Toward a National Water Affordability Strategy:

Report from the Aspen-Nicholas Roundtable Series on Water Affordability

JANUARY 2022

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A REPORT FROM THE 2021 VIRTUAL ASPEN-NICHOLAS WATER AFFORDABILITY ROUNDTABLE SERIES. 2021-2022.

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Vision & Process

The **Aspen Institute - Nicholas Institute Roundtable Series on Water Affordability** was organized to address one of the nation's most pressing water challenges: ensuring that water services are affordable for households and communities. While there has been growing attention and concern around water service affordability, the actual size and scale of the problem remains poorly understood. In addition, there are a range of approaches taken to address affordability challenges – utility customer assistance programs, regionalization efforts to improve economies of scale, state prioritization of revolving loan funds – yet there has been limited systematic evaluation of their effectiveness on improving affordability. Communities across the U.S. experience different causes of affordability challenges and have implemented different solutions, hindering the realization that water affordability is a challenge that exists within water service providers across the nation. With almost 50,000 community water systems, each operating mostly independently and each relying on their own ratepayers to cover costs, the entire model of water services creates systemic challenges that are not easily addressed or resolved.

The Aspen-Nicholas Roundtable Series aimed to articulate a set of principles for water affordability that could apply to water service providers nationwide, along with a set of specific recommended actions aligned with adopting those principles. To be clear, the challenge of water service affordability is systemic, intertwined with issues of public health, aging infrastructure, poverty and environmental justice. There are no single actions – federal programs, rate structures, or engineering technologies – that alone can fix the problem. Yet, the water sector must provide some guidance and direction to ensure that water services are affordable. **Indeed, it is time to adopt a national water affordability strategy.**

This Aspen-Nicholas Roundtable Series builds on many ongoing efforts across the US to address water affordability. These efforts have emerged from individual cities, innovations from the private sector, and broader state/federal initiatives. Moreover, the Roundtable Series occurred during, and drew real-time lessons from, the COVID-19 pandemic. In many ways, the pandemic demonstrated far more clearly the immense value of water services and the importance of those services being affordable to all.

The 2021-2022 Aspen-Nicholas Water Affordability Roundtable Series was part of a series of dialogues, forums, and discussions extending for nearly two years. The 2020 Aspen-Nicholas Water Forum was held as a series of virtual sessions from June to

November of 2020. These sessions focused on what constitutes good water governance through the lens of water affordability and equity (2020 Report). Affordability has become such a critical topic in water management and policy, particularly as the impacts of the pandemic persisted, that it was continued in the 2021 Aspen-Nicholas Water Forum (October 19-20), but with greater focus on policy interventions, particularly by federal agencies, and how those would intersect with ongoing state and local efforts. The Roundtable Series – a gathering of a smaller, more focused group – occurred over 3 meetings: September 8-9 and November 8-9, 2021, and January 19-20, 2022 – to develop principles and recommendations around improving water affordability.

This report summarizes the perspectives of the Roundtable Group; it is intended to be a reflection of the opinions and perspectives of a very diverse group of experts, leaders, and representatives of organizations and communities affected by and involved in water service affordability. To capture these perspectives, the report is organized around five core findings that led to overarching principles, and these in turn formed the foundation of six actions and associated recommendations to advance the nation toward a future that ensures more affordable water services.

Disclaimer: As written and adopted, this report seeks to capture the essence of participant conversations, but individual participants may not agree with every aspect of the report. Rather, in affixing their name as a signatory, a participant is signaling support for the overarching concept of the series and the broad outcomes discussed herein. The participants took part in their individual capacity and their affiliation and titles are included here for identification purposes only. Their organizations are not responsible for the findings, principles, recommendations, or other content of this report.

Findings and Principles

FINDING 1: THE APPROACH TO PROVIDING WATER SERVICES IN THE U.S. IS WORKING FOR MANY HOUSEHOLDS AND COMMUNITIES BUT IS FAILING OTHERS.

Principle 1.1: Access to safe, reliable, and affordable water services is a human right; therefore, no person should be denied essential water services based on the ability to pay.

Principle 1.2: Solutions to improve water affordability for households and communities must account for existing and long-standing racial and economic inequities in water services.

Principle 1.3: Affordable water services should be elevated as a national priority.

FINDING 2: THE AFFORDABILITY CHALLENGE IS INADEQUATELY DEFINED AND MEASURED.

Principle 2.1: Standardized affordability metrics should be established and supporting data collected to create a systematic approach to understanding the scale and location of affordability challenges.

FINDING 3: SAFE, RELIABLE, AND AFFORDABLE WATER SERVICES PROVIDE BROAD SOCIETAL BENEFITS CURRENTLY PAID FOR BY RATEPAYERS.

Principle 3.1: The broader benefits of affordable water services should be recognized as essential for ensuring public health, economic development opportunities, and environmental sustainability.

Principle 3.2: The broader societal benefits of affordable water services should be accounted for in revenue generation.

Principle 3.3: Federal and state governments have important roles in ensuring that water services are safe, reliable, and affordable.

FINDING 4: ASSISTANCE IS NECESSARY TODAY FOR SOME HOUSEHOLDS AND SOME UTILITIES.

Principle 4.1: Ensuring the provision of and access to safe, reliable water services will require assistance for low-income households and under-resourced utilities.

Principle 4.2: Federal and state governments need to take an active role in coordinating, funding, and providing assistance.

FINDING 5: THE COSTS OF PROVIDING WATER SERVICES ARE RISING, EXACERBATING AFFORDABILITY CHALLENGES IN THE FUTURE.

Principle 5.1: Ensuring affordability will require managing and reducing long-term costs.

Principle 5.2: Safe, reliable water services must not be compromised for water affordability.

Actions and Recommendations

ACTION 1: DEVELOP A NATIONAL STRATEGY.

Recommendation 1.1: Governments should make access to affordable water services a priority, and the federal government should develop a national strategy that raises the profile, provides leadership, and dedicates resources to the issue.

Recommendation 1.2: The national strategy should adopt the vision of a human right to safe, reliable, and affordable water services, meaning that no person should be denied essential water services based on ability to pay.

Recommendation 1.3: Any national strategy should be informed by and seek to address inequities in water service provision rooted in race, class, and place.

ACTION 2: ADOPT AFFORDABILITY METRICS AND COLLECT DATA RELATED TO AFFORDABILITY.

Recommendation 2.1: The water sector should adopt metrics that enable quantifying, inventorying, and describing water service affordability at the household and utility levels.

Recommendation 2.2: The federal government should enable the systematic, nationwide collection and curation of key affordability-related data for water services to demonstrate the scale and location of affordability challenges.

ACTION 3: ENSURE HOUSEHOLDS HAVE ACCESS TO ASSISTANCE WHEN THEY CANNOT AFFORD TO PAY FOR WATER SERVICES.

Recommendation 3.1: The federal government should ensure that low-income households have access to an assistance program to pay for essential water services.

Recommendation 3.2: Any assistance program should prioritize ease-of-access by having minimal barriers of entry and automatic enrollment if possible.

ACTION 4: SUSTAIN AND INCREASE SUBSIDIES FOR UNDER-RESOURCED UTILITIES.

Recommendation 4.1: Subsidized loans and grants should be maintained and increased, with prioritization of under-resourced communities.

Recommendation 4.2: States and the federal government should reduce barriers to utilities for accessing available grants, loans, and funding.

ACTION 5: INVEST IN MANAGING AND REDUCING COSTS OF WATER SERVICES WHILE ENSURING QUALITY.

Recommendation 5.1: Incentivize and reduce barriers to integrated water planning and action.

Recommendation 5.2: Incentivize regionalization and consolidation with subsidized loans and grants.

Recommendation 5.3: Infrastructure spending, including subsidized loans and grants, should prioritize projects that reduce long-term costs over projects that are shovel-ready or lowest cost today.

ACTION 6: PURSUE FISCALLY SUSTAINABLE REVENUE MODELS THAT INCLUDE THE BROAD PUBLIC BENEFITS OF WATER SERVICES.

Recommendation 6.1: All utilities must recover the full-cost of delivering water services.

Recommendation 6.2: Revenue portfolios should be diversified to capture the broader benefits of water services to society.

Recommendation 6.3: Water service providers should pursue multiple methods for pursuing payment; shutoffs should be a last resort.

PART 1

Findings & Principles

PART 1: Findings & Principles

Water is essential for any household, and for any community to survive and thrive. Over the past few decades, the provision of water services has expanded to include drinking water, wastewater, and increasingly stormwater (hereafter referred to as water services). The provision of, and responsibility for, water services in the U.S. is at the local level, whether provided by a private company or a local government entity - city, town, county, district, or authority. The result has been that each utility has the responsibility to plan, finance, and provide water services. Today, an estimated 94% of residents are served by one of the 50,000 community water systems (CWS) for their drinking water (the remaining population relies on private wells) [1] with 90% of CWS serving fewer than 10,000 persons.[2] In addition, 78 to 82% of U.S. residents receive centralized wastewater treatment (most of the remaining rely on private septic systems).[3]

These water service providers (i.e., utilities) function almost entirely independently from each other and fund nearly all their expenses with revenue from local customers (residential, commercial, and industrial), also referred to as ratepayers. The federal and state governments have established regulatory requirements for these utilities, along with some financial assistance, but the vast majority of the responsibility for short-term and long-term planning, operation, management, and financing of water services falls on the local utility. In turn, each individual utility relies on its customers to generate sufficient revenue to meet all its functions: securing water supplies, constructing treatment and delivery systems, billing customers, and covering the costs of finance. The result is financial fragmentation along with organizational fragmentation, all occurring amidst the ongoing sorting and clustering of the nation's population into communities that are predominantly wealthy or predominantly poor. Utilities serving communities with concentrated poverty will have an even greater challenge to address household affordability while generating sufficient revenue to provide safe, reliable services.

Indeed, while the local-based approach to water services has been successful in the past for many households and communities, it is badly failing some households and communities. As recognition of affordability challenges has grown, there have been

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1 U.S. EPA. 2020. Population served by Community Water Systems with no reported violations of health-based standards. American Housing Survey.

2 GAO. 2021. Private Water Utilities: Actions needed to enhance ownership data.

3 U.S. Census Bureau, 2015 National - Plumbing, Water, and Sewage Disposal - All Occupied Units. American Housing Survey. EPA. 2022. Septic System Overview.

some efforts at the local, state, and national level to provide solutions. For example, the Low-Income Household Water Affordability Program (LIHWAP) was created to provide crisis (not long-term sustained assistance) relief resulting from the COVID-19 pandemic.[4] There is continued national recognition of the need to financially support utilities with additional funds being made available to invest in water infrastructure in the Infrastructure Investment and Jobs Act[5]; however, a national strategy is needed to ensure these investments improve long-term affordability challenges and do not exacerbate affordability challenges in the future.

The United States should have the vision that its governments – federal, state, territorial, tribal, and local – can and do ensure the provision of safe, reliable, *and affordable* water services across all its communities.

Below, we articulate the findings and principles from the Aspen-Nicholas Water Affordability Roundtable Group to begin more intentionally addressing water affordability challenges across the U.S. Throughout the Roundtable series, and in this report, we focus on the affordability of interrelated populations. First is the household, particularly low-income households, where household affordability refers to the ability of a household to pay for basic water services while maintaining the ability to pay for other essential needs and services. Second is the water service provider – the utility – where financial capability is the ability for the community to cover the costs of the utility in terms of operations, maintenance, and financing.

FINDING 1: THE APPROACH TO PROVIDING WATER SERVICES IN THE U.S. IS WORKING FOR MANY HOUSEHOLDS AND COMMUNITIES BUT IS FAILING OTHERS.

In many ways, the local-based approach to providing water services in the U.S. has been very successful at providing safe, reliable water services to many communities and residents through infrastructure that spans most of the country, representing a public spending investment of approximately $5 trillion since 1956.[6] The continued investment and regulatory oversight has apparently improved the safety and reliability of water services with the number of drinking water systems identified by the Environmental Protection Agency (EPA) as "serious violators" dropping from around 4,400 community water systems in 2011 to 1,500 in 2021.[7]

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[4] HHS. 2021. Biden-Harris Administration launches relief program to improve access to affordable water services.

[5] Infrastructure Investment and Jobs Act. 2021.

[6] CBO. 2018. Public Spending on Transportation and Water Infrastructure, 1956 to 2017.

[7] EPA. 2021. Safe Drinking Water Dashboard. It is worth noting that there are high levels of uncertainty about violations, particularly under-reporting of SDWA violations, and so data and reporting related to SWDA violations should be considered as being based on limited data and likely under-estimates of actual conditions. See GAO. 2017. Drinking Water: Additional Data and Statistical Analysis May Enhance EPA's Oversight of the Lead and Copper Rule. GAO-17-424. EPA, 2008. 2006 Drinking Water Data Reliability Analysis and Action Plan. Office of Water (4606M), EPA 816-R-07-010.

The success at the national level belies the reality that there are some communities, and households within communities, who are not receiving adequate water services, or are not receiving basic water services at all. A portion of households – perhaps a tenth to a third of households – lack access to safe, affordable water services that are presumed elsewhere; based on the limited data available, an estimated 2 million people in the U.S. lack access to running water[8], an estimated 8 to 9% of the population resides in communities supplied by water systems with health-based violations in the past 5 years[9], and between a tenth to a third of households may struggle to pay for basic water services.[10]

The consequences of unsafe or unaffordable water services are serious. When water is unsafe to drink, people can get sick, suffer long-term effects, or die. When households are unable to pay for water services, the provider (i.e., utility) can shut off access to those services.[11] This dramatically increases the financial hardship for the household, as they will face disconnection and reconnection fees, liens placed on their property or eviction for tenants, and the need to procure water (borrowing from a neighbor or purchasing bottled water). Shutoffs also jeopardize the broader public health as families must go without the most basic of human needs. The ability for households to pay for water services depends on the cost of services, water usage (intentional or leaked), and household income. As such, the growing inequality in household incomes since the 1970's[12] translates into growing disparity in the ability to pay for water services, even if the costs of those services remained the same. The cost of services, however, has not remained the same; rather, costs have grown by an average of 5% each year since 2001, far exceeding inflation or the average growth in wages.[13]

While the challenge of water access and affordability has gained considerable recent attention,[14] this challenge has existed for decades, particularly in communities of color. The United States has a long history of inequities along racial, economic, and geographic lines, and these inequities have become ensconced not just in our cities and neighborhoods, but also in our water services. Racial segregation in housing and urban planning at the scale of neighborhoods and census tracts[15] have shaped the

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8 DigDeep & U.S. Water Alliance. 2019. Closing the water access gap in the United States.

9 U.S. EPA. 2020. Population served by Community Water Systems with no reported violations of health-based standards. American Housing Survey.

10 Mack & Wrase. 2017. A burgeoning crisis? A nationwide assessment of the geography of water affordability in the United States, *PLOS One*; Teodoro & Saywtiz. 2020. Water and sewer affordability in the United States: a 2019 update, *AWWA Water Science*; Cardoso & Wichman. 2020. Water Affordability in the United States; Patterson & Doyle 2021. Measuring water affordability and the financial capability of utilities, *AWWA Water Science*.

11 DigDeep & U.S. Water Alliance. 2019. Closing the water access gap in the United States.

12 Pew Research Center. 2020. Trends in Income and Wealth Inequality.

13 Raftelis. 2021. Water bills become a burden for low income customers.

14 Lakhani & Adolphe. 2020. https://www.theguardian.com/us-news/2020/jun/26/running-drinking-water-poverty-us-cities. *The Guardian*.

15 Madrigal, A.C. 2014. The racist housing policy that made your neighborhood. *The Atlantic*.

development of water and wastewater utility infrastructure: after WWII, as residential segregation increased, municipalities could more easily exclude communities of color from water and sewer services through "under-bounding," whereby municipalities selectively annexed White neighborhoods into a town's official boundaries while denying service to communities of color.[16] This practice (and others) resulted in many communities adjacent to water service providers never receiving water services. In other cases, expanding suburbs chose to create their own utility rather than seeking service from the already existing utility, removing both wealth and the ability to expand service area boundaries for older, urban systems. In this latter case, the "aging infrastructure" associated with the original water service system had been partially responsible for the generation of original wealth in previous decades, which was then being transferred – along with the higher income population – to newer, suburban systems serving higher income populations. The remaining population was left with older infrastructure and often stagnant or declining population and/or declining industrial water users as well.

In sum, while water services have been made available to most in the U.S., they have not been equally available, or affordable, to all.

Principle 1.1: Access to safe, reliable, and affordable water services is a human right; therefore, no person should be denied essential water services based on the ability to pay.

Water services are essential for individuals, households, and communities to exist. To reflect this basic need, a range of national and international organizations have taken positions or adopted policies to assert that access to water services is a basic human right. The United Nations has adopted a human right to water[17] and some states have passed legislation establishing water as a human right, including California[18], Massachusetts[19], Pennsylvania[20], and New York.[21] The value of such a declaration shows firm commitment to move towards ensuring all persons have access to safe, reliable, and affordable water services.[22]

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16 Montag. 2019. Water/Color: A study of race and the water affordability crisis in America's cities. LDF Report

17 UN. 2022. Human Rights to Water and Sanitation. UN.

18 California Assembly Bill 685. 2012.

19 Constitution of the CommonWealth of Massachusetts. Article XCVII. n.d.

20 Constitution of Pennsylvania. 1967 Amendment.

21 Environmental Rights Amendment. 2021. New York Proposal 2.

22 This vision is also relevant to private sector water providers: the National Association of Water Companies (NAWC) first principle of water equity is that everyone should have access to water that is safe, reliable, and affordable (https://nawc.org/priorities/water-equity/). The American Water Works Association's (AWWA) strategic plan declares their first core principle is to "protect human health" (https://www.awwa.org/About-Us/AWWA-Strategic-Plan).

A right to affordable water services does not mean water is free; rather, it is recognizing an appropriate societal goal to ensure that water services are made affordable to all households in a community. A right to affordable water services does not mean an unfunded mandate to utilities, but rather it means the collective commitment at all levels of government to work towards ensuring affordable water services.

A right to affordable water services does not mean water is free; rather, it is recognizing an appropriate societal goal to ensure that water services are made affordable to all households in a community.

Principle 1.2: Solutions to improve water affordability for households and communities must account for existing and long-standing racial and economic inequities in water services.

A variety of decisions based on race and place have led to disparities in water services across the U.S.[23] These are not just historic oddities; rather, a legacy of discriminatory policies and practices is built into our infrastructure today, as evidenced by the present reality that unserved and under-served communities are too often communities of color.[24] Because water services depend on capital intensive infrastructure that is long-lived, decisions related to infrastructure are hard to shift, and can have an inordinately long-term impact on a community. Moreover, utilities typically pay for infrastructure via debt financing (e.g., multi-decade municipal bonds or government loans) which can constrain future decisions of the community for decades due to debt limits and debt service. Thus, water service decisions of the past have implications for decades. Historic inequities mean solutions to address affordability cannot be developed and implemented *de novo,* but rather must account for the realities of history or geography.

Principle 1.3: Affordable water services should be elevated as a national priority.

Over the 20th century, insecure water supply and degraded water quality were viewed as national-level challenges. Once recognized as such, water supply and water quality received sustained national-level attention, leading to major initiatives, policies, and resources (e.g., Water Supply Acts, Reclamation Acts, Clean Water Act, Safe Drinking Water Act). In the 21st century, unaffordable water services are increasingly recognized as a national-level challenge.

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[23] See examples from Zanesville, OH, Roanoke, VA, Hollins, VA, and many examples in the Central Valley of CA: DigDeep & U.S. Water Alliance. 2019. Closing the water access gap in the United States.

[24] A 2018 study examined the relationships between race and access to water services in areas bordering 75 municipalities in North Carolina; results showed that the two most unserved groups were low-income African American populations excluded from municipal services, and higher income White populations on private well and septic systems: Leker, H. & J. Gibson. 2018. Relationship between race and community water and sewer service in North Carolina. *PLOS One.*

The rising costs of services combined with stagnating wages and underemployment creates the conditions for affordability challenges to be present within some communities and households nationwide.[25] The drivers of rising costs – climate change, loss of large water users, emerging contaminants – coupled with stagnant incomes, are beyond the capacity for some individual utilities or even states to address. Water affordability must be elevated as a national priority in order to receive sustained, focused, and holistic attention over the long-term.

FINDING 2: THE AFFORDABILITY CHALLENGE IS INADEQUATELY DEFINED AND MEASURED.

Despite the growing attention on affordability, empirical studies at the national or even regional scales are only recently becoming available.[26] These early-stage empirical studies show that there are no single, broadly accepted definitions or metrics of water affordability, whether for the household or utility capability.[27] Household affordability is the ability of a household to pay for adequate water services while also maintaining the ability to pay for other essential needs and services. While defined, the definition lacks specificity (e.g., how much water is adequate). This creates difficulties when trying to measure and compare household affordability across geographies. Utility financial capability defines the ability for the community to afford the costs of utility operations, maintenance, infrastructure, and debt service. The accounting methods of utilities are diverse, as are definitions of how revenues and expenses are classified, creating challenges for determining how to measure the financial capability of the utility. Additionally, some measurements, such as the median household income, have been used to define both household affordability and utility financial capability, adding to the confusion.[28] Many metrics have been proposed to more explicitly consider household affordability and utility financial capability[29]; however there has been limited agreement or adoption of metrics across the water sector.

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[25] Charges for water and wastewater increased between 7.2 and 7.5% between 2016 and 2018 while the Consumer Price Index increased only 4.6%. Similarly, water and wastewater increased > 5% annually between 1996 and 2018 while CPI increased only 2.1% during the same period. 2019 Water and Wastewater Rate Survey. American Water Works Association.

[26] E.g: Mack & Wrase. 2017. A burgeoning crisis? A nationwide assessment of the geography of water affordability in the United States. *PLOS One;* Teodoro & Saywitz. 2020. Water and sewer affordability in the United States: a 2019 update. *AWWA Water Science*; Cardoso & Wichman. 2020. Water Affordability in the United States; Patterson & Doyle 2021. Measuring water affordability and the financial capability of utilities. *AWWA Water Science.*

[27] Raucher *et al.* 2019. Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector. AWWA Report and Goddard *et al.* 2021. How should water affordability be measured in the United States? A critical review. *Wires Water.*

[28] Teodoro & Saywitz. 2020. Water and sewer affordability in the United States: a 2019 update. *AWWA Water Science.*

[29] Raucher *et al.* 2019. Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector. AWWA Report.

Principle 2.1: Standardized affordability metrics should be established and supporting data collected to create a systematic approach to understanding the scale and location of affordability challenges.

The scale and locations of the affordability challenge is poorly understood because data are not widely available, definitions are subjective, and metrics are not standardized. Without standardized metrics, we will not have standardized data with which to understand how affordability challenges are manifesting in households and communities across states, tribes, and territories, let alone nationally. National attention and action emerge when a problem is clearly identified as prevalent across the nation and not as a problem only experienced by a few utilities, communities, or individuals. For example, data on the prevalence of lead service lines have resulted in a federal effort to replace all lead service lines in the U.S., partially funded by the 2021 Infrastructure Investment and Jobs Act.[30] Justification for, and scale of, mobilizing resources often only occurs when problems are moved beyond anecdotes and into empirics. Further, such metrics are critical components of identifying potential solutions, and evaluating their eventual effectiveness.

FINDING 3: SAFE, RELIABLE, AND AFFORDABLE WATER SERVICES PROVIDE BROAD SOCIETAL BENEFITS CURRENTLY PAID FOR BY RATEPAYERS.

Water services are far more than a commodity delivered to individual customers; rather, water services provide substantial, broad, and essential benefits to society. The importance of water services for public health was recognized in the early 1900s with water services provided throughout cities because the risk of epidemics spread by water-borne diseases was so great.[31] The proliferation of water and sanitation systems nearly eradicated these diseases, improving the public health and economic condition of cities. Likewise, and more recently, broader public health concerns around lead in water have galvanized a national effort to replace lead service lines.[32] Water services are also essential for fire suppression and critical to sustaining the health of downstream, receiving water bodies and ecosystems, which can serve as water supply sources for other communities.[33]

Beyond just availability, affordable water services are essential for the economic opportunities of households and economic development in the broader community. As the price of water services increases, a household will have reduced discretionary

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[30] The Biden-Harris Lead Pipe and Paint Action Plan. 2021.

[31] Troesken, W. 2004. Water, Race, and Disease. MIT Press. 288 pp.

[32] EPA. 2021. Funding for lead service line replacement.

[33] Significant fires devastated a number of US cities including Portland, ME (1861), Chicago, IL (1871), Jacksonville, FL (1901), and San Francisco, CA (1906), among many others. Note that changes in building codes can considerably reduce the amount of water needed for fire suppression; thereby requiring less water and reduced infrastructure needs (e.g. Yadav & Patel. 2014. Assessment of Water Requirement and Calculation of Fire Flow Rates in Water Based Fire Fighting Installation).

income, particularly when wages stagnate.[34] Reliable and affordable water services can be essential to attracting businesses into any community, whether urban manufacturing hubs or rural, agricultural communities.[35] Vice versa, when water services decline, it can be difficult to attract new businesses or retain existing businesses.[36]

The broad societal benefits of water services can be undermined by the highly localized, fragmented condition of water utilities in the U.S. The fragmentation and localization of water services means that the costs and financial conditions for each utility are quite different. In some cases, ample supplies of high-quality water will be secure and relatively inexpensive to access, while peculiarities of water quality or histories of water rights can require nearby (or even adjacent) water service providers to manage the higher costs of poor quality raw water or uncertain supplies. This fragmentation also means that the revenue potential of a utility is directly constrained by the financial capability of the community it serves. All of this means that the costs of providing water services, and the financial resources to pay those costs, can vary tremendously. We cannot expect for the costs or revenue potential to be the same from one utility to the next (barring subsidies). Yet the benefits of well-functioning utilities extend to broader society, well beyond the boundaries of an individual utility.

Principle 3.1: The broader benefits of affordable water services should be recognized as essential for ensuring public health, economic development opportunities, and environmental sustainability.

When water becomes unaffordable, whether at the household or community level, it undermines the broad benefits of water services. Households that struggle with water service affordability are less able to afford other basic services and have reduced disposable income. Many low-income households that struggle with their water bills have little or no disposable income, along with existing household debt; this results in partial payments and growing arrearage problems, and likely experiencing chronic affordability challenges. And when a household is unable to afford water services, and loses access to water services, there are cascading consequences, from basic hygiene to loss of housing.[37] Beyond the impact on households, communities with degraded water quality or unaffordable water services cannot realistically attract business development or new residents.

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[34] Teodoro, M. 2018. Measuring Household Affordability for Water and Sewer Utilities. *JAWWA*.

[35] There are anecdotes of water infrastructure being important for economic development, particularly in rural areas; e.g., data service centers in Prineville, OR (Selsky 2016. Timber Town's Comeback Story) and biorefinery in Blair, MO (pg 84 in Dabson *et al.* 2002). Case Studies of Wealth Creation and Rural-Urban Linkages. Rural Futures Lab. However, the link between water infrastructure and rural economic development has not been rigorously tested.

[36] A primary example of this is General Motors leaving Flint Water due to declining water quality prior to the broader water crisis in Flint; Masten *et al.* 2016. Flint Water Crisis: What Happened and Why? *JAWWA*.

[37] Nonpayment can lead to shutoffs, leans on houses, evictions, removal of children from households - a cascade of additional challenges. See Montag. 2019. Water/Color: A study of race & the water affordability crisis in America's cities. LDF Report.

Water utilities should not be viewed as providing a commodity; rather, water utilities should be viewed as providing an essential service to society with broad societal benefits. **Affordable water services should be recognized as a foundational benefit to and necessity of a community, and advocated for and ensured by community leaders.** While there has been an ongoing advocacy for the 'value of water'[38], this needs to be expanded to recognize the value of *affordable* water. Moreover, ongoing advocacy for the value of water must also recognize that when water is not affordable or accessible to all, its value to a community is undermined.

Affordable water services should be recognized as a foundational benefit to and necessity of a community, and advocated for and ensured by community leaders.

Principle 3.2: The broader societal benefits of affordable water services should be accounted for in revenue generation.

The current approach by utilities for revenue generation does not sufficiently reflect the broader societal benefits of water services. For instance, property values benefit from well-functioning water services (fire suppression, environmental quality, economic development, etc.), but property values are often separated from revenue generation for water services. Outside of water services, broader societal benefits are often funded through taxes, with local benefits typically funded from property tax (e.g., schools, libraries, fire services). Because of the benefits to society from water services, a broader revenue model that makes greater use of affordability-friendly rate structures[39] and potentially additional revenue from local taxes (e.g., ad valorem) would be appropriate, as has begun to be used in some utilities.[40] However, any adjustment in the revenue generation model must begin by ensuring that costs to the utility are fully covered and that water services meet regulatory standards.

Principle 3.3: Federal and state governments have important roles in ensuring that water services are safe, reliable, and affordable.

Because of the diffuse benefits of water services, and because of the high fragmentation of water utilities, some utilities will not have a sufficient revenue base to cover the costs of providing water services. Utilities serving a high percentage of chronically poor ratepayers will have difficult financial hurdles to generate sufficient revenue from

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[38] The Value of Water Campaign. http://thevalueofwater.org/.

[39] Teodoro, M.P. 2002. Tailored Rates. *Journal of American Water Works Association* 94(10): 54-64.

[40] There are examples of wastewater utilities using ad valorem based revenue in combination with a usage charge, e.g., Buffalo, NY.

their remaining customers to cover costs. Due to policies and individual preferences, households that can afford to move historically cluster along economic and racial/ethnic lines. Clustering between, rather than within, communities shifts the revenue base for utilities and exacerbates the affordability challenge for communities where wealth is leaving.[41] Essentially, rich communities are getting richer and overall, can better afford water services. Poor communities are getting poorer and less able to afford water services (along with other essential services).

The inability to ensure affordable water services *across* utilities creates the need for federal and state governments to play coordinating and resourcing roles. Utilities that have been chronically disinvested, excluded from past subsidized funding, or have heavily contaminated or uncertain water supplies will need subsidies and/or assistance to make necessary investments. Further, the federal and state governments should ensure, through their regulatory roles, that communities are receiving safe, affordable water services essential to broader society, and that utilities failing to provide these services are addressed. This is necessary to maintain community-wide trust in water services. When trust is eroded, individual customers will seek to secure their own water supply, which will inevitably come at higher costs (e.g. bottled water for households increases their affordability challenges).[42]

FINDING 4: ASSISTANCE IS NECESSARY TODAY FOR SOME HOUSEHOLDS AND SOME UTILITIES.

Historically, water has been one of the cheapest essential services in the U.S.; however, the cost of water services has risen faster than nearly all other essential services over the past 20 years. Today, water bills can be as much, or even more, than electricity and telecommunication bills.[43] It is likely that water bills will continue to rise, in part because the costs of providing water services continue to rise as systems replace infrastructure, comply with regulations, adapt to climate change, move towards charging full costs of service, and address the rising costs of operations. Moreover, water service providers typically fund infrastructure projects using long-term debt (e.g., municipal bonds and subsidized loans). Current interest rates have been at historic lows; as interest rates on debt inevitably rise in the future, the costs of capital infrastructure for water services will rise.[44] These trends indicate that water bills are likely to rise, placing greater burden on utilities to generate sufficient revenue and on households to afford water services.

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41 Trounstine, J. 2017. Race and Class Segregation and Local Public Policy. *Tax Law Review 70* (513).

42 Balazs & Ray. 2014. The Drinking Water Disparities Framework: On the Origins and Persistence of Inequities in Exposure. *AJPH*.

43 The costs of water services and trash have increased 130% since 1998, while other services have increased by ~50%; Bureau of Labor Statistics from Raucher et al. 2019. Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector. *AWWA Report*.

44 Smull *et al.* 2021. Rising Market Risk Exposure of Municipal Water Service Providers in Distressed Cities. *ASCE(WR)*.

Principle 4.1: Ensuring the provision of and access to safe, reliable water services will require assistance for low-income households and under-resourced utilities.

An overarching goal should always be to ensure that water services are affordable, both now and for the long-term. However, some communities and many households are facing immediate financial crises. These situations require immediate assistance. Such challenges are endemic in society, and there will always be a need to ensure water services remain available to households and communities in times of crises, just as was done across the nation via LIHWAP.

Outside of crises, most utilities serve some population within their community that struggles with chronic poverty. Even relatively low water costs might create hardship for some households. In these instances, both affordability programs and assistance programs are needed. Long-term assistance may be needed to help financially insecure households afford basic water services until truly affordable water services are available or until sufficient affordability programs are established. The assistance programs may be financial or to improve water use efficiency (i.e., reduce water use and thus bills) via direct intervention within the home. Historically, customer assistance and water efficiency programs have been provided by utilities or non-profits. However, not all utilities are legally able to establish an assistance program (determined by state policies)[45], engage in work on the private side to address leaks, and/or have the financial, administrative, or technical capacity to provide such programs.

Principle 4.2: Federal and state governments need to take an active role in coordinating, funding, and providing assistance.

Most utilities do not offer customer assistance programs (CAPs), with CAPs present for around a third of surveyed utilities (often large and very large utilities).[46] Since most utilities do not have a CAP, and some cannot provide a CAP, the federal and state governments will need to play some role in the future of assistance programs. Federal and state governments are needed to provide assistance to low-income households (e.g., LIHWAP), particularly for those utilities with constrained legal and financial capabilities. Any type of federal or state coordination must recognize that the costs to provide water services are specific to a community. It is simply more expensive to provide water in some locations than in others, and likewise, some utilities serve more low-income households than others. Thus, we cannot presume that the cost of water services, the need for assistance, or the appropriate design of an assistance program would, or should, be the same across communities.

[45] EFC. 2017. Navigating legal pathways to rate-funded customer assistance programs.

[46] Vedachalam & Dobkin. 2021. H2 Affordability: How water bill assistance programs miss the mark.

FINDING 5: THE COSTS OF PROVIDING WATER SERVICES ARE RISING, EXACERBATING AFFORDABILITY CHALLENGES IN THE FUTURE.

Assistance - whether to households or to utilities - does not address the rising costs of water services or drivers of systemic and long-term affordability challenges. Rather, the goal must be to ensure affordable water services as quickly as possible, and thus reduce or even eliminate the need for assistance. Addressing affordability will require managing or even reducing the long-term costs of providing water services. Managing long-term costs will require investments in the future, and while these investments may reduce some costs in the near-term, more likely, the benefits in terms of reduced bills to customers will not be realized for several years. Thus, addressing affordability will require both investments in the future while also recognizing the need to provide immediate assistance for struggling households and utilities today.

Principle 5.1: Ensuring affordability will require managing and reducing long-term costs.

Effectively managing the long-term challenges of affordability will require making broader-scale, longer-term investments and policy changes which do not necessarily address the immediate challenges of affordability, but begin to address some of the root causes of unaffordable water services. Ensuring long-term affordability will require controlling future costs such that bills do not grow faster than the ability of customers to pay. In some cases, costs can be reduced over time by updating technology and/or infrastructure, and adjusting asset management practices. Managing and reducing long-term costs may also require adjustments in water utilities themselves in terms of their size or operations. More than half of water systems serve fewer than 10,000 customers, meaning that they lack basic economies of scale, resulting in the potential for high costs and decreased reliability and quality of service.[47] Communities with high costs and low revenue, without intervention, may not be able to recover the costs necessary to provide safe, affordable water; the financial capacity is simply too limited. These systems may struggle with ensuring that their services are affordable throughout the community, particularly if these communities lose population or large water users.[48] Consolidation or regionalization of some functions (e.g. data management, administration, billing) may be necessary for ensuring that water services are both safe and affordable.[49]

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[47] Teodoro, M. 2021. The Sweet Spot. https://mannyteodoro.com/?p=2774

[48] Smull *et al.* 2021. Rising Market Risk Exposure of Municipal Water Service Providers in Distressed Cities. *ASCE(WR)*

[49] Aspen-Nicholas Water Forum. 2018. Reaching Watershed Scale through Cooperation and Integration; Environmental Policy Innovation Center. Utility Consolidation to Achieve Health Equity; US Water Alliance. 2019. Strengthening Utilities Through Consolidation.

Principle 5.2: Safe, reliable water services must not be compromised for water affordability.

Regulations affect service costs, but are essential to ensure public health and broader environmental quality and sustainability (Finding 3). Regulations and accountability can generate trust from the community that the water coming from a tap is safe to drink and that wastewater is treated before returning to the environment, i.e., that the water service provider is meeting appropriate public health, environmental, and safety regulations. When regulations are insufficiently rigorous, unfunded, poorly balanced, or inconsistently enforced, trust between the community and the utility is lost. Furthermore, affordability challenges are compounded as many households increase the amount they spend on water by paying for bottled water in addition to their water utility bills. Tradeoffs between affordability and quality must never be made.[50]

[50] Goddard et al. 2021. How should water affordability be measured in the United States? A critical review. *Wires Water.*

PART 2

Actions & Recommendations

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ACTION 1: DEVELOP A NATIONAL STRATEGY.

The provision of water services has been a compilation of locally driven, bottom-up decisions inter-mingled with state, regional, and national policies and resources when problems emerge that expand beyond a few locations. For example, the widespread recognition of environmental pollution and degradation triggered federal action, including both leadership and resources, to protect water quality with the Clean Water Act in 1972. Two years later, several studies found that millions of people across the U.S. were provided potentially unsafe drinking water. In response, the federal government again developed and provided a national strategy, policies, and resources through the Safe Drinking Water Act (1974) to ensure drinking water was indeed safe to drink.[51] In both cases, states and local governments were responsible for implementation. This approach has been largely successful, creating a framework for water quality protection in the United States that largely succeeded in meeting their original goals of improving surface water quality and providing safe drinking water.

Half a century later, water service affordability has become a challenge experienced by communities and households nationwide with an estimate that between 1 to 3 out of 10 households may struggle to afford their water bills. Despite the critical importance of water, there are no national safety nets for households (even though there are nationally provided social safety nets for food, energy, housing, and even telecoms). Not only are households struggling, so are utilities. There are an unknown number of utilities struggling to generate the revenue needed to ensure the safe, reliable provision of water services. However, when these utilities fail, the consequences of failure create a crisis that often extends beyond the borders of the particular community. A national strategy is needed to address the widespread affordability challenges present today that draws on the strength and cooperation of federal, tribal, territorial, state, and local governments.

Recommendation 1.1: Governments should make access to affordable water services a priority, and the federal government should develop a national strategy that raises the profile, provides leadership, and dedicates resources to the issue.

Water services in the United States are managed across all levels of government. The co-management of water affordability should follow a cooperative federalism approach

[51] Pontius. 1993. SDWA: A Look Back. *Journal of the American Water Works Association* 85 (2).

in which the local (i.e., municipal), tribal, territory, state, and federal governments share responsibility in recognizing, prioritizing, and addressing affordability. Some tribes, territories, municipalities, and states have already recognized and begun developing and implementing solutions to address affordability challenges (e.g., the Safe and Affordable Funding For Equity and Resilience program in California and the Tiered Assistance Program in Philadelphia). Likewise, the federal government created LIHWAP to provide crisis relief to utilities and low-income households. However, there is not a collective, coordinated approach amongst and between different governments and therefore no clear responsibility assigned for addressing affordability challenges. This creates substantial disparities between locations because the responsibility for water services (including bearing the costs of such services) ultimately falls on local governments and when local governments fail to act or are unable to adequately respond, the burden shifts onto individual households.[52] Moving toward affordable water services across the entire nation will require actions and approaches that occur within this system of federalism, meaning the responsibility for ensuring water services are affordable is the *shared* responsibility of local, tribal, territorial, state, and federal government.

Within this inter-governmental context, the federal government is best suited for raising the visibility of the issue and coordinating or resourcing specific state, tribal, territorial, and local government activities for more effectively responding to specific affordability challenges. When water issues span the nation, such federal roles – when commensurate with activities by local, state, territorial, and tribal governments – can provide the necessary impetus for fundamentally pivoting the nation's future. Further, such cooperative federalism works best when responsibility is clearly assigned along with an established timelines and accountability mechanisms. As such, the federal government should identify a federal agency lead for the issue of water service affordability that cooperatively develops a series of milestones, timelines, and accountability.[53]

Recommendation 1.2: The national strategy should adopt the vision of a human right to safe, reliable, and affordable water services, meaning that no person should be denied essential water services based on ability to pay.

The vision for a national strategy should align with Principle 1.1 – that there is a human right to affordable water services; therefore, an appropriate ambition for the nation should be that no person is denied essential water services based on the ability to pay. The human right to affordable water services does not mean water should be free; indeed, utilities need to be able to recover the full costs of providing services. **Rather, the human right to affordable water services is an aspirational goal that we, as a nation,**

[52] Balazs & Ray. 2014. The Drinking Water Disparities Framework: On the Origins and Persistence of Inequities in Exposure. *AJPD*.

[53] One of the earliest steps for raising the profile as part of this national strategy should be to clarify the scale of the challenge, identify policy guidelines, inventory potential solutions, and assess the efficacy of currently available solutions. See Action 2.

are committed to and striving to meet together. Pursuing such a vision does not mean leaving local utilities an unfunded mandate; rather it means that we are collectively creating a framework for how water services are provided across the entirety of the water sector (from water supply and reuse to demand management and infrastructure to water quality regulations to financing mechanisms) that stabilizes the costs of water services and supports an ability for everyone to afford safe, reliable water services.

Rather, the human right to affordable water services is an aspirational goal that we, as a nation, are committed to and striving to meet together.

Along with this vision and aspiration must be an equal recognition of the reality that the costs of providing safe, reliable water services are high, growing, and fall almost entirely on the local community. There will always be a tension between generating revenue to cover the costs of providing safe reliable services and ensuring affordable water services, especially for low-income households. These tensions reflect the reality of how important water services are for our society and how difficult that work is.

Recommendation 1.3: Any national strategy should be informed by and seek to address inequities in water service provision rooted in race, class, and place.

Any national strategy for affordable water services needs to recognize and work within the reality of past and present inequities because these inequities are manifesting as disparities in water services, from where water is provided, to the quality and location of infrastructure, to leaking pipes and the ability to pay water bills. Many of the utilities struggling with ensuring affordable water rates, and households struggling to afford water bills, are communities that have been systematically and chronically under-served, whether due to race, class, or location. The implications of these past and present inequities permeate daily lives and operations, including water bills and financial constraints of municipalities. When solutions are developed and implemented, they cannot start de novo; they cannot start from an assumption that all communities or households are starting from the same place of opportunity. Rather, certain communities and households – most often those communities of color – are starting from a place of systemic disadvantage. As such, a national strategy to ensure water affordability must recognize this inequity and prioritize providing resources to address affordability challenges in those communities.

ACTION 2: ADOPT AFFORDABILITY METRICS AND COLLECT DATA RELATED TO AFFORDABILITY.

Despite the growing recognition of water affordability challenges, there has not been sector-wide adoption of metrics to assess, inventory, and describe water service affordability. Along with this, the water sector has generally been a late adopter of digital technology and reticent to share data and information publicly. There are many good reasons for slow technology adoption and concerns around data sharing. However, water is a public good and some data – particularly data aggregated to the utility scale - can be, and should be, shared publicly. The lack of basic public data related to water services and affordability (e.g., shut-offs, delinquencies, service area boundaries, rate structures) is contributing to difficulties around understanding the prevalence and location of these challenges. Affordability challenges cannot be well managed or resourced without data to understand the challenge (you cannot manage well what you don't measure). As such, it is important for the water sector to (1) determine how best to measure affordability challenges (i.e. what metrics are needed) and (2) determine what data need to be collected to quantify those metrics. This action seeks to address those challenges and develop the data and metrics needed to guide the development of a national strategy and implementation of that strategy by state and local governments (Action 1).

Recommendation 2.1 The water sector should adopt metrics that enable quantifying, inventorying, and describing water service affordability at the household and utility levels.

Metrics are important to create a shared, consistent understanding of affordability challenges. Because of the importance of metrics, the water sector – regulatory agencies, water service providers, community groups, investors – must clearly decide what should be measured and how those measurements will help inform the national strategy and its implementation by states, tribes, territories, and local governments, including utilities. The water sector should come to agreement around shared definitions and adoption of metrics of affordability – utility financial capability and household affordability – as well as what data are most appropriate for those metrics. *Whenever possible, affordability metrics and the underlying data should be publicly available to provide transparency and trust, to garner greater participation and leadership around affordability challenges, and to provide consistent messaging and communication about the complexities of affordability.*

Recommendation 2.2: The federal government should enable the systematic, nationwide collection and curation of key affordability-related data for water services to demonstrate the scale and location of affordability challenges.

Once there is agreement on the key data needed to meaningfully measure affordability, then there must be a concerted, nationwide effort to collect the relevant data. The federal government will likely need to either incentivize or require utilities to report

these data; however, there is a cost to collecting and reporting data and it is important to ensure the data will be used, to limit the data collected, and to support data collection (by making the process easy or providing financial support).[54] The purpose of data collection must be well defined by clearly articulating how each dataset will be used to create metrics that a) provide foundational information about affordability, b) illustrate the consequences that occur when water services are not affordable, and c) convey the effectiveness of potential solutions.

Every effort should be made to minimize the need for new data collection or adding administrative loads to utilities, agencies, and communities. Indeed, there is already a substantial amount of data and information already collected and reported – whether internally by a utility, or for other reporting requirements – that can provide input to questions about affordability, including proxies and surrogate data. However, relevant data are currently poorly managed or rarely shared between units of government. Standardization and adjustments to already reported data (such as standardizing definitions or formatting) could greatly increase the insights possible from already existing data.

Examples of data that could inform affordability, and are generally available to many utilities include:

- Service area boundary,
- Rate structures,
- Number of customers served by customer type,
- Number of shutoffs by customer type,
- Number of accounts > 90 days delinquent (or other number of days),
- Availability and characteristics of Customer Assistance Programs,
- Typical household bill (e.g., median or average based on typical use).

In addition, **before any requirements for reporting data related to water services affordability, the regulating agency – whether federal or state – should have an appropriate, modern data management system developed for ingesting, storing, securing, and accessing affordability related data.** This system should allow public access to relevant data and metrics in open, standard formats, while providing and ensuring appropriate measures for privacy and security. It is not likely or preferable for a federal agency to develop such a data management system. Rather the federal government should fund the development of this system following Internet of Water principles as referenced in the Infrastructure Investment and Jobs Act.[55]

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[54] The Internet of Water. 2022. Legislation for Modern Data Infrastructure. The human right to water act (2012) in California provided the legislation needed for California to begin collecting data around water affordability.

[55] Internet of Water Principles as required by the Infrastructure Investment and Jobs Act. The development of such a system could be accomplished via a cooperative agreement with or grant to an independent third party.

Data and metrics should also be used to assess the efficacy of solutions being developed for addressing affordability.[56] Rate structures, customer assistance programs, conservation efforts, regionalization, consolidation, and innovative financing have been the primary solution sets used to address the affordability. However, there is limited aggregated, systematic evidence of the effectiveness of these approaches to reduce costs and improve affordability. While substantial attention is paid to failures, far less attention has been paid to successes, which may provide templates for future success. Systematically assessing the effect of different solutions could allow for course corrections and knowledge sharing between communities and utilities, better leveraging benefits that come through the experiences of others.

ACTION 3: ENSURE HOUSEHOLDS HAVE ACCESS TO ASSISTANCE WHEN THEY CANNOT AFFORD TO PAY FOR WATER SERVICES.

A human right to affordable water services (Principle 1.1) holds within it a tension between (a) ensuring that no person should be denied access to water because of an inability to pay, and (b) utilities needing to generate sufficient revenue to fully recover the costs of providing water services. To ensure access to affordable water services amidst the rapidly growing cost of water bills, utilities need multi-pronged strategies. First, there must be sustained focus on reducing costs wherever possible so that water bills are affordable whenever possible. Second, there must be an assistance program available for low-income customers who are unable to afford their water bills. Customer Assistance Programs (CAPs), for example, are effectively subsidies to increase the ability of financially constrained households to *maintain* access to water services, but they are not a replacement for affordability.[57] CAPs were initially intended to provide short-term crisis assistance; over time, CAPs have evolved into a customizable approach to address the variety of financial struggles that households may face, from assistance for seniors to bill reduction following a medical emergency. Such assistance is needed to address the reality that the cost of water services have become unaffordable for some households, whether chronically or due to an immediate crisis. Our goal should always be to ensure that water services are affordable; yet when this is not possible, assistance programs are a necessity to ensure access to water services. However, the majority of utilities do not have CAPs, and where CAPs do exist, enrollment of eligible customers is often low. Thus, until we are able to realize a national vision of affordable water services, there must be some baseline assistance available to ensure low-income households maintain access to water services, and such assistance could come from either the utility, state, tribal, territorial, or federal government.

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[56] Vedachalam & Dobkin. 2021. H2 Affordability: How water bill assistance programs miss the mark; Pierce *et al.* 2021. Solutions to the problem of drinking water service affordability: A review of the evidence. *Wires Water.*

[57] EPA. 2016. Drinking Water and Wastewater Utility Customer Assistance Programs; AWWA. 2019. State of the Water Industry Report; Vedachalam, S. and R. Dobkin. 2021. H2Affordability: How Water Bill Assistance Programs Miss the Mark.

Recommendation 3.1: The federal government should ensure that low-income households have access to an assistance program to pay for essential water services.

There is a shared responsibility between all levels of government to ensure assistance is available to low-income households when essential water services are not affordable to all households in a community. Assistance is needed by some households within almost all utilities; however, not all utilities have the ability or the capacity to create assistance programs.[58] The current revenue model for utilities relies almost exclusively on local ratepayers, meaning that some utilities will not have the financial capability to provide assistance programs (particularly if their customers are predominantly low-income). In addition, some states prohibit using revenue from ratepayers to subsidize other customers. There are also large administrative costs to creating CAPs that can increase the rates of other customers and exacerbate affordability challenges.[59]

Since not all utilities can provide assistance, and because the financial realities can overwhelm the capacity of local programs, it is necessary for the federal government to play a role in ensuring the availability of assistance for basic water services at the household level. This is not an unfamiliar role for the federal government in ensuring essential services at the household level: programs already exist to assist in food (Supplemental Nutrition Assistance Program – SNAP), energy (Low Income Home Energy Assistance Program – LIHEAP), housing (e.g. - Federal Public Housing Assistance), and internet services (Affordable Connectivity Program). Each program has different eligibility requirements and funding mechanisms, with different advantages and disadvantages.[60]

The specific set of activities that the federal government takes on will need to ensure that assistance is available for households in times of crisis, or assistance is available for households that are chronically poor when water services are unaffordable to some. With these two goals in mind, there are multiple pathways available depending on the particular goals and how such assistance may be best ensured:

- **The federal or state government could stand-up, fund, and sustain an assistance program:** The federal government could decide to sustain LIHWAP as a mechanism for providing assistance or to fund and expand the currently unfunded Low Income Water Assistance pilot program through EPA that will award grants (currently 40 grants per year) to eligible entities to develop local programs to assist low-income households through discounted rates, direct financial support to households, or debt relief to water system providers.[61] Another option is for the federal government to include water assistance within an already existing assistance program – such

[58] UNC Environmental Finance Center. 2017. Navigating pathways to rate-funded customer assistance programs.

[59] While utilities may fund CAPs, very few administer these programs directly. Rather, they often rely on third parties to administer CAPs (Vedachalam, S. and R. Dobkin. 2021. H2Affordability: How Water Bill Assistance Programs Miss the Mark).

[60] Patterson et al. 2020. Water Affordability & Equity: Re-Imagining Water Services - The Aspen Institute.

[61] Infrastructure and Investment Jobs Act. 2021.

as providing a water bill allowance as part of SNAP. Under the LIHWAP approach, households are currently provided assistance through the utility (i.e., the federal government pays overdue bills), requiring each utility to determine how best to administer assistance. If the federal government utilized a different assistance program, such as SNAP, funds are sent directly to households and utilities are provided assistance through individuals being able to pay their bills. The challenges here are the varying costs of water services, as well as the challenges and logistics of constructing, operating, and sustaining new government programs.

- **The federal government could require states and utilities to have assistance programs:** The federal government may mandate that states or local utilities provide household assistance, and then provide enabling resources for implementation as needed (i.e. administrative, technical, or financial) through already existing programs (such as SRFs). Currently, most utilities do not have a CAP, and the variability of the design and implementation of CAPs between utilities is substantial. **At a minimum, the federal government should issue guidance and best practices for customer assistance programs.** Because of the high degree of fragmentation in the utility sector, each utility is currently faced with designing and implementing its own assistance programs. The variability in these programs is large, as are the costs of design and implementation. The federal government could reduce costs and uncertainties of CAP design for utilities by pulling on the experimentation of utilities across the country to create different CAPs that address affordability.

At a minimum, the federal government should issue guidance and best practices for customer assistance programs.

Whichever option or pathway is chosen, all levels of government must recognize that assistance programs are stop-gaps, and are not replacements for the overarching goal of ensuring that water services are truly affordable to all households.

Recommendation 3.2: Any assistance program should prioritize ease-of-access by having minimal barriers of entry and automatic enrollment if possible.

CAPs are designed to assist certain populations: those in crisis, seniors, low-income households, those with disabilities, etc. However, the existence of assistance programs does not mean that assistance is reaching households in need. The general consensus is that there are often low (less than 30%) participation rates, and a recent study exploring CAPs across 20 large drinking water utilities found CAPs enrolled only 10 to 15% of eligible households.[62] Additionally, CAP eligibility requirements may exclude households

[62] Vedachalam, S. and R. Dobkin. 2021. H2Affordability: How Water Bill Assistance Programs Miss the Mark.

that need assistance, such as tenants, particularly those residing in multi-family housing if the units do not have submetering. Assistance programs with low participation rates hurt households that could use the assistance and is an inefficient use of resources given the costs of designing and implementing a CAP.

Regardless of which level or agency of government provides assistance (Recommendation 3.1), CAPs should have minimal barriers of entry and automatically enroll eligible participants. The federal government, in collaboration with other governments and organizations, should establish best practices for CAP enrollment and for how data are shared between governments to protect privacy while helping utilities reach households in need of assistance. For example, a household may be automatically enrolled in a CAP if they are receiving some other type of federal assistance for essential services (e.g. food, energy, housing) with the assumption that the household is likely struggling to afford all essential services, including water.

ACTION 4: SUSTAIN AND INCREASE SUBSIDIES FOR UNDER-RESOURCED UTILITIES.

Utilities largely rely on local ratepayers to generate revenue. Utilities that serve smaller populations and/or predominantly low-income residents have smaller revenue bases and may have difficulty generating sufficient revenue to cover capital improvement, operations, and maintenance costs. In short, utilities with limited revenue bases have limited financial capability. Some utilities may defer needed maintenance and capital investments to keep rates more affordable for customers. Without ongoing maintenance, the quality of services can decline and it is more expensive to replace infrastructure reactively (i.e. once it breaks) than proactively. Insufficient revenue is more problematic when the shortfalls are chronic and when unexpected, large expenses occur. These utilities can reach a point where the costs of providing safe and reliable water services to their community is no longer affordable.

To address these types of challenges, the government – state and federal – has provided financial assistance to utilities, primarily in the form of subsidized loans and grants. While these subsidies are immensely important to create sustainable long-term financial resources, the amount of state and federal support is not adequate to meet the scale of the problem, particularly as the costs of service continue to rise.

Recommendation 4.1: Subsidized loans and grants should be maintained and increased, with prioritization of under-resourced communities.

The federal government and state governments have developed many programs to provide financial assistance to water utilities, particularly subsidized loans. A large portion of these subsidies are via loans to provide sustainable financing for water systems over time, e.g., the State Revolving Funds (SRF) created by amendments to the Clean Water Act and the Safe Drinking Water Act. These revolving funds are capitalized with

federal grants, state contributions, leveraged bonds, and loan principal and interest payments. Because states issue loans rather than grants through the program, the repayment of loans adds to the pool of capital that states use to finance infrastructure over time, creating a perpetual source for future loans.[63] That is, sustaining and increasing federal funds to the SRF programs ensures states have capital to make current and future investment in water infrastructure. And because these loans are subsidized (i.e. the SRF interest rate is lower than the municipal bond market), the costs to finance projects are lower, which reduces the amount of revenue that utilities must collect from their customers to fund capital infrastructure projects. In short, subsidized loans to utilities help make water rates more affordable for customers, including households. The greater the investment by the federal government in subsidized loans, the greater the potential for more affordable water services in the future.

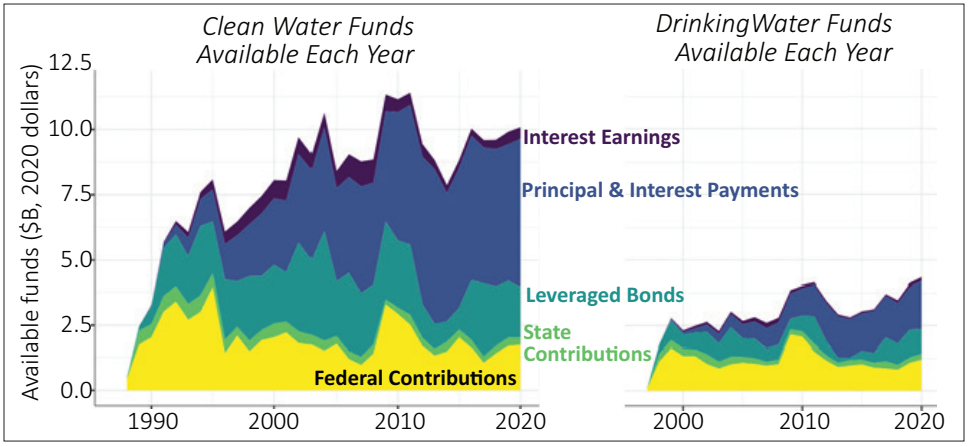

Figure 1: Annual available funds by source in the Clean Water and Drinking Water SRF. From 1987—2020, the EPA awarded over $92.2 billion in federal capitalization grants. States added $18 billion in matching contributions and $82.5 billion in leveraged bonds. Data: NIMS.[64]

Importantly, states allocate a substantial amount of SRF subsidized loans and other types of financial assistance to under-resourced communities. For example, SRFs prioritize assisting overburdened communities by requiring at least 6% and up to 35% of Drinking Water funds to go to communities that meet federal requirements.[65] To improve the financial capability of utilities, these loans should continue to prioritize such communities, while also maintaining the pool of funds that are available to finance water infrastructure in perpetuity.

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[63] K. Colson. 2021. Sustainable Water Infrastructure Testimony on Behalf of the Council of Infrastructure Financing Authorities. From 1987 to 2020, the EPA awarded over $92.2 billion in federal capitalization grants to the CWA and SDWA SRFs, with states adding $18 billion in matching contributions. An additional $82.5 billion has been generated through repayment of loans and interest from bonds. Hansen et al. 2022, in prep. Unspent State Revolving Funds.

[64] Ibid

[65] America's Water Infrastructure Act of 2018. 42 U.S. Code § 300j–12

Despite the sustainability of revolving loan programs, some communities will be challenged to afford to repay any loan and there will be some need for subsidies to be made as grants rather than loans. At the national level, there will need to be some portfolio of funding to utilities made available as grants, with explicit consideration and priority for how those funds are allocated to under-resourced communities.

Recommendation 4.2: States and the federal government should reduce barriers to utilities for accessing available grants, loans, and funding.

There are many grant and loan programs to finance water infrastructure available throughout the U.S., yet not all of these necessarily reach targeted utilities and communities. For example, by 2020, states and Puerto Rico had not committed $9.6 billion of available SRF funds, of which 14 states allocated the majority of available funds, 26 states allocated most funds (over 95% of available funds), and 10 states allocated less than 90% of available funds.[66] Uncommitted funds represent missed opportunities to improve infrastructure, as well as to improve affordability for communities.

Beyond reducing the balance of uncommitted funds, there is a need to ensure that resources are used as effectively as possible. In particular, communities most in need must know about and be able to access resources explicitly authorized for them. Because of the wide variety of programs (administered by many different agencies and offices), communities can struggle to simply identify which programs they are eligible for, let alone navigate the process of applying for funds.

In all, there needs to be a concerted effort to ensure that the most in-need communities can access already available subsidy programs. To enable this, states, in collaboration with relevant federal agencies, should:

a. **Make the application processes easier.** Applications for grants and subsidized loans should be reviewed, in collaboration with intended utilities, for the ease of application. For example, adopting rolling acceptance windows and creating online portals (in addition to sustaining paper applications) will make the application process easier.

b. **Provide proactive, pre-application assistance.** Applying for subsidies can be time consuming, and requires some level of expertise. In fact, with multiple federal and state agencies providing grants and subsidies, often through multiple funding pathways, just identifying available funding can exceed the capacity of targeted utilities. A consolidated office or pathway, at the state or federal agency level, could provide guidance and assistance to match utility needs with funding, providing the specific type of assistance needed to access available funds (i.e. identify funds, assist in applications, assist in managing awards, etc.).

[66] Hansen *et al.* Draft Publication. Unspent State Revolving Funds. Environmental Policy Innovation Center.

c. **Provide more planning and development grants.** Even if under-resourced utilities identify and pursue subsidized funding, projects need to have some degree of advance work done before subsidized funding is available. Some utilities do not have the resources to do upfront planning and would benefit from assistance to ensure long-term infrastructure investments are creating as many benefits as possible for the community.

d. **Broaden the use of funds.** Fewer financial resources are available for water service providers to cover operation and maintenance costs that exceed current revenue generation. Allowing some funding to be used for such purposes could gain traction, reduce deferred maintenance, improve water service provision, and reduce costs of infrastructure failure (e.g., non-revenue water loss, emergency response to main breaks, etc.). Funds may also be made available to improve monitoring and detection of the system to avoid emergencies.

ACTION 5: INVEST IN MANAGING AND REDUCING COSTS OF WATER SERVICES WHILE ENSURING QUALITY.

Over the long-term, ensuring access to affordable water services will be driven by the ability to deliver quality services while also reducing, or at least controlling, long-term costs. If costs rise uncontrolled, then the need for assistance programs will grow, adding expense. Thus, the water sector must invest wisely to manage, and ideally, reduce long-term water service costs. Wise investment means that the collective water sector must adopt an increasingly integrated, holistic approach to water management rather than as a series of fragmented, function-specific and isolated service providers. We must rethink traditional concepts of separating drinking water from wastewater or stormwater (i.e., adopting a one-water approach)[67], as well as rethinking the geography of water services by expanding planning to regional scales and perhaps even addressing challenges that occur within the private distribution network (i.e. within-the-house).

Importantly, investments in managing and reducing utility costs will not be immediately apparent in addressing affordability, which is why there must be availability of household assistance (Action 3). Rather, these long-term investments can result in reduced costs in the future if we make intentional investments in the present. This does not mean that costs in the future will be cheaper than today; rather, this means that by investing wisely and intentionally today, the costs of water will be cheaper in the future than if poor investments (or no investments) were made today. The conundrum is that household assistance will never solve the affordability challenge, which can only be solved by making wise investments that will reduce long-term utility costs.

[67] US Water Alliance. 2022. One Water Hub.

Recommendation 5.1: Incentivize and reduce barriers to integrated water planning and action.

One mechanism to reduce long-term costs is to ensure the long-term sustainability of water sources in terms of both quantity and quality. The risk of disruptions to water service drive up costs and many of these risks are external to a single utility's service area. Durable and resilient solutions must better match the scale of challenges and also expand beyond traditional boundaries, whether by engaging integrated planning through a One Water lens, adopting a more regional lens, or even better integrating at the utility and community scale (e.g. co-planning with other utilities or land development office). Moving towards more integrative planning will require addressing current policy barriers, such as the inability of many utilities to invest money generated from ratepayers for purposes outside of their service area. Integrated planning can also create opportunities for coordination and cost-sharing of projects between utilities.[68] In addition, federal and state governments can prioritize funding for collaborative projects between utilities that increase scale to generate long-term benefits; this may be best enabled by allowing multiple utilities within a region to obtain subsidized loans as a collaborative partnership rather than applying individually.

Integrated planning may also expand by recognizing that pipes do not end at property boundaries and that water loss or contamination on the private end creates weaknesses in the entire system. For example, addressing leaking pipes and/or inefficient water fixtures can create significant benefits for households (reduced bills) and the utility (reduced water loss in the system, improved operating efficiency, and reduced costs of providing assistance for high bills due to leakage). While going beyond the property line can improve efficiency of a utility and improve household affordability, such efforts at providing in-home efficiency measures (appliances, leak checks) can be logistically difficult, have high transaction costs, and create an additional role for utilities that are often already over-extended.

Recommendation 5.2: Incentivize regionalization and consolidation with subsidized loans and grants.

The fragmentation of water service providers limits the potential to reach economies of scale, allowing the costs of water services to be shared by a larger customer base. Small utilities, in particular, face several financial disadvantages that can lead to higher costs per customer: much of water infrastructure costs are fixed, limited technical and managerial hiring capacity, limited access to capital to address infrastructure needs. In these instances, some form of regionalization or consolidation can allow costs to

[68] For example, the Texas Water Development Board requires each region to develop their water strategy plan - including lists of projects. The coordinated planning builds awareness of activities between local stakeholders within and across regions - allowing for collaboration and potential funding assistance from the state.

be shared among a wider revenue base, thus improving household affordability, and can range from informal partnerships, to merging staff and resources, to the physical consolidation of infrastructure.[69] It can also include privatization, where a single entity owns multiple systems across a state or region.

Consolidation of water services, however, must also be viewed and considered through its direct impacts on communities and households; too often these voices of the community have not been at the table. When these groups and perspectives are absent, consolidation can cause significant harm, particularly to vulnerable communities. As such, **consolidation should account for community input from the start, rather than engaging the community late in the process.** When used, consolidation should be viewed as a mechanism for improving safe and affordable water services and not as an instrument for other agendas (e.g., reducing the size of government). Thus, any exploration of consolidation must first be done in a way that is fully transparent and engages the local communities affected. Second, consolidation must be prioritized in systems that persistently fail to to meet health-based standards over others that are merely experiencing financial challenges.

Consolidation should account for community input from the start, rather than engaging the community late in the process.

States and the federal government should incentivize, if not directly fund the transition costs to enable the various forms of regionalization, from virtual/shared management to combined infrastructure.[70] When states have encouraged or mandated regional consolidation, there has been a systematic decrease in the overall number of utilities and a commensurate decline in water quality violations. States like California and Ohio provide financial incentives for systems that pursue consolidation under the SRF program. Also, several states began requiring any new system to provide evidence as to why it should be created rather than a nearby system expanding to provide those services. This role of the states and federal government should also ensure that when consolidation occurs, local communities are part of the process and sufficiently heard throughout.

Recommendation 5.3: Infrastructure spending, including subsidized loans and grants, should prioritize projects that reduce long-term costs over projects that are shovel-ready or lowest cost today.

Capital planning is often done for a 5- to 20-year period, with rates set to support the capital plan using as many low-interest loans and grants as possible. As a result, one of

[69] Physical consolidation is a viable option for 86% of small systems that are located within 5 miles of another system: EPA. 2002. System partnership solutions to improve public health protection. Volume 2.

[70] Aspen-Nicholas Water Forum. 2018. Reaching Watershed Scale through Cooperation and Integration.

the primary lenses for determining the best capital plan has been to select the lowest cost plan today even though that plan may not always be the lowest cost over the lifetime of the project. To reduce long-term costs for ratepayers, water utilities need to evaluate the lifecycle and long-term costs of current investments. This may mean selecting unusual, alternative, or even a more expensive capital infrastructure plan today, but one that will achieve long-term sustainability and resilience that lowers the total costs over the lifespan of the infrastructure and its debt.[71] Additionally, there must be a cultural shift to not only continually invest in, but also maintain infrastructure (included in full cost analysis and planning), in order to prevent crises that are dangerous to the public health and ultimately more expensive to remedy.

Procurement practices at the utility scale, as well as loan programs at the state or federal scale, must shift their prioritization and scoring criteria from least costs now to full costs over decades in order for investment practices to change. As an example, as part of the American Reinvestment and Recovery Act following the 2008-2009 recession, the federal government prioritized "shovel ready" projects rather than what the sector refers to as "shovel worthy" projects that are sustainable and resilient. This pivot requires moving from a focus (or even fixation) on low-bid, to instead focusing on long-term sustainability, or projects that can realistically result in long-term cost reductions.

ACTION 6: PURSUE FISCALLY SUSTAINABLE REVENUE MODELS THAT INCLUDE THE BROAD PUBLIC BENEFITS OF WATER SERVICES.

The costs of water service are rising from factors beyond the control of local water service providers: climate change, migration of water intensive industry, improved water efficiency, upstream pollution, emerging contaminants, among others. The reliance on local ratepayers within a utility to cover those growing costs will strain the financial capacity of some communities. Moreover, rate structures that price services strictly on water usage do not account for the broader public benefits (e.g., fire suppression). In order to better reflect broader benefits of water services to society, utilities may look to diversify and expand their revenue sources.

Recommendation 6.1: All utilities must recover the full-cost of delivering water services.

Affordable water services provide immense benefits to public health, the environment, and the economy. Despite these benefits, it has been a chronic challenge for some water service providers to recover the full costs of delivering these services. Even with rate increases, an estimated 10% of water utilities in 2019 still were not charging enough to

[71] For example, EmNet - a company acquired by Xylem - used data and technology to improve wastewater and stormwater management generating estimated savings of $437 million over the next few decades (https://news.nd.edu/news/smart-sewer-technology-leads-to-nearly-450-million-in-savings-for-south-bend/). Another example is the DC Environmental Impact Bond, where DC entered into a $25M bond to invest in green infrastructure in order to reduce the estimated $2.8B in gray infrastructure needed to address stormwater challenges (https://www.quantifiedventures.com/dc-water).

recover full costs and 19% are barely able to cover full costs.[72] Thus, at a minimum, all water service providers – drinking water, wastewater, and stormwater – must develop a revenue model that recovers the full costs of services.

Recommendation 6.2: Revenue portfolios should be diversified to capture the broader benefits of water services to society.

Many water utilities rely on usage-based rates to generate revenue. However, relying solely on such approaches to revenue generation do not recognize or reflect the broader benefits to society that well-functioning, affordable water services provide. Among several ways to improve revenue generation, several were recognized as worth being explored as part of ensuring water service affordability:

a. **Increase the use of metering:** The use of water metering provides a wide range of benefits including leak detection, demand management, and conservation. It can also provide a mechanism for a more active relationship between the utility and customer if assistance is needed. Improved metering, particularly submetering, may allow the water sector to diversify rate structures to recognize (and charge for) different water uses.

b. **Increase flexibility for rate-setting.** The ability for utilities to develop and implement rate-setting approaches to improve affordability has been constrained, in some cases, by state regulations.[73] State policies around rate structures should be revisited and enable utilities to establish rate structures that better promote affordability goals.

c. **Make greater use of affordability-enabling rate structures.** Some elements of affordability can be provided via tailored rate structures (which can, at times, obviate the need for assistance programs). Rate-structures can enable affordability by adopting several features: (a) low fixed charges; (b) volumetric sewer prices based on indoor flows; (c) low volumetric water prices for essential household water use; and (d) steeply escalating volumetric prices for demand beyond essential use.[74] There has been tremendous research on rate structures that can improve affordability, but these new approaches have been insufficiently deployed across utilities to improve affordability. It should be noted that if utilities have flexibility in rate-setting (see b. above), then making greater use of this flexibility is a very efficient mechanism available to the utility. However, there can be

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[72] AWWA. 2019. State of the Water Industry Report.

[73] UNC Environmental Finance Center. 2017. Navigating pathways to rate-funded customer assistance programs.

[74] Teodoro, M. 2018. Why rate structures, not assistance programs, offer the most promising path to water affordability.

unintended consequences from rate structures – for example conservation rates during drought and the use of water budgets.[75]

d. **Protect water service funds for water service purposes.** Too often, local governments use water service rates to keep municipal taxes artificially low. When water services are part of local government (rather than operated and governed as a special purpose district), local governments divert rate payer funds for purposes outside of water services. Additionally, municipal water utilities, at times, are taxed by the municipality they serve.[76] In both cases, increasing water rates to keep taxes low disproportionately impacts low-income customers, who in effect subsidize the local municipalities by paying higher water bills while allowing the municipality to keep local taxes artificially low.

e. **Value broader benefits of affordable water services:** Utilities should seek to generate revenue in a way that more appropriately values the broader benefits of water services to society. This could include diversifying the revenue portfolio through such approaches as leasing land for revenue (e.g., telecom towers) or adding ad valorem based revenues to rates to more equitably capture societal benefits by generating more revenue from higher value properties (i.e. those who benefit the most from services such as fire suppression).

Recommendation 6.3: Water service providers should pursue multiple methods for pursuing payment; shutoffs should be a last resort.

Adopting a principle for the human right to affordable water services (Principle 1.1) means moving towards reducing, and aspiring to eliminate the use of shutoffs on residential households. Shutoffs are seen as a mechanism for ensuring payment, which in turn boosts the confidence of credit rating agencies that debts can be repaid, thus lowering the cost of capital for utilities. The actual disconnection and reconnection of services is costly for utilities and recovered costs typically represents a small component of a utility's revenue; that is, shutoffs are not (in and of themselves) a highly effective financial instrument for the utility. Thus, while shutoffs are useful for ensuring payment, they are costly and have detrimental impacts on the community, particularly vulnerable communities who are disproportionately affected by shutoffs.[77] Because of the challenges that shutoffs cause for the household, the community, and the utility, utilities should develop and pursue multiple cooperative efforts to reduce the need for shutoffs, which should always be viewed as a last resort for ensuring payment.

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[75] E.G. Beecher. 2012. The ironic economics and equity of water budget rates. Journal of the American Water Works Association 104(2): E73-E81.

[76] Teodoro, M. 2021. (Un)taxing the Tap.

[77] Montag. 2019. Water/Color: A study of race and the water affordability crisis in America's cities.

Appendices

Glossary

The following is a list of terms and phrases either defined elsewhere or defined as used here.

Affordability: In the context of this report, affordability is used to discuss household level affordability (defined below) while affordability at the community level is discussed as the financial capability (defined below) of the community to afford its water-related utility(ies).

Affordability program: A program in which a utility provider's rates are designed to ensure eligible households are able to pay their regular utility bills consistently and successfully.

Assistance program: A program or policy that is not an affordability program and that (a) is designed to meet the need of an eligible household (or eligible customer) through short-term assistance to pay utility bills or arrears, including but not limited to grants, arrearage forgiveness, or deferred payment agreements, (b) provides ongoing reductions to eligible households or customers utility bills through methods including but not limited to recurring discounts on bills or assistance with improvements to plumbing, fixtures, or property to reduce water usage or other conservation efforts. Such programs are often referred to as Customer Assistance Programs (CAPs).

Class: A system of ordering a society in which people are divided into groups based on perceived social or economic status.

Customers (or ratepayers): residential and non-residential customers who receive water services from a utility. Residential customers may refer to single family residents or multi-family residents (e.g. apartments, condos). Multi-family residents are sometimes classified with non-residential customers - at least in terms of rates. Non-residential customers typically include commercial, industrial, and institutional organizations. Water service customers are also often referred to as ratepayers.

Essential Water Services: An amount of water to ensure basic domestic needs of drinking, cooking, sanitation, and hygiene. The World Health Organization recommends that each person needs between 13 to 26 gallons each day to meet basic needs and that the costs of such services should not exceed 3% of a household's income.[78] Note that this report does not weigh in on what constitutes essential services for drinking water, wastewater, and stormwater.

[78] UN. 2010. Human Right to Water.

Financial capability: the ability for a community to afford the costs of their water utility(ies) in terms of infrastructure, operations, maintenance, and financing (e.g., debt service) while remaining in compliance with regulations.

Household affordability: the ability for a household (whether residing in a single residential unit or a multi-family building, e.g. apartments) to pay for the basic water services needed for drinking, cooking, cleaning, and sanitation while maintaining the ability to pay for other essential needs and services.

Overburdened: Minority, low-income, tribal, or indigenous populations or geographic location that potentially experience disproportionate environmental harms and risks. The term describes situations where multiple factors, including both environmental and socio-economic stressors, may act cumulatively to affect health and the environment and contribute to persistent environmental health disparities.

Sustainability: Ensuring the long-term availability of water services that are reliable (adequate supply and safe) and affordable.

Utility: an organization supplying the community with water, sewerage, or stormwater. The organization may be publicly or privately owned.

Water Sector: refers to the broad compilation of actors involved in managing water resources. This includes federal agencies, state agencies, local governments, utilities, private organizations, and nonprofits. The decisions and actions made by these groups impacts the quantity, quality, and management of water resources.

Water Services: the provision of drinking water, wastewater treatment, and stormwater services from a utility, whether public or private.

Water Systems: the utility's physical infrastructure that provides water services in a community.

Participants

Note: As written and adopted, this report seeks to capture the essence of participant conversations, but individual participants may not agree with every aspect of the report. Rather, in affixing their name as a signatory, a participant is signaling support for the overarching concept of the series and the broad outcomes discussed herein. The participants took part in their individual capacity and their affiliation and titles are included here for identification purposes only. Their organizations are not responsible for the findings, principles, recommendations, or other content of this report.

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