essential for the full enjoyment of life and all human rights.[18] In the U.S., water is a "constitutive commitment", which describes

[18] UN. 2010. The human right to water and sanitation. https://undocs.org/A/RES/64/292

statutory rights that are held as constitutional rights.[19] To date, California (a western state) is the only state that has formalized the human right to water (AB 685).[20]

WATER AFFORDABILITY FOR UTILITIES AND HOUSEHOLDS

In 1977, the federal government funding 63% of capital expenditures. Today local governments fund more than 90% of water infrastructure. In the future, the estimated costs to replace water infrastructure range from $655 billion in the next 20 years to $1 trillion in the next 25 years. For local utilities to cover future costs, household bills would need to triple in some communities, while a 2018 AWWA survey found only 21% of utilities believed they could cover the full cost of services from their customers. Many utilities cannot raise enough money to invest in the infrastructure needed to meet regulatory mandates while maintaining affordable rates for their citizens. Citizen incomes have largely stagnated in the past few decades, making it hard for households to afford services as rates rise.

Water rates have increased faster than inflation in many areas for reasons beyond infrastructure. For some utilities, politicians deferred rate increases for years because they are unpopular with voters. Then, when the need becomes so great that politicians have no choice but to raise rates, rates often increase by a significant amount. For example, one utility increased volumetric rates by 286% from a low $1.52 per 100 CCF in 2006 (rate increases had been deferred for many years) to $5.86 in 2020. Utilities that communicate rate increases and raise rates by incremental amounts each year often receive less backlash from the community. Utilities may increase rates in response to new expenses arising from climate change impacts, such as sea-level rise and increased flooding. Other utilities may increase rates due to consent decrees or increased regulations due to water quality challenges, such as meeting the Chesapeake Total Maximum Daily Loads.

The financial health of utilities is tied to the number of customers and their financial health. As such, there are two types of affordability that must be considered: (1) **household affordability**, or the ability for households to afford water services, and (2) **utility affordability**, or the ability for the community to collectively afford their utility.

Balancing utility affordability with household affordability

Utilities have three primary financial goals: (1) ensure water is affordable for households (household affordability), (2) ensure their fiscal health to continue operating reliably (utility affordability), and (3) invest in infrastructure to ensure they meet regulatory requirements and provide safe water. Financially strained systems must make trade-offs between these three goals (Figure 5) because they cannot afford to meet all three goals.

[19] Murthy, S. 2016. A new constitutive commitment to water. *Boston College Journal of Law and Social Justice* 36 (2): 159-233.
[20] AB 685. 2012. The Human Right to Water.

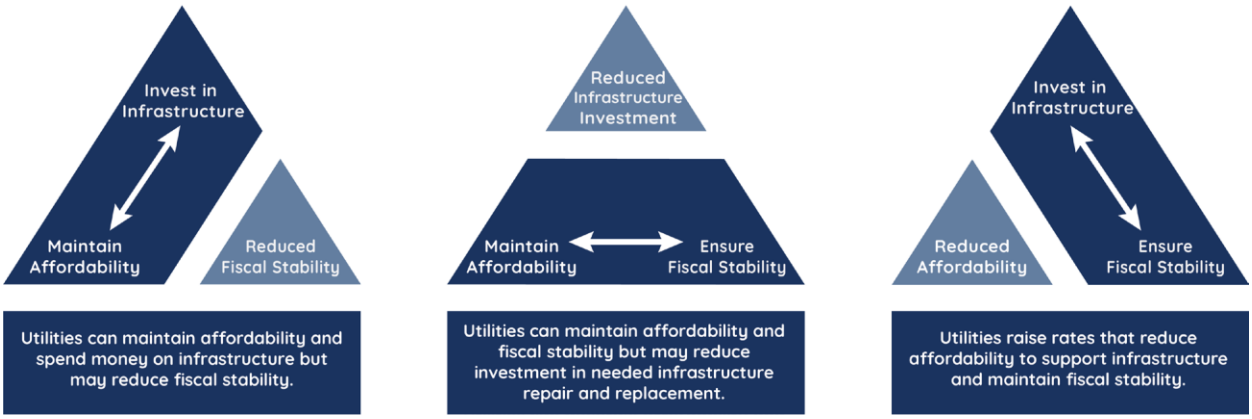

Figure 5. Economic trilemma for water service providers.[21]

Tradeoffs and deferred investments save money now but cost more later. The tradeoffs that Flint, MI made when they transitioned to a new water source because the current source was no longer affordable serves as a pertinent example. Numerous tradeoffs were made to lower transition costs that contributed to the Flint lead crisis. The crisis further eroded household affordability as customers no longer trusted the Flint utility and now pay for both water services and bottled water. Utility affordability suffered for the Flint utility, and utilities across Michigan, as the State implemented new monitoring and reporting requirements, perhaps in part, as a means of regaining trust. New testing revealed the extent of lead contamination in utilities across the state due to lead service lines, resulting in new regulations to replace all lead service lines over the next 20 years. Michigan is attempting to create funding opportunities to help cover additional expenses because when regulations exist without funding, tradeoffs are inevitable which could result in negative public health impacts. If treatment infrastructure is the most expensive component for utilities, then it may be time to rethink water infrastructure and create regulations that encourage more flexible, low-cost solutions. The science and technology exist today to allow systems to safely treat water without relying on the traditional, centralized infrastructure. Smaller, decentralized treatment technologies could dramatically improve the ability of communities to afford their utility.

Utilities are in a difficult position as they balance their financial health with the financial well-being of their customers. When utilities raise their rates, low-income households have less money available to pay for food, shelter, energy, health, and so on. Low-income customers are forced to make tradeoffs on which bill to pay based on their most pressing needs. Once a customer cannot pay their water bill, not only is water shut-off, but the customer is charged with extra fees. This compounding debt creates a deepening hole for people struggling with poverty. Yet, many utilities believe shut-offs and fines are needed to recover costs because it would be inequitable to pass those costs onto paying customers.

[21] Doyle et al. 2020. Growing options for shrinking cities. AWWA.

HOW CAN LOCAL, STATE, AND FEDERAL GOVERNMENTS WORK TOGETHER TO REACH AFFORDABILITY?

Federalism is a continual conversation between federal and state governments around roles and responsibilities in governing society. Similarly, state and local governments are continuously negotiating roles and responsibilities. Over the past 30 years the financing, roles, and responsibilities have increasingly been deferred from federal to state to local governments.

Below, we explore the historic role of federal, state, and local governments to finance water systems, as well as their potential role to address affordability and equity today. The ideal role for local governments is to attend to household affordability through rate structures and customer assistance programs. The ideal role for states is to incentivize and enable practices that help with local utility affordability. This means altering policies that inhibit income-based rates or recovering costs in customer assistance programs. It also means streamlining the application process to State Revolving Funds from the federal government and ensuring funds are allocated equitably. The federal government is the only agency with sufficient funds to cover the replacement costs of water infrastructure.

Additionally, the pandemic has highlighted the need for a federal safety net for household water affordability. Local organizations are best equipped to implement a federal water assistance program because they know their individual customers and their needs. Utilities may partner with local organizations addressing poverty issues by collectively ensuring households have access to education, electricity, food, and water through federal programs. A unified approach is logical given a household struggling with poverty would benefit from all federally subsidized programs. A federal household water affordability program would also help with utility affordability. Utilities lose money when there are non-payments, which is of particular concern in the ongoing pandemic resulting in widespread unemployment and increased non-payments; in such cases, utilities cannot afford to subsidize household bills. A federal household affordability program would need to address different types of water use, geographies, and the limited data local utilities and states have regarding their customers (Box: A Steep Learning Curve).

A Steep Learning Curve

Many states are on a steep learning curve about their utilities. Michigan, like many states, issued executive orders to end shut-offs and reconnect residents to water services at the start of the pandemic. The state required utilities to submit monthly reports documenting progress. Other states have required similar data collection, such as arrearages in North Carolina. This is the first time many of these data have been collected. States are learning how little they know about their utilities and utilities are learning how little they know about their customers as they attempt to provide financial relief. Many states were surprised by how many of their residents live without access to water. In Michigan, state officials learned about different strategies utilities implement to deal with nonpayment, such as shut-offs or adding nonpayment to property taxes. When Michigan applied $20 million of its CARES Act funds to forgive arrearages of water customers, an immense effort was undertaken to merge state and local databases to find customers. Similar data challenges will need to be addressed to implement a federally subsidized household water affordability program.

Federal government

The federal government has been responsible for setting regulations and subsidizing infrastructure. The Environmental Protection Agency (EPA) is responsible for ensuring local water systems are in regulatory compliance. EPA is also responsible for administering the State Revolving Funds (SRF) established in the CWA and SDWA. SRFs are the key mechanism by which the federal government has subsidized primarily urban water and wastewater infrastructure over the past 30 years. The US Department of Agriculture (USDA) Rural Utilities Service Water and Environmental Programs is the primary federal program meeting the financial and technical needs of rural communities (10,000 people or less) to develop water and wastewater services. The USDA works hard to cultivate relationships with local governments and communities through hundreds of field offices. These long-term relationships are essential to ensure local, state, and federal governments are developing solutions that will meet community needs. Building and maintaining those relationships is essential to ensure tailored solutions have long-term sustainability and benefits.

The federal government continues to provide funds, although the amount provided has decreased over time and converted from grants to loans. The eligibility and ability to access those funds remain inequitable. The needs of some communities are not eligible for funding, or the community cannot afford the time and resources for the application, or it takes months or years for funds to reach a community in crisis. There needs to be a fundamental restructuring to move from legacy procedural approaches to a more agile outcomes-based future. The federal government must take a leading role. Currently, even motivated federal agencies with strong support can take months to coordinate funding sources and resources and collaborate on a problem. Often state and local officials do not have the luxury to wait. While coordination is critical to good governance, it is often the least utilized. In this administration, the federal government has made a greater effort to create sustained interagency collaboration to streamline regulations and funding procedures.

State governments

States play a key role as intermediaries between federal and local governments. How they implement federal regulations, administer financial programs, and work with local utilities can result in very different equity and affordability outcomes.

The state role in household affordability

State policies can prohibit or enable the ability of local governments to subsidize low rates for basic water usage. For example, some states have policy requirements that do not allow utilities to charge differential rates, such as Proposition 218 in California, or for high-income customers to subsidize low-income customer bills. State policies can also help local utilities address household affordability by earmarking money explicitly for affordability. For example, Michigan is in the process of launching a grant program for communities that are seeking to do water affordability planning or explore innovative rate structures. Perhaps the most significant role for states in household affordability is to (1) update policies and legislations that are barriers to local governments setting rates or financing CAPs, and (2) provide financial incentives for communities to implement policies that would help ensure household affordability, such as increasing block rates or consolidating systems.

The state role in utility affordability

States have primarily addressed utility affordability through SRFs. States have the authority to create regulations and policies to support and incentivize actions that can lead to better financial sustainability. Some states integrate regional planning with financial incentives. For example, the Texas Water Development Board (TWDB) is responsible for securing the state's future water supply and manages the SRF's as a mechanism for integrating financing and planning. Now, most of the money available for economically distressed systems are tailored to projects that consolidate small, struggling systems into nearby larger systems.

Regionalization is an approach some states have taken when a community can no longer afford its water system. For example, California manages over 3,000 systems, of which 300 systems lack the capacity to meet water quality standards, resulting in more than 1 million citizens without access to safe drinking water. California recently passed new legislation aimed at incentivizing small systems to consolidate to reach affordable economies of scale. Their legislation followed Kentucky's SB 409 passed in 2000, which used structural incentives and regional planning to successfully consolidate small systems throughout the state. Even though regionalization can help small systems become affordable, many do not want to consolidate because of distinctive cultures, politics, and so on. It is important to recognize those dynamics and acknowledge incentives. For example, Texas provides financial incentives through low-cost financing that is available for regionalization projects through their State Water Implementation Fund (SWIFT). California encourages large systems to consolidate with failing systems by providing funding to address the inherited problems of the failing system. States can mandate consolidation, and while an unpopular practice, the occasional use of mandatory consolidation can lead to more voluntary consolidations.

States may decide to use SRF money to meet the human capital needs of low-income systems. For example, the TWDB used SRF money to seed a CFO-to-go program that contracts a Chief Financial Officer (CFO) to work with struggling systems on accounting and financial management strategies. They also have launched an asset management program to contract engineers to assess systems, set best management practices, and develop capital improvement plans. Texas is subsidizing human capital to help local utilities plan and implement strategies at lower costs. The ability to provide or consolidate human capital can be particularly important to lower costs for remote systems that cannot physically consolidate.[22]

States may need to revisit policies to allow SRFs to allocated to provide human capital to utilities. States may also rethink how they approach regulatory compliance. For example, New Mexico is working with communities to diagnose water quality problems and design affordable solutions. This is different from the traditional approach of referring communities to engineering firms that profit from designing complicated and expensive solutions that are beyond the communities' capacity to afford. This new approach will ideally create long-term sustainable and affordable solutions for its communities.

[22] Aspen-Nicholas Forum. 2018. Reaching Watershed Scale Through Cooperation and Integration

Local governments

Local water managers are effectively the mayors of our nation's water system. They are most attuned to, and responsible for addressing, emerging issues and external shocks on their community. Local water managers face extraordinary challenges as they simultaneously balance providing affordable and equitable water services with their budgets while navigating political and legal restraints.

Utilities must recover costs, but rate increases harm low-income customers. Customers that cannot pay their bills are in crisis or struggling with poverty and face multiple financial challenges. The most direct way for utilities to address affordability is by (1) implementing income-based or variable rate structures and (2) creating customer assistance programs (CAPs). Many utilities, however, find it challenging to implement income-based rate structures, raise funds for a customer assistance program, proactively locate low-income customers, and get widespread participation in customer assistance programs. Only 30% of local drinking water systems provide some type of CAP, and many of these CAPS **struggle to raise money for the program and reach their target customers**.

Implementing income-based rate structures and raising money for customer assistance programs

Local governments are constrained in their ability to develop income-based rate structures or raise funds for customer assistance programs by local and state policies (Figure 6). These policies were designed to protect customers by prohibiting different rates within a similar customer class; unfortunately, the unintended consequence has prevented utilities from subsidizing low-income customers. Many states have ambiguous legislation (Figure 6), but few utilities are pushing the interpretation of these laws by implementing income-based rate structures. For those systems without additional legislative prohibitions, the political will to pass income-based rates is lacking because it may bring litigation and the risk of losing the next election.

Utilities with boards appointed by state governors or privately-owned utilities may find it easier to try income-based rates. A federal safety net program may be necessary for those utilities who are legally unable to set variable rates or income-based rates. Small utilities are also less likely to be able to implement a CAP program (See Great Lakes Water Authority CAP).

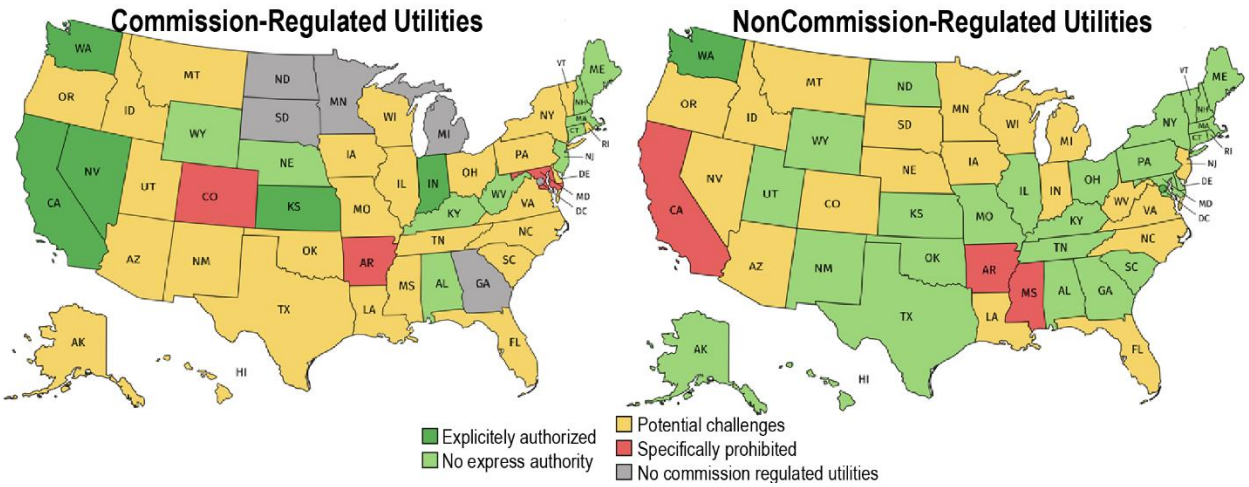

Figure 6. State regulations around creating rate-funded customer assistance programs. Source: Environmental Finance Center at Chapel Hill, NC (https://efc.sog.unc.edu/project/navigating-legal-pathways-rate-funded-customer-assistance-programs).

Great Lakes Water Authority CAP

The Great Lakes Water Authority (GLWA) serves nearly 4 million residents across eight counties. The GLWA created a sustainable funding source dedicated to providing water assistance to households by committing 0.5% of their annual revenues to a CAP. GLWA allows for universal qualification and streamlined eligibility requirements. One of the challenges has been that agencies working to address poverty are city or county-based and since GLWA serves over eight counties, it required partnerships with multiple agencies of varying capacities. GLWA made it optional for their utilities to participate in the CAP and found that smaller utilities did not have the capacity to administer the program. Another challenge is that GWLA cannot repair rental properties with leaky toilets, which often create the highest bills. A single integrated federal program to address basic needs could help streamline bureaucracy and allow a more direct service model.

It is difficult to find low-income customers and get high participation in CAPs

CAP's can target low-income individuals, senior citizens, or those with disabilities. Utilities have difficulty finding target communities because they do not have data about individual households. Most water utilities only relate to households through billing and have data on the name, address, amount of water used, and maybe a credit card for payment. Most low-income households rent properties or reside in multi-family homes that do not receive individual bills. The utility does not know who lives there and cannot communicate directly. Nor are utilities in the business of income qualification or poverty alleviation. Utilities often partner with organizations that work directly with low-income communities. For example, DC Water partnered with the federal Low Income Home Energy Assistance Program (LIHEAP) to automatically enroll households supported by LIHEAP into the DC Water CAP. LIHEAP can target customers because many multi-family buildings are sub-metered for energy (but not water).

In 2018, DC Water attempted to expand its affordability program to include another 14,000 households. DC Water used social media, marketed in low-income areas, and promoted the program through churches, non-profits, and other organizations. As of 2020, there are only 575 participating households. It is unclear if they overestimated the number of eligible households, if the message failed to reach households, or if the discount was not high enough to compensate for the costs of applying. While DC Water wants to provide financial assistance to low-income customers, they do not have the data to offer targeted assistance. This experience is true of most water utilities.

Even when a utility can target customers, participation in CAPs remains eerily low. For example, the Hampton Roads Sanitary District (HRSD) worked with United Way to create multiple services to assist customers that were close to experiencing a second shut-off in a 12-month period. The customer had three options: (1) do nothing and have water shut-off, (2) connect with United Way, or (3) pay their bill. HRSD believed the target audience would be motivated to participate in the program but found that less than 10% of 3,000 households participated and only 40 households completed the program to receive the full benefits, including forgiveness of past dues. HRSD spent over $120,000 with United Way, dismissed $40,000 in customer debt, and only helped 40 households. HRSD, like DC Water, is committed to understanding why participation in their CAP is low and find ways to assist low-income customers.

What can local governments do to improve household affordability?

Local governments know their communities. There are many facets to community health, as local leaders must work to ensure affordable housing, transportation, childcare, and other services on top of providing water/wastewater. Healthy households make healthy communities. However, the needs facing local governments simply cannot be met without support from partners, including federal and state governments, NGOs, and businesses. Good public policy happens when all partners are involved to create requirements and contribute funding.

Partnerships with NGOs and businesses can help local governments advocate for their needs and address poverty holistically in the community. These partners can advocate state and federal representatives on behalf of water utilities. Partnerships are key to bringing new ideas and resources to the table. Communication between utilities about what has or has not worked with their CAP programs is another way to learn and iterate towards more robust CAPs. Local governments need to become creative and "think outside the bill." CAPs can only be part of the solution, such as diversifying investments, optimizing operations, and so on. Partnerships also bring diversity. There is a lack of racial and economic diversity in the water community. Diversifying the workforces and communities participating in utility departments, engineering firms, and water associations is needed to truly address the problems of inequity and create the political will for true change, rather than addressing the symptoms.

A FUTURE FEDERAL WATER ASSISTANCE PROGRAM?

The federal government has a long history of providing subsidies that help offset the costs of essential services such as food, heating, health insurance, and housing to help those struggling with poverty. While

water and wastewater services are essential to the public health and well-being of people and communities, there is no federal assistance program for water. The responsibility for providing household assistance rests on local water and wastewater utilities, who must design and implement their own customer assistance programs within the constraints of local and state policies. A well-designed program created by one utility may not be directly transferable to another utility, creating immense upfront costs in designing, testing, and implementing such programs. Additionally, local utilities may not have the capacity to provide customer assistance.

The pandemic has created a window of opportunity to create a federal water assistance program for low-income households. Shut-off moratorium and reconnections have brought to public attention the large number of households that live without basic water services. We have seen the disproportionate impacts of lack of access to safe and affordable water services by communities of color. Diverse stakeholders—from equity advocates to water utilities—are calling for the creation of a water affordability program as part of any future federal COVID-19 relief and recovery packages.

What do current federal assistance programs look like for energy, food, and taxes?

We explored the federal assistance programs for energy, food, and taxes. Each year these programs provide billions to millions of households across the U.S., averaging ~$680 for energy to $3,100 for food per household in 2019 (Figure 7).

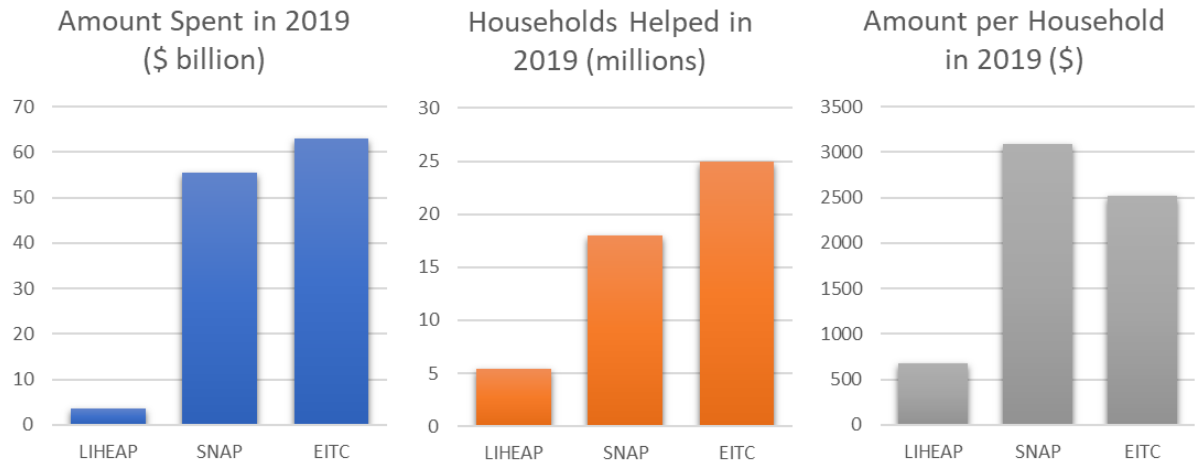

Figure 7. The amount spent (left), households helped (middle), and per household expenditure (right) of all three federal programs in 2019.

Low Income Home Energy Assistance Program

The Low Income Home Energy Assistance Program (LIHEAP) was created in 1981 to address concerns about the rising energy prices of the 1970s. The Department of Health and Human Services administers LIHEAP with funds appropriated annually by Congress. The appropriation of annual funds has made partnerships with non-profit organizations incredibly important as these organizations bring data and

personal stories to Congress to advocate for funding. Non-profits also play critical roles in advocating for additional funding from other sources, advocating for policy changes at state and federal levels, and implementing LIHEAP within communities.

LIHEAP is a block grant that the federal government provides to states and tribes, who have the flexibility to design programs that best meet the home energy needs of their communities. Funding could be used to weatherize homes to make them more energy-efficient, provide direct bill assistance, and/or provide home repairs. States often partner with local organizations to identify customers and administer the program within their communities.

Supplemental Nutrition Assistance Program

The USDA administers the Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program. The first food stamp program started during World War II to meet the immense need created by widespread unemployment during the war. In the 1960s, different parts of the country piloted food stamp programs, culminating in the federal Food Stamp Program in 1974. SNAP is an entitlement program, meaning the money available grows and shrinks with need. While SNAP is the bedrock of our nation's federal nutrition safety net, there are additional federal programs that support target groups such as senior citizens, children, schools, and emergency food banks.

Earned Income Tax Credit

The Earned Income Tax Credit (EITC) started in 1975 to provide tax credits for low-income working Americans. Eligible low-income workers receive refunds when they file for taxes, averaging $2,476 per household in 2019, which represents a significant amount of money for families with an annual income of $10,000 to $24,000. The benefit of tax refunds has shrunk in recent years as incomes have stagnated while costs continue to rise. However, EITC kept an estimated 5.6 million people above the poverty line in 2018. The program has a high usage rate, with 4 out of 5 people eligible for the program claiming their tax credit. Additionally, states can create their own tax credits to further assist families, as is true for 29 states, plus DC and Puerto Rico. EITC is similar to SNAP in that the program contracts and expands with need. However, in a recession, as during COVID-19, the EITC tax has reduced or no benefits to households that have lost their jobs because the size of the refund is based on earned income.

What are some of the most successful elements of these programs?

LIHEAP has done a tremendous job identifying low-income houses that have elderly members, disabilities, or illness (particularly if they require life-saving equipment reliant on energy), and children under six years old. These populations are the most vulnerable to energy disruptions or temperature extremes. Black households experience energy disconnections twice as much as other households and there is a significant need for LIHEAP to improve awareness around and access to its services for Black families. LIHEAP has also been successful in giving states the flexibility to administer programs tailored to their community and climate, allowing multiple approaches to lower energy usage and address the affordability of energy bills.

SNAP benefits from being a federally entitled program; meaning the program is nimble and has the funding to meet the current needs. One of the most important successes of SNAP is its ability to leverage and build a support network to holistically help families in poverty, as seen through the development of programs that

feed, protect, and help children before, during, and after school (Box: SNAP for School). Food is essential for life and is often a key component in building relationships, allowing SNAP to create unusual partnerships for the broader health and well-being of communities.

EITC has had tremendous success in reaching most eligible households and has done particularly well in reaching families of color. Research indicates families receiving tax credits are associated with better school performance, health, retirement security, and so on. There are significant benefits to keeping families above the poverty line.

SNAP for School

There has been a tremendous cultural shift around the provision of meals for children before and after school. Schools initially resisted providing extra meals outside school hours. Advocacy groups collected data that showed children who had breakfast performed better in school. As a result, schools piloted programs to offer breakfast before school started, but participation was low because of the stigma of poverty. Schools then offered breakfast after school started or provided breakfast to all students. These changes led to greater participation, improvements in grades, and fewer absences. The success of these programs resulted in additional after school snacks and supper programs that not only feed children, but also provide a safe, supervised environment, tutoring, SAT preparation, and so on. If you feed them, they will come.

What are some of the biggest failures of these programs?

LIHEAP was born out of public outrage to media coverage that revealed people dying in their homes from heat exposure and it is a failure of the system that people had to die before the government acted. Currently, the biggest failure are the immense costs inhibiting families from enrolling. A household in poverty is in crisis. Yet, families are required to provide a stack of paperwork to prove income, identity, number of people in their household, and so on. They must pay for copies of their birth certificates, pay a bus fare, or bring their sick kids with them. The cost of applying may exceed the benefit. LIHEAP is trying to reduce the cost and streamline the process by making households automatically eligible for LIHEAP (states must agree to this eligibility clause) if that household is part of SNAP. Many federal poverty programs want automatic eligibility to reduce administrative costs and lessen the burden on families.

SNAP offers a sub-therapeutic dosage to ease the symptoms of hunger without addressing the disease of food scarcity. The SNAP allotment is based on the food habits of the 1960s where families cooked from scratch, which is not the norm today. SNAP benefits must increase for households to purchase a nutritional diet, especially as grocery costs rise. Another challenge is that each federal nutritional program for children operates individually. A child fed before, during, and after school belongs to three separate programs, each with different rules and eligibility requirements. This bears a cost to the family as well as to the schools and communities offering these programs. Ideally, SNAP would provide seamless meal service and maximize dollars going to feeding kids rather than administrative fees.

EITC eligibility excludes immigrants, individuals without a social security number, or those who file taxes with individual tax numbers. This exclusion increases hardship for immigrants and disproportionately affects

communities of color. Currently, two state EITC programs have ended this exclusion for state credits and there is a desire for the federal program to follow suit.

What are the implications for a federal water assistance program?

Some components to consider in developing a federal water assistance program include:

Develop an entitlement program that allows the amount of money to grow and shrink with need, rather than seeking annual allocations from Congress.

Streamline eligibility to reduce the cost for families to apply for water assistance and include automatic eligibility if a household is already part of federal assistance programs. This feature may be incredibly important for water, given many water providers struggle to reach low-income households.

Ensure the benefits exceed the application costs in the short- and long-term.

Design and implement the program to address inequities. Similar to energy, water disconnections disproportionately affect households and communities of color. The program could prioritize those populations most vulnerable to disruptions in water services, particularly households with children.

Develop partnerships with local nonprofit organizations that help families struggling with poverty to implement the program. Water utilities do not need to implement assistance programs. For LIHEAP, nonprofits implement the assistance program on behalf of energy utilities. There is an immense opportunity for a federal water assistance program to work with already existing programs and partners. Indeed, unlikely partnerships that expand goals can lead to creative and holistic outcomes (Box: SNAP for school). Forming unusual alliances will draw support from city, state, and federal governments. One opportunity may be to partner with SNAP, which has an effort to include a glass of water on the MyPlate brochure alongside the glass of milk. Adding a glass of water to every child's placemat would be a great way to elevate the importance of water for children's health. This could be an especially powerful message in schools where students cannot drink from the fountains because the water is unsafe.

Give local governments flexibility in how funds are allocated. A federal water assistance program would benefit from having flexibility in deciding how funds are spent to best meet the needs of their communities to prevent high bills (often a comorbidity with old homes and leaking toilets or pipes) and address the inability to pay bills. States could pilot several implementations of a federal water assistance program to see which strategies are most effective. Simultaneous pilots could allow for rapid learning across the sector. There is also much to be learned from local CAPs.

Provide clear, consistent communication to create buy-in and reduce stigma. Advocacy for a federal water assistance program should be tailored towards both parties to develop bi-partisan support. The communication strategy should involve (1) a data story and (2) a personal story. For example, in one community outside of Pittsburgh, more than 80% of people in a town had their water shut-off and schools used mobile shower units so children could shower. Stories are powerful and can create passion in the public and Congress for change.

RETHINKING WATER SERVICES

Most of the legislature and discussion around affordability has centered on helping low-income urban households or small, struggling rural utilities. The big picture is that water infrastructure needs to be rebuilt and modernized and ratepayers do not have enough money to fund replacement costs. The shifting of the financial burden from federal to local governments was not sustainable before the pandemic and is certainly not sustainable post-pandemic as households and utilities recover from the recession.

The federal government is the obvious source of funding, especially since some costs are imposed by federal legislation that requires and incentivizes centralized tertiary water systems that are not affordable for smaller communities. The water sector needs to look to the energy sector and the revolution that changed how energy is distributed across the grid using real-time data on supply and demand. Energy, like water, traditionally relied on centralized power plants. Now, the energy system includes decentralized sources such as solar panels from households, wind farms, and so on.

The new water grid could lower infrastructure costs by introducing decentralized treatment technology deployed throughout the developing world. Small-scale, low-tech systems would be far more affordable for more remote, smaller areas. Federal and state regulations would need to change to allow utilities to implement technologically appropriate, sustainable, and affordable treatment systems. Data would need to be collected more frequently and robustly to ensure public safety and grow public trust in their water systems. Data infrastructure is much cheaper than gray infrastructure.

Systems may explore adopting point of use and point of entry technologies as more tenable solutions. A decentralized treatment approach does present challenges. First, there is not a robust market for water treatment technology to drive down costs, regardless of whether the treatment is centralized or decentralized. Technology companies cannot reach scale when few systems are willing to adopt new technologies at the risk of jeopardizing public health and regulatory fines. Second, it is difficult to maintain and ensure point of use products are working correctly without continual testing and assurance (e.g., difficulty in ensuring residents change their air filters in homes or water filters in refrigerators). It is a significant challenge to adopt a new technology, ensure it works, and reach scale. Third, many states will struggle with how to permit these systems. It is much easier to permit a small set of technologies known to work than it is to allow a market to develop that may result in hundreds of treatment options.

ADVANCING WATER PRIORITIES WITH A NEW ADMINISTRATION

The past decade has brought several diverse, large crises to various parts of the country, bringing awareness to Congress as many of their own communities are affected. There is a growing national conversation naming these challenges, making them personal, and bringing them to greater public awareness. Future conversations must have state governments, local utilities, and non-profit organizations representing their communities. Creating space for conversations across communities and sectors can lead to better solutions for all, regardless of whether the solutions are embedded in legislation or financial incentive structures.

In addition to the myriad disruptions that have occurred in 2020, it was an election year. The Biden-Harris administration will start in 2021 with a focus on four priority areas: the COVID-19 pandemic, economic recovery, racial equity, and climate change. Water equity and affordability have a place in all four key areas and the water community must consider how to position water within the new administration's priorities.

Priority: COVID-19 Pandemic

The rising number of COVID-19 cases are spurring conversations around more extensive measures to limit exposure, many of which will slow the economy. Large-scale unemployment from COVID-19 has brought increased delinquencies, which have a negative impact on utility revenues and financing. This deficit cannot be erased through rate increases or loans that must be repaid by ratepayers. Future COVID-19 relief packages must include grants earmarked directly for water and wastewater utilities, and not just for local governments. Many local governments have an immense need for funding, and it is unclear how much of funding would be delivered to water utilities unless clearly specified. The federal government could also provide flexibility for SRF loans and grants to forgive debts and/or incentivize collaborations. Any relief package must provide guidance on how to distribute money to ensure it is reaching communities that need it most. Many under-resourced and marginalized communities will need assistance to apply for and access stimulus money.

The COVID-19 pandemic has highlighted the immense importance of water for public health, as well as the staggering consequences to communities and households that lack access to water services (or cannot afford water services). The federal government could establish water as a human right, which would create common grounds for prioritizing water accessibility and affordability among state and local governments. The federal government may also revisit how costs are distributed across customers. If water is a public good, then water might be paid for as part of the tax base (like roads or fire protection), rather than as a commodity (like buying a bottle of water).

Priority: Economic Recovery

Water is essential to life. Airports are a luxury. Yet, the Atlanta airport alone received $300 million in stimulus funding while water utilities received $0. Water remains a low priority in federal spending *even* when it has an essential role in fighting a pandemic. Local governments are absorbing the costs of restructuring operations during the pandemic while continuing to provide services when customers are not able to pay their bills. The time is right to pursue a federal water assistance program to provide a safety net for households and ensure utilities receive payments for services.

The future price tag for rebuilding water infrastructure back to current conditions is a big number that far exceeds the financing ability of ratepayers, local governments, and state governments combined. We have an opportunity to rethink how we rebuild our water infrastructure and create a modern water grid that could be less expensive if rebuilt differently. Envisioning a new water grid requires identifying what works and does not work with the current system. This includes revisiting plumbing codes, fire suppression systems, and centralized treatment technologies. The water sector must take this opportunity to shift our water paradigm before spending trillions to rebuild a water grid that struggles to meet the needs of the 21st century.

A modern water grid must be equitable, sustainable, and affordable. A utility that is affordable for the community will be more affordable for their customers, including individual households. It remains a red herring that federal assistance programs exist to subsidize electricity, housing, food, and even cell phones for low-income households, but there is no such program for water. If the essential purpose of government is to provide for the collective welfare and well-being of communities, then there has been a substantial and systemic failure in political will around water.

Priority: Racial Equity

Systemic racism has been a driving force for water insecurity and shut-offs have been used disproportionately against communities of color; undermining trust in utilities (Box: Cultivating Trust). There is a legacy of decisions and policies that were implemented to make some neighborhoods prosperous while concentrating inequity and poverty in other neighborhoods, many of which are predominantly residents of color. Current infrastructure reflects and reinforces those inequities. For this reason, any proposed infrastructure packages should be earmarked for utilities and should consist of grants that will improve infrastructure in historically underserved areas. These packages should also include guidelines that ensure underserved areas can access and use the allocated funds.

New policies must also address the legacy impact of communities who have historically been excluded from receiving funds and support. For example, many Native Tribes do not have access to water because of a lack of federal support, a federal law that prohibits tax collection, their location in areas without water (making it expensive to access), and contentious relationships with states over water rights (which often takes years to settle). This has resulted in huge gaps in water access and compounding other problems for these communities. While the federal government has increased its capital investments in infrastructure, for example by including the construction of drinking water systems as part of Indian water rights settlements, they do not provide resources to fund ongoing operation and maintenance costs. Yet, they also do not allow Tribes to raise sufficient revenues from their citizens to operate and maintain these systems. The federal government has ongoing legal obligations to the tribes. As claims are settled, some Tribes have succeeded in bringing economic development to their communities through water resources. Their newfound power has given them a voice at the table. These communities should not have to fight for a right to be at the table. They should be invited.

Cultivating Trust

Firefighters are a trusted institution in many communities. They are visible, provide an important service, and regularly engage with the community outside of fire protection. Water utilities provide safe, reliable water services, including the water to fight fires, but they are rarely seen as trusted anchors. Utility infrastructure is often hidden and most customer interaction is through customer bills. The days of operating successfully unnoticed, however, are coming to an end as managing water – whether due to fire, flooding, algal blooms, or aging infrastructure – is becoming more challenging and expensive. Since most utility-customer interactions are through bills, the relationship has become increasingly adversarial as rates increase.

The reality is that water utility workers are essential and should be viewed as anchors for the community. Many utilities are learning to cultivate relationships and trust with customers outside of billing interactions through new communication avenues. For example, some newly created stormwater utilities have mascots that go to schools to educate children about stormwater, some are creating stakeholder groups, and some are holding public meetings that allow the community to ask questions. Utilities can build trust by consistently communicating and showing their (1) performance: what you do and how well; (2) values: what they are and how they align with the community; (3) integrity: do you stick to your values when it is hard; and (4) reliability: are you consistent even when circumstances change. Outside organizations can help with communicating to the public. Clear communication is important to begin and maintain a dialogue with the community.

There has been increasing momentum driving leaders to examine affordability and equity challenges through an environmental justice lens. This is critical to avoid perpetuating solutions that continue to exclude communities from funding and technology solutions that might be best suited to address their challenges. Part of the solution is to ensure residents, members of a community, have a voice at the table to help define and solve the problem. When federal, state, and even local representatives bring a "solution" for a problem, sometimes the wrong problem, it often does not address the actual needs of the community or is not sustainable.

Priority: Climate Change

Much of America is rural land used primarily for agricultural production and these communities are some of the first to have experienced increased stress from climate change on water resources. Long-term and severe droughts in Colorado and California highlight the significant impact a warming climate has on crops, junior water right holders, and rural communities whose wells went dry (and/or were contaminated) as groundwater levels dropped. The last two years have seen an increase in wildfires that have burned large areas of forest, agricultural, and urban environments. In 2020, more than 4% of California burned. At the other extreme, flooding has placed a massive strain on the levee and dam systems built over a half-century ago in the Mississippi and Missouri River basins. The intersection of climate change, water shortages, and water contamination have resulted in numerous conflicts and high-profile lawsuits between states sharing river basins and aquifers.

There is growing bipartisan support for federal involvement to ensure the nation's water security through infrastructure investments, technology development, conservation management, inter-agency collaborations, and policy changes. Support has only grown as the pandemic has further revealed the implications of limited to no water access and proper sanitation for communities, especially tribal and communities of color. The new administration should consider policy changes that redirect the flow of money following natural disasters. For example, the Federal Emergency Management Agency currently requires utilities and households to rebuild to conditions prior to a flood event, even if that structure floods every year. Policy changes might mitigate these climate risks by allowing communities to use the money to rebuild elsewhere and rebuild to be more resilient to future flood events.

Preparing the new administration

Water is vital for life, for ensuring public health in a global pandemic, for economic recovery, for improving racial equity, and for ensuring water security in a warming climate. Something as vital as water should have a high priority and the water community must be prepared to actively engage with the new administration to help bring equity and affordability to water services. During the first 100 days, a new administration strives to set a strong precedent for accomplishing its priorities. The ideas from our past six months of convening must now be distilled into action items that can be taken to Congress and the Senate for their consideration. The water community has an opportunity to draft language to advance actionable policies.

APPENDICES

Appendix I: Acronyms

AWWA	American Water Works Association
CAPS	Customer Assistance Program
CARES	Coronavirus Aid, Relief, and Economic Security Act
CWA	Clean Water Act
FHA	Federal Housing Administration
EITC	Earned Income Tax Credit
EPA	Environmental Protection Agency
HRSD	Hampton Roads Sanitation District
LIHEAP	Low Income Home Energy Assistance Program
NGO	Non-governmental Organization
SDWA	Safe Drinking Water Act
SNAP	Supplemental Nutrition Assistance Program (previously Food Stamps)
SRF	State Revolving Fund
SWIFT	State Water Implementation Fund
TWDB	Texas Water Development Board
USDA	United States Department of Agriculture