Safeguarding Water Affordability

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Introduction

In a series of briefs, the Bipartisan Policy Center's Water Task Force is exploring some of the unique challenges and opportunities facing our nation's water and wastewater sectors. This paper dives into one of the most vexing problems for water systems in the United States: how to price water services to fully cover costs and maintain affordability for customers who already struggle to pay their bills.

From a policy perspective, there are four main points to recognize:

- The magnitude of investments needed to address aging infrastructure, changing customer bases, regulatory compliance, and climate change requires higher rates. Related to this, conservation efforts have led to water use declines, which can push utilities to further compensate for lost revenue.
- Because every human being needs safe, clean water and sanitation, safeguarding affordability and access for vulnerable households amid these rising costs must be a national priority.
- Many water systems are fundamentally ill-equipped to respond to cost pressures and address affordability concerns, lacking effective asset management and sustainable business models.
- In strategically responding to these challenges, partnerships with the private sector—a potentially cost-effective but underutilized tool in the water industry—offer a promising opportunity to modernize infrastructure and optimize service.

This brief reviews these issues and offers policy options to ensure that disadvantaged communities have equitable access to critical water services. This aim must be part of a broader effort to more effectively price water services and manage water systems across the country. Without tackling these first-order challenges, many water systems will continue to operate unsustainably and insufficiently maintain their assets, leading to waste, inadequate service, and higher prices.

Water Sector Landscape

In the United States, water services—drinking water, wastewater, and stormwater—are provided by a fragmented system of entities, both small and large, publicly and privately owned. Even within a municipality, these services may all be managed by different agencies, departments, or utilities. Typically, the U.S. Environmental Protection Agency (EPA) classifies these systems as one of the following:

- Community Water System (CWS): A public water system that supplies drinking water to the same population year-round.
- Non-Transient Non-Community Water System (NTNCWS): A public water system that regularly supplies drinking water to at least 25 of the same people at least six months per year. Some examples are schools, factories, office buildings, and hospitals with their own water systems.
- Transient Non-Community Water System (TNCWS): A public water system that provides water in a place such as a gas station or campground where people do not remain for long periods of time.
- Publicly Owned Treatment Work (POTW): Facilities and systems that treat domestic and municipal wastes, as well as industrial wastewater, and discharge the treated wastewater into U.S. waters.
- Municipal Separate Storm Sewer System (MS4): Systems through which stormwater runoff is transported and discharged into local water bodies, but which are not part of a POTW.

BPC's Water Task Force provided a more comprehensive rundown of these systems and their needs in its first brief, *Understanding America's Water and Wastewater Challenges*.[1] However, a short overview of the water sector landscape is instructive. Its makeup deeply affects the ability of water systems to affordably provide services.

There are more than 151,000 public drinking water systems across the country. Yet most Americans—more than 300 million—are served by the over 50,000 community water systems.[2] See Figure 1 for a breakdown of these systems and the populations they serve. Notably, though those serving fewer than 10,000 people make up 92 percent of CWSs, they provide drinking water to less than one-fifth of the total population. In comparison, just 429 of the largest community water systems account for nearly half of the population served. According to the U.S. Census Bureau, public or private water systems are the primary source of drinking water for 88 percent of U.S. households, with wells serving the remainder.[3]

For wastewater and sometimes stormwater conveyance and treatment, 14,748 publicly owned treatment works serve more than 238 million Americans or 76 percent of the U.S. population.[5] According to the U.S. Census Bureau, 19.6 percent of U.S. households use septic tanks or cesspools for sewage disposal.[6] In addition, the EPA regulates about 7,450 MS4s for their stormwater discharges.[7]

Both public and private entities operate these various water systems, though private sector involvement is more common in the provision of drinking water. Water systems classified by the EPA as either privately owned or under public-private ownership represent 49 percent of all community water systems, though they serve 13.5 percent of the population. Among these systems, there is a diversity of ownership arrangements, from regional investor-owned companies to multinational water providers.

Figure 1. Community Water System Statistics, 2016

	Population Size Category					
	Very Small ≤ 500	Small 501 - 3,300	Medium 3,301 - 10,000	Large 10,001 - 100,000	Very Large ≥ 100,000	Total
Number of Systems	27,604	13,466	4,984	3,883	429	50,366
Population Served	4,644,976	19,341,848	29,127,636	111,048,115	141,670,009	305,832,584
Percentage of Systems	55%	27%	10%	8%	1%	100%
Percentage of Population Served	2%	6%	10%	36%	46%	100%

Source: U.S. Environmental Protection Agency[4]

Pricing Pressures

Many water systems are grappling with aging and deteriorating infrastructure, changing customer bases, regulatory compliance, and climate change—all of which add to the growing costs of providing water services. At the same time, per capita water use has been declining, in part because of the widespread adoption of more efficient fixtures and appliances.[8] While increased water efficiency and conservation efforts may help to lower customers' bills, they can also jeopardize the stability of incoming revenues and compel systems to compensate with higher rates. But in the long run, conservation can reduce costs by limiting the amount of water that must undergo treatment, preserving strained supplies in water-stressed regions of the country, and helping growing systems avoid new and expensive investments to expand capacity. On balance, because of such benefits, declining water use is not analogous to other pressures facing water systems, though it similarly complicates rate-setting and financial sustainability.

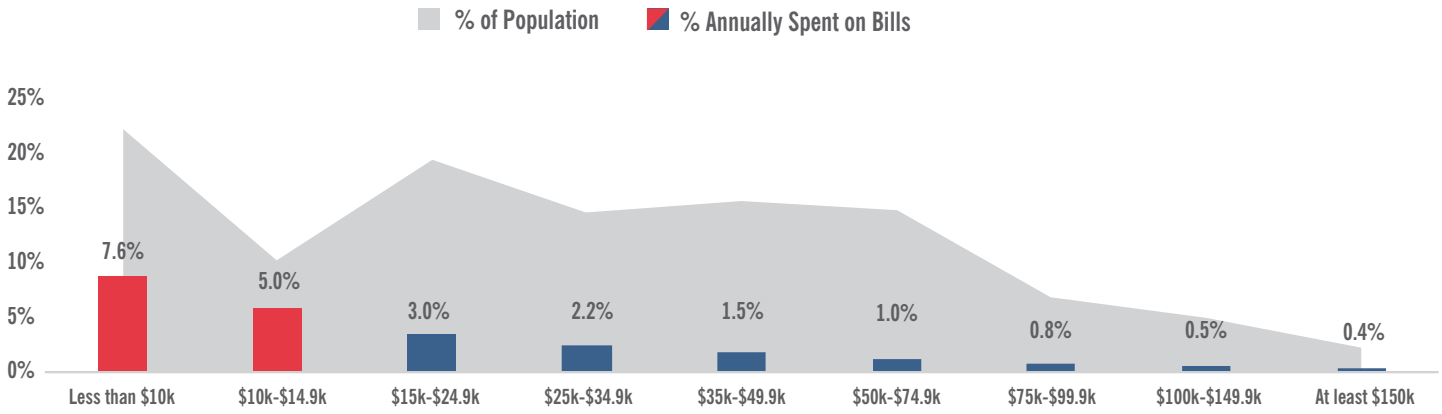
Despite some national visibility around the general need for infrastructure investment, the severity of the challenges facing the water industry, and their potential impact on the ability of households to pay for water services, are vastly underappreciated among both policymakers and the public. Historically, widespread underpricing has led to the perception that water services are cheap or essentially free, with little attention paid to the complicated and, at times, costly infrastructure needed to treat and convey water and wastewater. This is partly a symptom of ineffective and unsustainable management. That is not to say that all water systems are poorly managed. But many have failed to adopt effective business models, including a full accounting of the life-cycle operations and maintenance (O&M) costs of existing infrastructure and new investments required to meet future needs. This is a first-order problem in safeguarding affordability. No comprehensive database of costs, investment needs, and rates at the system level exists. Even if it did, these rates likely would not fully reflect the costs of sustainably providing water services. This makes understanding the level of need and parsing out the burden of rising prices all the more complicated.

Despite these limitations, some researchers have attempted to better understand the challenge of water affordability in the U.S. with the best data available. One study found that if water rates rise at projected amounts over the next five years, the percentage of U.S. households who will find water bills unaffordable could triple from 11.9 percent to 35.6 percent.[9] The Congressional Budget Office similarly projected that between 11 and 21 percent of households will spend more than 4 percent of household income on drinking water alone by 2019.[10] Water industry stakeholders generally interpret EPA guidelines to suggest that spending under 2.5 percent of household income on drinking water is affordable (4.5 percent for annual water and wastewater spending combined).[11]

Rising rates can be especially problematic for lower-income customers, whose water and wastewater costs represent a comparatively higher proportion of monthly household expenditures. Particularly for those on fixed incomes, this can lead to trade-offs between paying for water services and necessities like housing, food, medicine, and other utility bills.

To illustrate this point further, consider that in 2015, the median household income in the United States was $56,516 and the average drinking water bill, according to one study, was $62.40 a month or $748.80 annually (assuming a family of four and 100 gallons of water used per person per day).[12] Drinking water costs alone therefore represent approximately 1.3 percent of the

Figure 2. Affordability of Water and Wastewater Rates in Detroit
(Assessed at 5,000 Gallons/Month and 2015 Income Levels)



Note: EPA guidelines suggest that spending more than 4.5 percent of household income on drinking water and wastewater combined is unaffordable.
Source: University of North Carolina at Chapel Hill Environmental Finance Center[13]

national median household income. Yet for the 43 million Americans that live below the poverty line—$24,257 for a family of four—drinking water costs alone jump to 3.1 percent of income or more. Figure 2 provides a snapshot of this challenge, breaking down the costs of water and wastewater by income groups in the City of Detroit. Those making less $25,000 pay between 3 percent and 7.6 percent of their annual incomes on water and wastewater.

Though the national poverty rate stands at 13.5 percent, American Indians and Alaskan Natives (26.6 percent), Blacks (24.1 percent), Hispanics (21.4 percent), residents of rural communities (16.7 percent), and people with disabilities (28.5 percent) are all more likely to live in poverty.[14] Moreover, 13.5 percent of poor Americans live in neighborhoods of concentrated poverty (i.e., census tracts where 40 percent or more of the population lives below the federal poverty line).[15] Growing up in these neighborhoods has been tied to poorer physical and mental health outcomes.[16] Though clean, safe water and sanitation are critical to all Americans, affordable access to these basic services is essential to protecting the health and wellness of vulnerable or disadvantaged populations.

These disparate health outcomes are far from surprising. A growing body of research has shown that disadvantaged communities face disproportionate environmental burdens.[17] Recent failures in drinking water infrastructure and management tragically illustrate such findings, having jeopardized public health and led to public outcries in both small and large communities across the United States—including lead contamination in Flint, MI, and Jackson, MS; chromium south of Midland, TX; elevated levels of uranium and radium in New Mexico; and the nitrates and arsenic identified in California's rural Central Valley.[18] The evidence is clear: Communities of all sizes are struggling to reliably provide clean, safe drinking water at reasonable rates.

To ensure that low-income households can affordably purchase water services, policymakers must recognize the primary drivers of increasing costs and impediments to a holistic response. In our first brief, *Understanding America's Water and Wastewater Challenges*, the task force outlined many of the issues utilities are grappling with, but the following subsections provide a brief overview of key factors affecting the trajectory of water prices.[19]

Aging Infrastructure

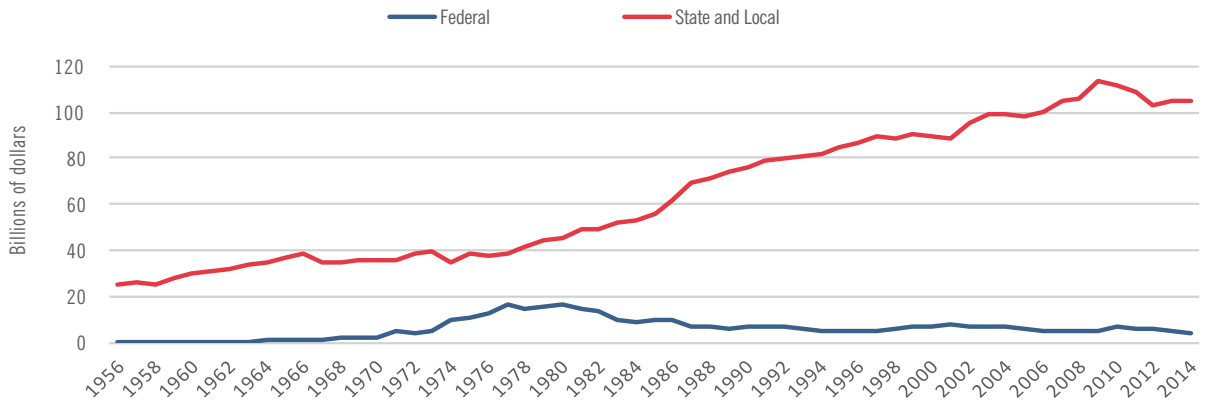
The growing cost to repair, replace, and expand drinking water, wastewater, and stormwater infrastructure across the country is putting significant pressure on utilities to raise rates. Aging infrastructure, some more than 50 to 100 years old, has a particularly high relative cost of replacement. Moreover, water and wastewater utilities are capital intensive by nature, requiring more financial capital in fixed assets (e.g., supply, treatment, and distribution facilities and infrastructure) relative to operating revenues than many other utilities and industries.

At the root of the problem, too little emphasis has historically been placed on ensuring that water systems adopt financially resilient business models. This includes appropriately managing infrastructure assets, fully accounting for O&M costs over their assets' lifecycles, prioritizing investments, and setting rates to collect the revenues needed to sustainably operate over the long term. As a result, many water systems have deferred maintenance and replacement, pushing infrastructure assets far beyond their intended lifespans, and now face significant costs to repair or replace them.

According to EPA surveys, the United States has a 20-year investment need of $655 billion—$271 billion for wastewater/stormwater upgrades and $384 billion for drinking water upgrades.[20] Moreover, these surveys do not fully capture all needs. For example, the EPA's clean water survey only accounts for 21 percent of stormwater management needs.[21] Investments needed to comply with recent regulations and deliver projects related to fire suppression, future population growth, and source water protection are other examples that are not captured in the survey numbers. The American Water Works Association separately estimated a 25-year investment need of over $1 trillion just to maintain and expand drinking water infrastructure to meet expected demand.[22]

The financial burden of repairing and replacing aging infrastructure, and expanding systems where needed, falls largely on local governments and, of course, individual utilities and their rate-paying customers. As shown in Figure 3, the federal government has traditionally provided only a fraction of public spending for water infrastructure. Apart from the uptick in federal investment that followed the passage of landmark environmental protections in the 1970s, federal funding for water and wastewater infrastructure has not kept pace with state and local investments or growing needs.

Figure 3. Public Spending on Water and Wastewater Systems



Source: Congressional Budget Office[23]

Changing Rate Bases

The overall number of rate-paying customers—whether growing or shrinking—affects a utility's ability to spread the mostly fixed costs of operating existing infrastructure and delivering water services over its base of customers. By one estimate, population growth will drive the need for new capacity and increase O&M costs by up to $2 billion per year for wastewater utilities.[24] However, growing systems do have some ability to recoup the costs of expansion (for example, through the assessment of impact fees and increased user revenues) or delay adding capacity (by encouraging conservation).

Yet many cities struggle with shrinking populations, including 99 of 674 midsized U.S. cities (populations from 50,000 to 99,999).[25] Reviewing ten of these cities, the Government Accountability Office found that utilities in mid- and large-sized cities with shrinking populations face declining revenues and increasing operational costs. When compared with similar cities with growing populations, declining cities had higher poverty rates (23.6 percent compared with 16.5 percent), higher unemployment (12.5 percent compared with 9.2 percent), and lower median household incomes ($40,993 compared with $57,729).[26] Residents in these cities are left to cover the costs of systems designed for much larger populations, necessitating increased rates for a typically-low income population.

For systems serving a shrinking customer base, the combination of rising costs and flat or declining demand augurs rising prices, generally in communities least equipped to handle them. Irrespective of diminishing household ability to pay for services, any failure to make needed investments could undermine the integrity of their water systems and further exacerbate public health risks from lead and other contaminants. In the end, with few other options, these water systems often opt to continue operating and maintaining infrastructure intended to serve more people, leading to higher rates, excess capacity, deferred maintenance, and drained public resources. Incoming revenues become insufficient to cover future cash-flow requirements—particularly once debt repayments and increasing operational costs are factored—and affect a systems' bond rating and ability to attract private investment.

Regulatory Compliance

The purpose of federal water standards—established through the Federal Water Pollution Control Act (commonly known as the Clean Water Act or CWA) and the Safe Drinking Water Act (SDWA)—is to promote public health and protect aquatic ecosystems. Yet these standards and their attendant health and environmental benefits come at a cost. For example, one study estimated that government and industry have collectively spent over $1 trillion to abate water pollution in the United States since 1972, or over $100 per person-year.[27]

Detection of the dangerous parasite *cryptosporidium* in the Bull Run watershed, the primary source of drinking water for Portland, OR, and its suburbs, provides a recent example of the direct costs of regulatory compliance: Options to treat the contaminant to EPA standards—including the construction of a $350-500 million treatment facility—could increase rates anywhere from $3.01 to $18.14 a month, despite state health authorities declaring that there is no immediate threat to human health.[28] Increasingly stringent water quality standards, when the costs of compliance are fully recovered by customer rates, can become a significant burden.

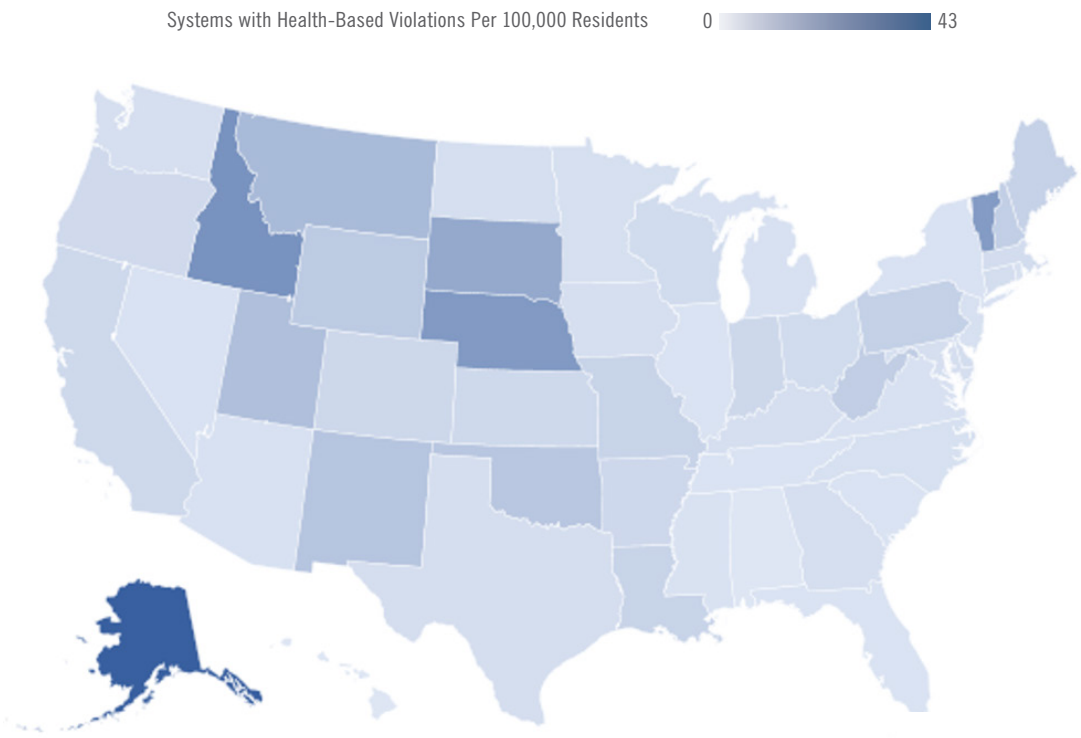
The EPA's most recent drinking water survey included $42 billion, or approximately 11 percent of needs identified in the survey, directly attributable to SDWA compliance.[29] Of that $42 billion, 88 percent is needed for compliance with existing regulations and the remaining 12 percent is needed for compliance with proposed and recently promulgated rules. While water systems continue to invest in treatment and detection to limit currently regulated water contaminants, emerging contaminants may be regulated in the future, and come with added compliance costs.

Compliance with the Clean Water Act—intended to reduce water pollution—includes its own set of costs. For example, the correction of combined sewer overflows (CSOs)—in which stormwater mixes with sewage, overwhelms treatment systems, and flows into local bodies of water—has a 20-year expected cost of $48 billion.[30] EPA-mandated retrofits to mitigate CSOs can include hefty price tags for individual cities: $4.7 billion in St. Louis, $1.3 billion in Seattle and King County, WA, and $3.1 billion in Cincinnati, for example.[31]

Remaining compliant with these regulatory standards requires significant and continuous levels of investments from systems of all sizes. Setting aside the potential for new regulatory requirements, many systems struggle with rules already on the books. Figures 4 and 5 map the incidence of both health-based drinking water violations and CWA noncompliance across the country. Notably, 34 percent of public water systems were found to be noncompliant with the SDWA in 2016—though mostly for minor infractions of reporting or monitoring requirements.[32] Very small water systems—those serving fewer than 3,300 people—made up 74 percent of the 4,470 systems found to be "serious violators," systems that often have a history of uncorrected violations.[33]

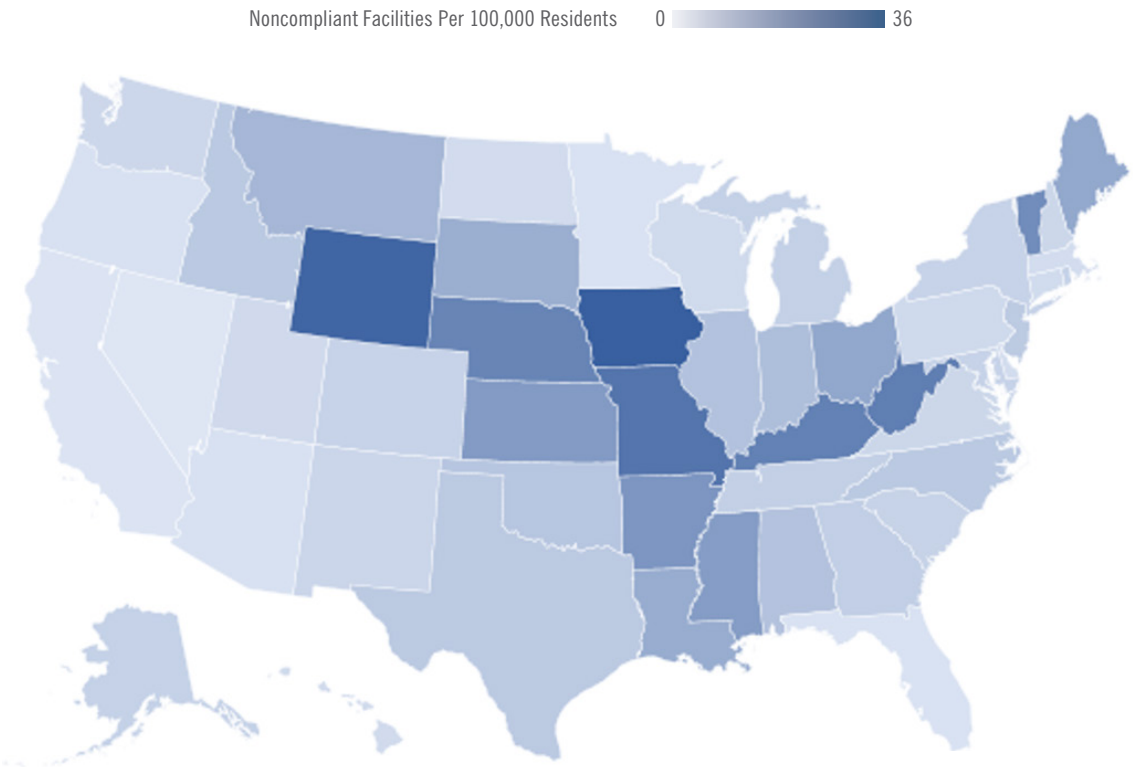
Small systems, in particular, often lack the economies of scale and technical, managerial, and financial (TMF) capacity to meet evolving regulatory standards.[36] Even with the same marginal benefits and the same customer incomes as large systems (which is usually not the case), small systems generally pay more per unit to invest in improving water quality. While the EPA and U.S. Department of Agriculture (USDA) provide some funding for construction and technical assistance, small and disadvantaged communities may struggle to even pool together sufficient resources to adequately identify their most pressing needs and apply for funding. Though the costs of complying with all federal standards can be burdensome, any effort to provide communities with additional flexibility can come at the expense of public health and safety.

Figure 4. Drinking Water Violations in 2016



Source: U.S. Environmental Protection Agency[34]

Figure 5. Clean Water Violations in 2016



Source: Environmental Protection Agency[35]

Climate Change

Across the country, temperatures are rising, snow and rainfall patterns are shifting, and extreme climate events are growing more common.[37] For example, in the past 50 years, precipitation from the most intense 1 percent of storms has increased by 20 percent, with the Midwest and Northeast observing even higher increases.[38] Climate change affects human health and the environment in ways that are of particular importance to how water systems operate. Specifically, projections show that our changing climate will:

- Reduce water quality, by increasing river and lake temperatures and changing the magnitude and seasonality of river flows, affecting the concentration of pollutants which community water systems must remove;
- Result in more extreme flooding and the increased discharge of untreated sewage into waterways, driven by an increase in extreme precipitation events;
- Lead to saltwater intrusion into estuaries and freshwater aquifers, driven by sea level rise, which could threaten drinking water supplies; and
- Create more dramatic fluctuations in surface and groundwater supplies, challenging water management and potentially leading to water shortages in some parts of the country.[39]

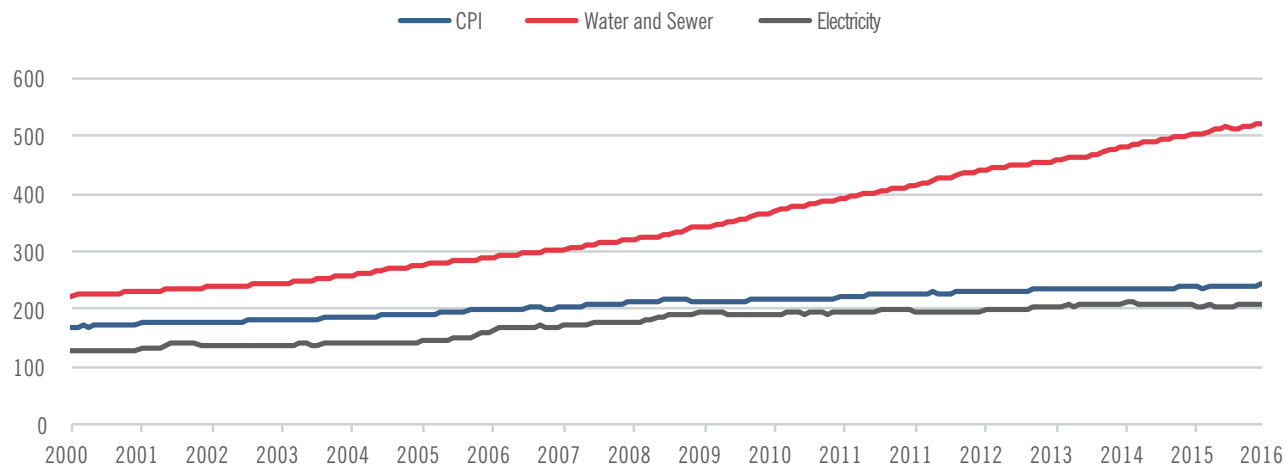
While these impacts certainly complicate water management and planning, they also come with tangible, direct costs. Using two different climate models, the EPA's Climate Change Impacts and Risk Analysis (CIRA) project estimated that, without global mitigation efforts to reduce greenhouse gases, climate change will affect water quality, urban drainage, and water supply in the United States, with damages totaling between $8.8 billion and $67.9 billion by 2050, and $23.6 and $198.2 billion by 2100.[40] With ambitious global mitigation efforts, the CIRA project still estimated between $1.2 billion and $14.4 billion in damage by 2050, and $3.2 to $19.6 billion in damages by 2100.[41] If CIRA estimates prove accurate, these impacts may represent a sizable burden on water utilities and require significant new investments in conservation, supply conveyance, and treatment.[a]

[a] These estimates are based on author calculations of CIRA project impacts to water quality, urban drainage (50-year storm), and water supply. The upper bound estimates for both mitigated and unmitigated damages does not include any MIROC climate model projections for urban drainage, as these were not included in publicly available CIRA data.

Framing the Affordability Challenge

Underscoring the challenge of these projected cost drivers, average consumer water prices are already rising, on average, by more than twice the rate of inflation (see Figure 6).[42] There are many reasons for this, some of which have been mentioned: water and wastewater systems face a massive backlog of needs; per capital demand for water has been declining, leading to less revenue generated; and capital, maintenance, and operations costs are increasing.[43]

Figure 6. Trends in Consumer Prices (1982-84 = 100)



Source: Bureau of Labor Statistics

Though water systems have historically underpriced their services, recent trends suggest that utilities are, to some degree, self-correcting. In fact, from 2000 to 2017, water and wastewater prices increased by 136 percent, with average annual increases of over 5 percent. Over the same timeframe, inflation jumped 44 percent, with average annual increases of just over 2 percent. The steep jump in water prices and rate of inflation both outpaced the increase to median household income, which went up just 35 percent over this time period.[44]

When water bills become unmanageable for a low-income household, missed payments and a delinquent account can turn into disconnection or shut-off from the system, an outcome with many negative impacts for both the customer and the utility. Disconnection, by legally and practically making a home uninhabitable, can have the same effect as eviction. Alternatively, some low-income households may absorb the cost of rising rates in the form of rent increases. For many of the 43 million renter households in the United States, water utility costs are often incorporated into the price of their unit. For example, among families at even 150 percent of the poverty level (the maximum eligibility threshold for the federal Low Income Home Energy Assistance Program or LIHEAP), 49 percent do not receive a water bill directly.[45] With one-fourth of renter households facing severe cost burdens (paying more than 50 percent of their income on housing), rising water rates may exacerbate these burdens and contribute to housing instability.[46]

In sum, the issue of water affordability is such a difficult challenge nationally because (1) water rates have been rising (despite pricing challenges), (2) water rates will need to be raised even higher, and (3) more and more households will lack the ability to pay for services that are critical to human life.

Understanding Rate-Setting

The direct impact of rising rates will vary around the country—and not just by household type. With different pricing schemes, governance structures, revenue sources, and more, how utilities can respond and safeguard affordability for lower-income households will differ too. For policymakers, these differences are important considerations in structuring an overall agenda to support more sustainable business models for all water systems. Importantly, in implementing pricing structures that recoup the full costs of providing water services, utilities can develop strategies to mitigate disproportionate or deleterious impacts on lower-income households.

Despite recent price increases and the growing problem of water affordability, rates have historically been set too low due political pressure, concerns over affordability, and limited understanding of all life-cycle O&M costs. This is hardly surprising: Structuring and raising rates can be a complicated endeavor, made more difficult by a population of consumers that have become accustomed to paying too little for water. Capacity strains, particularly among smaller systems, and legal limitations on governance structures and rate-setting can add additional roadblocks. However, charging rates that sufficiently cover all costs of service is critical to the sustainable management of a water system and its ability to comply with environmental standards over the long term.

Apart from being most utilities' primary revenue stream, rates are also a valuable tool to manage customer demand and encourage conservation to protect valuable water resources (potentially delaying investment in new, likely expensive capital assets). As previously mentioned, utility management and operations vary dramatically. However, to understand what utilities can do to better balance the need for higher rates with affordability considerations, we need to review the basics of rate-setting.

Full-Cost Pricing

"Full-cost pricing" is the practice of setting rates at a level that generates sufficient revenues to cover all the capital and operating costs of providing water and wastewater services. Rates and fees determine the amount of income that will be generated for every unit of service provided. Full-cost pricing strives for economic efficiency: By reflecting the approximate economic value added to water through treatment, storage, and delivery directly to and from consumers, efficient pricing induces more efficient water usage. As such, full-cost pricing is one of EPA's four pillars of sustainable infrastructure.[47] Many systems, despite the financial and conservation benefits of economically efficient pricing, have historically underpriced water due to public pressure to keep rates low, lack of cost knowledge, deferral of investment, or reliance on state and federal funding.[48]

As mentioned previously, a key impediment to recovering the full costs of providing water services is not knowing the full costs. Many water systems have failed to adequately manage their infrastructure assets by failing to account for all O&M costs of assets over their intended lifespans or "lifecycles" and incorporating those expenses into a sustainable cost recovery model.

Admittedly, designing rates to recover all costs, fixed and variable, is a complicated task. For most utilities, fixed costs by far exceed variable costs, particularly when debt service payments and other capital expenditures are included in the calculation. Approximately 80 percent of a water utility's costs are fixed. However, about 80 percent of a utility's revenue is generated from volumetric charges (i.e., based on amount used) for water or wastewater that has been treated, delivered, or discharged, which varies depending on individual customer needs. Thus, utilities face a mismatch between fixed expenses and variable revenues, a dichotomy that can create budgeting and management challenges over the long run.[49]

At some level, because most expenses are fixed, utilities need a dependable source of revenue to cover them and provide financial stability. High fixed charges, though, can be regressive, resulting in higher unit costs for low-volume users, some of whom may be low-income customers. Typically, water users also expect to pay based on their usage, which can vary due to seasonality, economic conditions, conservation efforts, and more. Relying heavily on fixed charges also diminishes the efficacy of price signals to customers about the value of the water services provided. Some systems have sought to deal with this issue through revenue stability mechanisms. These separate the utility's cost recovery from the amount of water it sells to recoup all fixed costs and ongoing infrastructure investment needs. This is accomplished through periodic rate adjustments designed to ensure that revenue is sufficient to cover costs regardless of sales volume, while still providing an incentive for efficient customer water use.

All water systems must prioritize at times competing and contradictory objectives to strike the right balance in setting rates. Underpricing water services encourages excessive or wasteful usage, which can lead to expensive investments in unnecessary production capacity. Overcharging customers relative to the costs of providing service, on the other hand, can lead to suboptimal consumer welfare outcomes or become a drain on local economic activity.[50] Despite these challenges, full-cost pricing is critical to long-term financial sustainability. For any system of any size, effective and sustainable management requires a fundamental understanding of existing infrastructure—e.g., location, size, condition, capacity, and replacement costs—to understand future needs and set efficient rates.

Rate Increases

Given the pricing pressures previously discussed and a widespread need to adopt more sustainable practices, rate increases are an inevitability for many utilities. This may seem counterintuitive in a paper about water affordability. Yet if strategically and appropriately implemented, rate increases can be beneficial in managing rising costs, improving a utility's ability to attract private capital, and facilitating water conservation efforts—mostly by heightening consumer awareness of cost recovery needs and water scarcity. Rate increases also help utilities sustain revenue levels in the face of decreasing demand and allow them to maintain favorable credit ratings and access to municipal bond markets. So what is standing in the way?

In an analysis of 529 water and wastewater utilities, the Water Research Foundation found that 16 percent of them had operating ratios—expenses as a percent of revenues—of less than 1.0 in 2012 (falling from 28 percent in 2010). These utilities, while mostly able to recover their O&M expenses through operating revenues, did not collect enough to also cover their depreciation expenses.[51] Because of wide variations in the availability of data and reporting of both operating revenues and expenses, the study also provided several single-state analyses. For example, more than half of the 946 systems analyzed in California had operating ratios of less than 1.0 between fiscal years 2001 to 2010.[52] Any utilities in such a circumstance must use reserve funds, transfers, or non-operating revenues to fill the gap between day-to-day O&M expenses and their operating revenues, leaving little to no revenue to cover capital expenditures. Over the long term, if rates at these utilities are not raised, costs or risks will shift from today's customers to tomorrow's, deferring needed investments and threatening intergenerational equity, and increase the possibility of a system failure.

For many water systems, higher rates are needed to advance economic efficiency and financial sustainability, but the process can be political. In cities across the country—from Billings, MT, to Cincinnati, OH—city councils have rejected recommended rate increases, often arguing they will make water services unaffordable for local residents.[53] Even when rates are approved, the task is far from easy. For example, a number of systems in Texas have recently sought to raise rates to pay for new water supplies and encourage conservation amid drought conditions and steady population growth. Yet political opposition has been a reoccurring theme. According to the chief financial officer of San Antonio's water system, "Every time we have to raise rates, it is a battle."[54]

Even a well-justified increase in rates can be controversial, particularly if utilities bear a burden of proof to justify those rate increases to their oversight bodies (regulators or local officials). Though regulations and regulatory bodies vary by state, private utilities—and even some public utilities—are regulated by state public utility commissions (PUCs) which often oversee and approve rate increases in "rate cases." Rates and other investment decisions for most publicly owned utilities, however, are overseen by locally elected officials or boards appointed by them.

Notably, some contend that private utilities' rates exceed those of comparable public water systems. Yet this argument misses several key points. Private utilities often have better federal regulatory compliance rates. They pay local, state, and federal taxes whereas public systems do not. Private water systems also abide by accrual accounting for pensions, post-retirement benefits, and other financial obligations. This prevents the development of large unfunded liabilities and better reflects the full cost of providing service. Additionally, private utilities frequently take over systems with significant maintenance backlogs and compliance issues, which may also account for the variation in rates.[55] When private utilities are accountable not just to regulators but also to shareholders, full-cost pricing, including a reasonable return on their investment, is standard practice.

There is little conclusive evidence that the type of rate-setting body has any influence on pricing.[56] However, in addition to its assessment of operating ratios, the Water Research Foundation found that fewer than 30 percent of utilities in Wisconsin changed rates in any given year between 2000 and 2012, much lower than all other states studied.[57] Unlike other states, government-owned water utilities in Wisconsin are regulated by the state's PUC and must obtain their approval for rate

increases in addition to the approval of local governing boards. One can infer that such a system results in more static rates or limits the appeal of more regular rate increases. Because rate modification practices and trends vary significantly, a more comprehensive study of how governance and economic structures affect rate-setting, financial sustainability, and performance would be beneficial.

Regardless, political pressure to keep rates low is a particularly difficult barrier to overcome. In fact, S&P Global Ratings, in its outlook for the municipal water utility sector, noted, "The sector has capacity to implement rate increases. But willingness to raise rates—which remain the sole source of operating revenues for nearly every utility—is an entirely different issue.[58] An inability to responsively raise rates has consequences beyond just a utility's ability to recover costs. For example, bond rating agencies generally view a history of consistent rate increases as one criterion for determining a utility's ability to repay its debts. Frequent rate increases are associated with higher credit ratings, which in turn provides a utility with lower borrowing costs when financing projects.[59] For this reason and others, keeping rates unsustainably low for everyone at the cost of needed infrastructure investments is a misguided long-term strategy.

Structuring Rates and Customer Assistance

Despite the challenges inherent in raising rates and their impact on low-income customers, rate structures oriented to fully recover costs can be responsive to equity and affordability concerns. Various programs to help water customers affordably purchase water services can also be more efficiently structured insofar as rates reflect the actual costs of providing critical services.

While most customers' bills reflect the amount of water they use, the way each unit of water is priced varies widely. Figures 7 and 8 provide a breakdown of common rate structures for water and wastewater utilities:

- Increasing Block: The price per unit of water delivered increases as the amount of water used increases.
- Declining Block: The unit cost of water declines per unit delivered—a pricing tool that may be used to attract water-intensive industry.
- Increasing/Decreasing Block: Prices result from a combination of increasing and decreasing blocks.
- Uniform Volumetric: Water systems price each unit of water uniformly.
- Flat Rate: One rate is assessed for each connection with a certain meter size or to forgo meters altogether.

No particular rate structure is necessarily *right* or *wrong.* Each system must weigh various priorities in setting up a rate system that provides the revenue needed to sustainably operate, and from there consider various options to safeguard affordability for their lowest-income customers. In fact, many water systems are increasingly looking at ways to provide "lifeline" amounts of water to low-income customers. One option is for an initial block of consumption to be priced lower than the marginal cost of service to provide low-income customers the public health benefit of a minimum quantity of water needed for daily living. This is commonly referred to as a lifeline rate, charging a lower or subsidized rate for a fixed portion of monthly household water use considered to be nondiscretionary—for sanitation, cooking, and cleaning. In such a structure, low-income households can monitor their usage and avoid discretionary water uses, such as lawn watering, to cut down on costs.

Figure 7. Rate Structure Breakdown of American Water Works Association Reporting Providers

Rate Structure	Number of Reporting Providers	Percent of Reporting Providers
Increasing Block	147	50%
Uniform Volumetric	86	29%
Decreasing Block	48	16%
Increasing/Decreasing Block	11	4%
Flat Rate	4	1%
Total	296	100%

Source: Elizabeth Mack and Sarah Wrase[60]

Note: Reporting providers include 296 of AWWA's member utilities—most of which provide both water and wastewater services.

Figure 8. Rate Structure Breakdown of National Association of Clean Water Agency Survey Respondents

Rate Structure	Percent of Survey Respondents
Flat and Volume Charge	54%
Volume Charge Only	21%
Flat Charge Only	15%
Tax Rate with Flat/Volume Charge	10%

Source: National Association of Clean Water Agencies[61]

Note: 122 clean water agencies, representing over 82 million people served, are represented in the survey.

The use of infrastructure surcharges is another way that rate structures can be responsive to affordability concerns.[62] Infrastructure surcharges are small incremental charges added to customer bills in between major rate changes. These allow the utility to recoup investments in critical areas such as aging infrastructure replacement, resiliency, or water quality compliance on a more timely basis, while smoothing the impact on customer bills and preventing periodic rate shock.

Utilities implement new rate structures and assistance programs both out of concern for the welfare of low-income customers and their bottom line. In a survey by the American Water Works Association, 22 percent of respondents rated nonpayment of water bills a big problem.[63] Among larger utilities responding (serving more than 100,000 people), about 33 percent considered nonpayment a big problem and 40 percent considered it a growing problem.

Rate structures and customer assistance programs (CAPs) are key to any strategy to address nonpayment, cure delinquent accounts, and prevent disconnections from the system, which carry considerable costs for both low-income households and utilities. Common programs include:

- Bill Discount: Utilities reduce a customer's bill.
- Flexible Terms: Utilities adjust repayment to help customers afford services, e.g., by forgiving arrearages, adjusting bill payment timing, or leveling billing to a more predictable amount.
- Lifeline Rate: Customers pay a subsidized rate for a fixed amount of water expected to cover basic needs.
- Emergency Assistance: Utilities provide short-term or one-time assistance to prevent disconnection or restore disconnection following an unexpected hardship (e.g., medical emergency, job loss, death, or divorce).
- Conservation: Utilities subsidize or provide water efficiency measures aimed at reducing water use and therefore water costs, e.g., by fixing leaks, offering rebates for efficient fixtures and appliances, or conducting in-home water audits.

While these programs are all structured to provide assistance to low-income customers, they are most effective in different situations. For example, while one-time bill assistance might help a household facing a crisis (such as a family medical emergency) make ends meet, a rebate for more efficient plumbing fixtures could help a consistently delinquent household lower bills to a more affordable level over the longer term. Recognizing that CAPs are often implemented in an ad hoc manner, the Water Research Foundation and the EPA charted out a business process model for a customer payment assistance program, categorizing process actions into three overarching strategies, which are summarized in Figure 9: shrink the bills, shrink the overdue caseload and arrearages, and shrink the cost of collection. Depending on an individual utility's needs and the needs of its customers, a mix of such programs can be targeted to meet specific performance criteria and ultimately lead to better consumer outcomes.

Despite the growing prevalence of CAPs, few states require that water/wastewater utilities provide them to low-income customers. Some utilities may not have the resources or customer base to make such a program successful. Absent specific legislative authorization, other affordability programs might be precariously positioned to pass judicial scrutiny.[65] A recent review of state laws affecting CAPs found that very few of them specifically address the authority to establish CAPs from rate revenues, creating legal uncertainty. Some jurisdictions have laws that in practice prohibit charging low-income customers

lower rates than other users, including anti-donation clauses that prevent utilities from assisting low-income customers or laws specifically limiting cross subsidization or differentiated rates—where one group of customers bears costs on behalf of another. In these cases, utilities are limited under the law in their ability to structure rates and CAPs to help low-income customers afford services.

Figure 9. Business Model Process of a Customer Payment Assistance Program

Strategy 1: Shrink the Bills	Strategy 2: Shrink the Overdue Caseload and Arrearages	Strategy 3: Shrink the Cost of Collections
• Conservation • Bill Practices • Bill Discounts • Alternative Rate Structures	• Prevention Before-the-Fact • Intervention After-the-Fact • Crisis Assistance Programs • Deferred Payment Plans • Programs to Minimize Recurrences	• Minimize Caseload and Arrearages • Maximize Efficiency of Caseload Processing • Minimize Repeat Occurrences of Nonpayment • Cost Benefit Analysis of the Overall Program

Source: Water Research Foundation and U.S Environmental Protection Agency[64]

Building an Affordability Strategy

With water systems around the country facing the host of challenges reviewed in this brief, more must be done to safeguard affordability. BPC's Water Task Force has identified several strategies for maintaining affordability for low-income customers, and more broadly support the financial resiliency of U.S. water systems. The basic strategies for reducing the financial burden of necessary price increases on the most vulnerable households are:

1. Increase government funding or finance water infrastructure outlays and improvements at attractive terms;
2. Subsidize water services for qualifying low-income households or restructure rates to minimize burdens;
3. Promote efficiencies that can lower overall expenses and improve utility management; and
4. Raise consumer awareness about water use and water costs to help households manage their use and budget accordingly.

The following sections outline a range of policy options to address affordability concerns in the water industry cutting across these four strategies. These policy options are:

- ***Prioritize Asset Management***
- ***Expand Funding and Financing***
- ***Pursue Regional Options***
- ***Partner with the Private Sector***
- ***Strengthen Customer Assistance Programs***
- ***Encourage Conservation***
- ***Promote Innovation***
- ***Educate the Public***

While the task force has included specific recommendations mostly focused on the federal government, one important caveat is that federal lawmakers have a more limited ability than local and state officials to impact water rates and how individual systems meet their capital and O&M needs. Local governments have primary jurisdiction over many of these issues with states having some control, namely through the State Revolving Funds (SRFs) and regulatory enforcement tools, including PUCs.

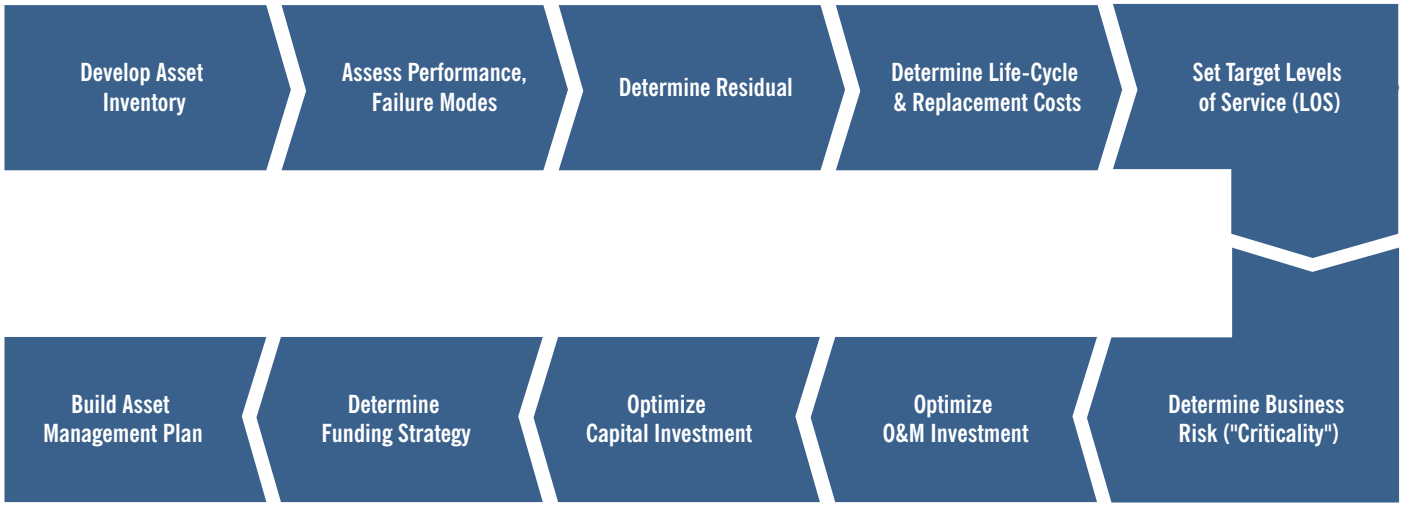
Prioritize Asset Management

Water and wastewater systems have networks of pipes, pumping stations, treatment works, and other infrastructure. Yet many of them—particularly smaller systems—may not have all those assets mapped geographically or tracked in a single database, let alone have a comprehensive assessment of those assets' condition, expected useful life, and the consequences of a failure. A transparent asset inventory of full life-cycle costs and the risks of inaction would make it possible for government leaders—

and the public—to understand the magnitude of projected liabilities their communities face, identify opportunities for allocating costs and sharing risks with the private sector or other public systems, and evaluate the cost of doing nothing. It would also provide valuable context to facilitate stakeholder engagement around the value of water and full cost of providing services.

For any system of any size, effective and sustainable management requires a fundamental understanding of existing infrastructure—e.g., location, size, condition, capacity, and replacement costs. Asset management—including an inventory of all assets and their condition—provides a framework to make data driven decisions about how to operate, maintain, repair, rehabilitate, and replace assets. Figure 10 provides an overview of the steps a utility must take to implement an asset management planning process.

Figure 10. Asset Management Plan 10-Step Process



Source: Adapted from U.S. Environmental Protection Agency[66]

Incorporating such initiatives into regular practice at utilities of all sizes is essential to bringing about a paradigm shift from reactive to proactive management, in which investment, staffing, and other decisions can be prioritized according to future needs. Many utilities, following years of deferred maintenance, are now forced into a posture of mostly responding to unbudgeted emergencies, like water main breaks, as opposed to more proactively anticipating their needs and investing in system improvements.

While a comprehensive asset management strategy requires upfront planning investments, political commitment, and skilled staff, it is also critical to more sustainable and efficient operations: Asset management can help maximize the benefits of existing infrastructure, informing decisions about maintenance and replacement. For new assets, the key is to evaluate total life-cycle costs—not only initial capital costs, but also subsequent operational, maintenance, and disposal commitments—to ensure that investments are optimally cost effective over their intended lifespans. Within this planning framework, water systems can also assess their exposure to climate risks and prioritize climate resiliency in making new investments and operational decisions.

It cannot be overstated how important these processes are to both the affordability of water services and the sustainable operation of water utilities. In many ways, asset management is a prerequisite to adopting other affordability strategies. Inventorying assets, evaluating their condition, and assessing future needs can open up the potential for partnership opportunities that may have never been considered, help a utility identify inefficiencies (such as water losses) that result in wasted resources, and allow utilities to more accurately set rates to recover all system costs.

Key Recommendations:

Require applicants for SRF, WIFIA, and all other federal programs to adopt asset management best practices. In a constrained fiscal environment, it is critical that taxpayer dollars are targeted to projects most in need and those most likely to effectively use federal funds. In the past, Congress—on a bipartisan basis—has recognized the many benefits of asset management. For example, the Water Resources Development Act (WRDA) of 2014 required that applicants seeking CWSRF loans for some water treatment projects develop and implement fiscal sustainability plans that include: an inventory of critical assets; an evaluation of the condition and performance of those assets; and plans for maintaining, repairing, and replacing them.[67] This is a step in the right direction. Yet as part of required certifications for all federal infrastructure funding or financing—including the Clean Water and Drinking Water SRFs, USDA rural development grants and credit support, WIFIA, and other programs—applicants should demonstrate that they are using best practices in asset management. For systems with limited resources, states can prioritize the use of SRF funds for such technical assistance. For example, CWSRF loan recipients in Maine, if they meet certain affordability criteria, can access up to $50,000 in principal forgiveness to develop and implement fiscal sustainability plans.[68]

Expand Funding and Financing

Drinking water and wastewater systems are funded through a combination of service charges or user fees, federal and state grants, or, in some cases, local taxes. Funding is the source of repayment for loans or bonds issued to cover costs and capital investments. For many systems, capital improvement needs are too expensive on a pay-as-you-go basis, requiring financing, extra revenue, and proactive capital planning. For example, an analysis of wastewater systems in West Virginia found that many communities had documented needs more than four times annual revenues.[69] It noted that, for those systems, setting aside even 10 percent of revenue every year for future capital costs would take 40 years to accumulate the savings needed just to address current needs.

Federal or state funding in addition to financing programs that lower the cost of capital with either low-interest or no-interest loans, guarantees, and other programs, all help to bring down the expense of needed infrastructure investments. Systems in the largest U.S. cities generally have the customer bases and credit ratings to independently secure low-interest bond financing, which may result in their exclusion from a state's list of projects it plans to fund through either the Clean Water or Drinking Water SRFs.

The SRFs are the largest source of federally appropriated funds to support local water and wastewater systems. Small systems—those serving fewer than 10,000 people—also rely on federal financing programs and grants through programs like

the U.S. Department of Agriculture's (USDA) Rural Utility Service. These systems may lack the size or TMF capacity to access the bond market or pursue innovative financing options. For example, a study of water systems in economically distressed counties throughout Appalachia found that relatively few communities have credit ratings for water and wastewater purposes.[70] For these systems, USDA loans and grants were the second largest source of available federal funding—trailing the CWSRF but providing more than twice as much funding as the DWSRF. USDA was also the largest source of grant funding in the region.

The connection between funding/financing and affordability is fairly straightforward: Any additional funding provided outside a utility's customer base, or subsidies that lower the cost of financing needed investments, mitigate at least partly the burden of increasing rates to pay for infrastructure investments. Importantly, this funding can also incentivize systems to delay needed improvements until assistance is secured rather than increase rates or issue bonds (where possible) to make immediate upgrades.

Key Recommendations:

Increase current levels of federal funding and financing support for water and wastewater programs. As mentioned, there are a number of federal programs, particularly the SRFs and USDA's Water and Waste Disposal Program, that are critical to modernizing water infrastructure, upholding environmental standards, and keeping services affordable.[b] Dramatic reductions in spending on such programs from current levels—as proposed in the Trump administration's FY 2018 budget—would seriously jeopardize public health and burden disadvantaged communities, many of which are already struggling to provide safe, affordable water services.

Recognizing the nation's growing needs, some lawmakers have sought increases in federal funding beyond current levels. For example, H.R. 2510, the "Water Quality Protection and Job Creation Act," cosponsored by Reps. Peter DeFazio (D-OR), John Duncan, Jr. (R-TN), and Grace Napolitano (D-CA), would increase annual CWSRF funding from $1.4 billion to $4 billion for the next five years.[71] Congress should follow their lead and work on a bipartisan basis to bolster critical programs like the SRFs.

To the extent possible, increased funding should be prioritized for communities that have implemented full-cost pricing and still face difficulty meeting federal environmental and public health standards. These communities must also be capable of sustainably providing services in the future if assistance is received. In addition to federal funding directly allocated to the states and local communities, the EPA and USDA also need sufficient resources, staff capacity, and expertise to provide guidance, technical assistance, and support to water systems seeking to access federal programs and meet federal regulatory requirements.

Make SRFs more flexible. As the primary source of federal support for water infrastructure, Congress should consider options to make the SRFs easier to access and more efficient. For example, some have proposed:

[b] See the BPC Water Task Force's first brief, Understanding America's Water and Wastewater Challenges, for a more comprehensive review of current federal programs for water and wastewater infrastructure. Available at: https://bipartisanpolicy.org/library/understanding-americas-water-and-wastewater-challenges/.

- Allowing SRF loans to finance system expansions to meet future population growth;
- Allowing longer loan repayment terms (so long as terms do not extend beyond an asset's intended lifespan); and
- Revising "Buy America" and other "cross-cutting" federal requirements to minimize added project costs.

Along with revising federal requirements, state policies should be reviewed to identify any undue or unnecessary burdens on applicants. Previously, the EPA has provided some technical support to state efforts to comprehensively review and streamline their own SRF application processes. For example, in 2009, the EPA—as part of the interagency Partnership for Sustainable Communities—worked with New York, Maryland, and California to explore potential modifications to their CWSRF programs, including reviews of their intended use plans, project priority systems, borrower application processes, and funding guidelines.[72] The EPA should work with additional states to similarly evaluate SRF processes and revise requirements that needlessly burden water systems seeking assistance.

Prioritize pre-screening. For systems with limited resources, the process just to find and apply for state and federal project funding or financing can be onerous, consuming staff time and money. Providers of such assistance—whether the states, the EPA, USDA, Economic Development Administration, the Department of Housing and Urban Development (HUD), or another government agency—should coordinate their allocation of resources and prioritize the pre-screening of eligible opportunities to weed out projects that are unlikely to be funded—saving local systems the expenses of planning and applying.

Preserve the tax-exempt municipal bond market and provide a new direct payment bond. About 70 percent of U.S. utilities use municipal bonds to some degree to finance water infrastructure projects.[73] As Congress weighs the merits of different tax reform proposals, it should consider how replacing, limiting, or eliminating the existing tax exemption on bond interest would raise financing and project costs for water infrastructure and hasten the rise in customer rates. Along with preserving the existing tax-exempt municipal bond market, a new direct payment bond could provide an additional financing tool for water service providers and attract new types of investors to the sector. BPC's Executive Council on Infrastructure recommended the adoption of a direct payment infrastructure bond that can be used for conventional projects as well as public-private partnerships (P3s) and can be converted into tax credits. Direct payment bonds, such as the Build America Bond program authorized from 2009-10, offer a new product—a taxable bond for which the issuer receives a direct payment from the federal government, or the buyer receives a federal tax credit, providing a borrowing discount to tax-exempt bonds. Unlike traditional municipal debt however, direct payment bonds are attractive to investors who do not have federal tax liabilities, such as pension funds.

Encourage states to leverage their SRF funding and exclude these programs from arbitrage restrictions. According to the Government Accountability Office, 28 states issue leveraged bonds—that is, when SRF capitalization grants and state matching funds are used as collateral to borrow in the bond market to increase the pool of available funds for project lending.[74] State programs that leverage their SRF funds have provided greater assistance as a percentage of their federal capitalization grants than those using only a direct loan approach.[75] However, an issue can arise when governments use SRF monies to borrow funds at tax-exempt rates to issue municipal bonds, the proceeds of which are invested in higher earning taxable

securities. The Internal Revenue Service (IRS) maintains arbitrage restrictions, arbitrage being the difference between the interest rates at which bond proceeds are borrowed and the interest rates at which the proceeds are invested. The EPA's Environmental Finance Advisory Board, among others, has recognized that these restrictions prevent greater growth of SRF funds and has recommended that EPA support congressional action to create an exclusion.[76] Such an exclusion is expected to open up millions in additional financing for water infrastructure projects.[77]

Pursue Regional Options

As previously mentioned, water services are provided by a fragmented system of entities, both small and large, publicly and privately owned. For decades, the EPA has advised water systems that regionalization could reduce costs and improve service delivery.[c] Yet only piecemeal progress has been made.

There are many explanations why system partnerships have evolved slowly: Some discover that distance is too great a barrier, cannot agree to equitable partnership terms, do not have the TMF capacity to pursue a merger, or fear ceding control over their local system. However, with the many challenges facing water utilities, particularly the pressure on rates, pursuing collaborations with other water systems can yield tangible benefits. For example, one study found that the unit cost of water produced can be reduced by 10 percent to 30 percent as production is doubled.[78]

Figure 11 highlights the wide range of partnership options that utilities can pursue. Regional collaboration can fall anywhere on this spectrum. While merging adjacent systems is often a cost-effective option, regionalization does not necessitate the physical integration of systems. Where physical interconnection is unattractive, cost prohibitive, or infeasible because of geographic obstacles, systems have other means of achieving economies of scale, such as partnering together on the purchase of treatment chemicals, contracting payroll services, and sharing staff. While discussed further in the next section, some private water services operators also acquire and operate systems in multiple, sometimes unconnected jurisdictions and can similarly provide economies of scale.

Bundling is another option for smaller utilities to reach a scale that attracts private capital to construction projects. Recent work by S&P Global Ratings has emphasized how the capital-intensive nature of infrastructure makes scale an important consideration in achieving more cost-efficient financing of construction and/or operations.[80] In particular, the report saw potential in the U.S. water industry for bundling needed projects together into a single procurement because of the industry's decentralized structure and generally aging infrastructure assets—often more than 50 years old.

Despite the challenges in encouraging regionalization, many states are seeing the upside of a less fragmented network of water systems and are pursuing policies to either incent regionalization or even force it. Figure 12 outlines the wide range of state laws passed in recent years to establish procedures for integrating or acquiring water systems.

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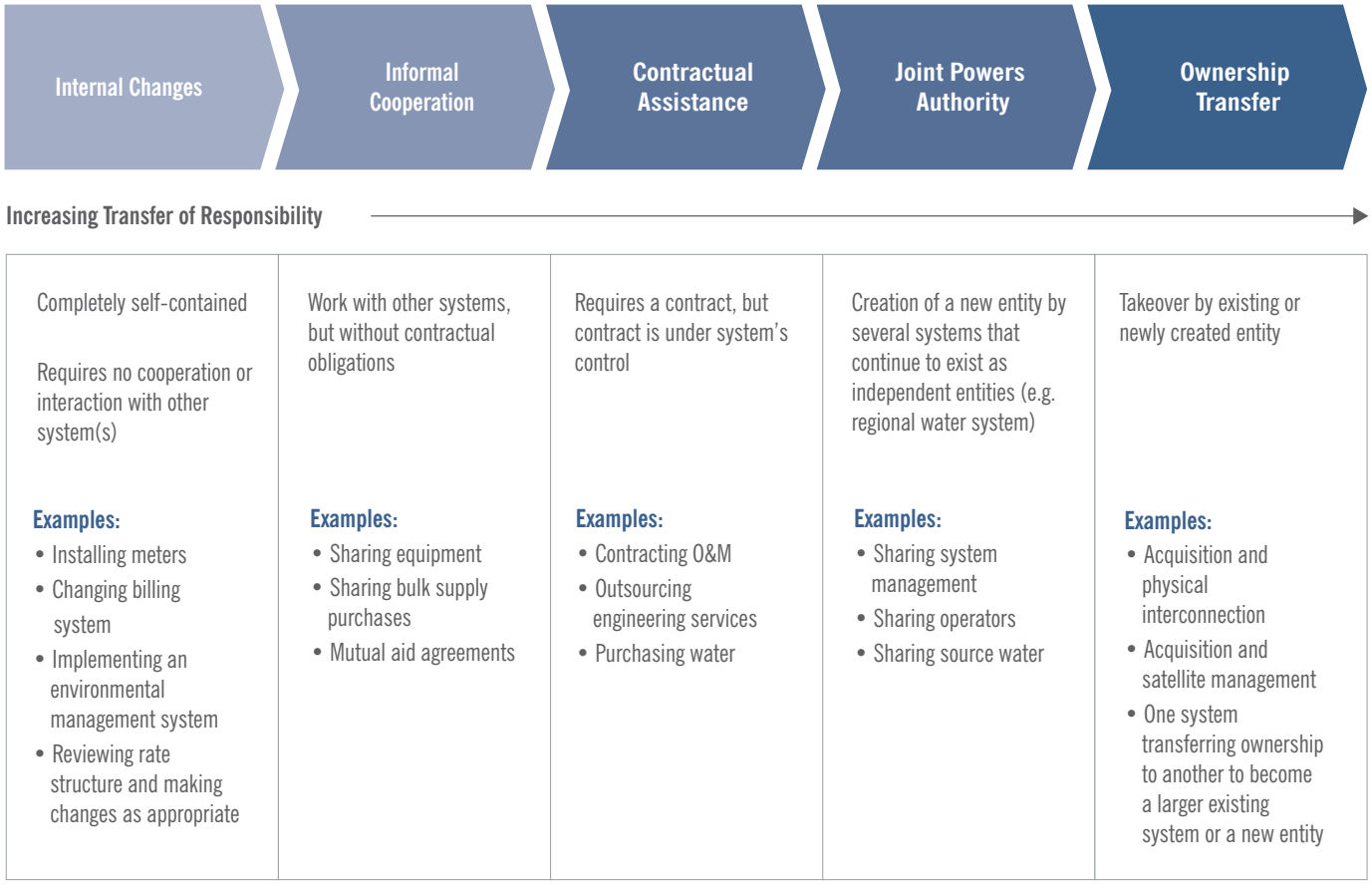
[c] For example, see EPA's June 1983 report, "Regionalization Options for Small Water Systems." Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=9100OQGZ.PDF.

Figure 11. Water System Partnership Options



Source: U.S. Environmental Protection Agency[79]

Many states have promoted regionalization with varying degrees of vigor and success. An EPA compendium of state statutes and regulations noted that such strategies run the gamut, including requirements for new systems to assess interconnection options, priority rankings for regional projects in the distribution of SRF funding, and cost-sharing for consolidation feasibility studies.[81] Notably, California's SB 88, passed in 2015, provides with the state with a particularly powerful tool to address disparities in drinking water standards and affordability in disadvantaged communities. The law gives the state's water board the authority to mandate physical or managerial consolidation when a water system is habitually failing to meet environmental standards.

It is difficult to look at the fragmented delivery of water services in the U.S.—through more than 150,000 public water systems, nearly 15,000 POTWs, and 7,450 stormwater systems—as economically efficient. While the cost savings of regionalization strategies may be difficult to quantify, it is undeniable that building partnerships and collaboration among local systems can help to improve the management of those systems, lead to better service, and ultimately reduce costs.

Figure 12. Water System Regionalization Legislation

Legislation	State	Year	Summary
Public Water System Investment and Consolidation Act	CA	1997	This act allows for the sale, lease, or transfer of water and wastewater utility assets under certain conditions, including submission of the issue before local voters. It also establishes the standards by which rates are set following consolidation, including prior public disclosure of acquisition costs and savings.
Act 11 (HB 1294)	PA	2012	Along with addressing rate case claims based on fully projected future test years and petitions for a Distribution System Improvement Charge, this act allows for water and wastewater revenue requirements to be combined for the rate-setting process. This helps large water utilities realize economies of scale and provide attendant benefits to their wastewater operations.
Water Systems Viability Act (HB 1379)	IL	2013	This act clarifies the valuation and ratemaking process and provides an alternative procedure for establishing a rate base when a public utility is acquired. A utility can elect to have three appraisals conducted, with the average of three used as the fair market value of the water or sewer utility being acquired.
Acquisition of Small Water Utilities (HB 142)	MO	2013	This act outlines criteria for the Missouri Public Service Commission to consider when approving the acquisition of small water utilities (serving 8,000 or fewer people). It further requires an appraisal process for the acquisition and sets out a process by which the lessor of the purchase price or the appraised value, along with other transaction costs, are used to establish the new rate base for the acquired utility.
SB 88	CA	2015	This act allows the California State Water Resources Control Board to order system integration—physical and/or operational—when a public water system in a disadvantaged community has demonstrated a continued inability to provide safe drinking water. It sets requirements for the consolidation process, including public notification and deadlines (as well as steps to encourage voluntary consolidation first), and allows the California legislature to provide financial assistance following consolidation.
Acquisition of Distressed Water or Wastewater Utilities (HEA 1319)	IN	2015	This act allows an acquiring utility of a distressed public water or wastewater system to petition the state's Utility Regulatory Commission to include a cost differential in setting its base rates. It also sets conditions for the commission's approval such as whether the distressed utility failed to furnish or maintain adequate facilities.
Sale of Nonsurplus Water Utility Property (HEA 1505)	IN	2015	This act establishes the procedures for the sale or disposition of non-surplus water, wastewater, or combined utility facilities, outlining appraisal requirements, the process for its local governing body to approve sales, and procedures for allowing public petitions for a sale and requests for a special election on the issue.
Water Infrastructure Protection Act (S 2412)	NJ	2015	This act allows water and wastewater utility owners to sell or lease assets to a capable private or public entity without a referendum if certain environmental standards are not met and outlines related acquisition procedures. It also requires public notice and outreach, including the opportunity for the public to petition to stop a lease or sale from moving forward.
SB 257	IN	2016	This act updated Indiana's HEA 1319, clarifying some provisions and expanding the small systems component of the law from 3,000 to 5,000 customers.
Act 12 (HB 1326)	PA	2016	The act requires two utility valuation experts to perform appraisals of any selling water or wastewater utility facility and submit them to the Public Utilities Commission. It empowers the commission to approve or deny the acquisition and help establish the rate base of the selling utility from the lower of either the purchase price or the average of the appraised values. It also allows the acquiring utility to collect funds for necessary post-acquisition improvements to be factored into rates.

Key Recommendations:

Encourage state adoption of regionalization tools. Given federal budget realities and our nation's growing infrastructure investment needs, federal resources should not subsidize water systems when regional solutions are feasible and more cost effective. Currently, the drinking water SRF prohibits funding systems that do not have technical, managerial or financial capacity. The SRF will provide them funding if they undertake 'feasible and appropriate changes in operations…if the state determines that the measures are necessary to ensure" proper system operation. In allocating state and SRF funding, some states—like Kentucky and Texas—do their due diligence in assessing the fiscal capacity of communities and promoting regionalization when systems appear financially unsustainable. This should be regular practice. While deference should always be given to systems that wish to maintain local autonomy over their water systems, they should not expect to receive assistance if a more sustainable alternative exists. Congress should consider options—such as further strengthening of SRF requirements, incentives, more stringent capacity assessments, and technical assistance—to incent fiscally responsible regionalization. States should also consider implementing a "good neighbor" grant program, allocating some SRF funding to larger water systems willing to extend service to a neighboring system that faces difficulty meeting EPA standards.

Maximize the use of federal funding for disadvantaged community coordinators, regional planning, and regionalization feasibility assessments. While water systems of different sizes and in different communities may benefit from regionalization, ensuring continued access to critical water services in disadvantaged communities is a first-order concern. One way to build more collaborative ties between system operators is maximize the use of integrated regional planning tools and ensure that federal resources for water and wastewater infrastructure, as well as economic development more broadly, are coordinated. For example, California's Tulare County received state funding to develop an integrated plan to address the drinking water and wastewater needs of the 353 disadvantaged communities identified in the Tulare Lake Basin area. Relatedly, the Missouri Department of Natural Resources contracted with Wichita State University's Environmental Finance Center to study current and future population changes in Missouri's 745 rural communities and their impact of financial sustainability. Such efforts lead to a better understanding of how disadvantaged (and rural) communities will afford water and wastewater infrastructure in the future, allowing state and federal agencies to better assess a community's needs and target assistance programs.

Audit and amend federal regulatory barriers to water system regionalization. Merging water systems or setting up a regional authority is not just difficult because of local politics and capacity. It can be practically difficult to combine the operations of different systems. For example, two water systems interested in merging may have different water quality problems, outstanding loans, and divergent infrastructure investment needs. Working through these issues can be one of the biggest hurdles to regionalization. As such, the EPA and USDA should coordinate a comprehensive review of their internal processes to ensure that federal permits, funding programs, and other processes are not standing in the way of partnerships that could lead to the delivery of better water services and more sustainable utility management. If changes require congressional action, the agencies should provide a list of all provisions needed to encourage regionalization.

Require regionalization feasibility assessments for SDWA-noncompliant systems. Returning systems with SDWA violations to compliance is critically important to public health. EPA's current enforcement policy includes a prioritization tool that weights violations by the gravity of their threat to public health, allowing states and the EPA to target resources to water

systems with the most significant problems. Systems with a history of serious violations or recently escalating violations should be required to study the feasibility of regional solutions that could improve customer outcomes and help return the systems to long-term compliance.

Improve the coordination of technical capacity and funding to support regionalization. There is no denying that regional options can be technically and mechanically difficult to pursue. Smaller, struggling systems may be naturally disinclined to entertain a regional solution for fear of ceding control of their local system. The preferred federal role in this task is to support and promote the tools that make it possible for a local champion to advance commonsense regional solutions, ones that can provide long-term system sustainability, better service, and cost containment. Yet state control of the SRFs has resulted in varied approaches and emphases on regionalization. To advance regionalization beyond where the last 30 years have taken the water industry, USDA and EPA staff—particularly those working in states and with local communities—as well as federal recipients of technical assistance dollars must have a coordinated and consistent message on the benefits of regionalization.

Break down barriers to single-tariff pricing. Several of the provisions listed in Figure 12 were intended to level the playing field for private water systems that acquire individual systems and thus can build efficiencies into their management of a network of systems. In particular, some states have allowed water service providers to implement single-tariff pricing—that is, the use of a unified rate structure for multiple water (or other) utility systems that are owned and operated by a single utility, but which may not be physically interconnected. It is used mainly by investor-owned utilities, with regulatory approval, but could also be implemented by public water systems. Consideration of such provisions should be encouraged. Laws allowing single-tariff pricing and outlining procedures for system acquisition and rate-setting can help to mitigate rate shock effects and concerns over affordability when troubled or noncompliant systems are acquired.[82]

Provide merging systems with a regulatory grace period. In instances where local water systems are reluctant to extend service to an adjacent water system, especially for low-income or expensive-to-serve customers, additional tools to promote regionalization and protect public health are needed. Having a clear, but limited regulatory grace period to bring an acquired system into compliance with federal standards would help to mitigate the risks associated with taking over a noncompliant or struggling system.

Partner with the Private Sector

Public-private partnerships (P3s) can take many different forms: A public agency might contract with a private company for the design and construction of a new infrastructure asset. In other cases, the private party might also handle the O&M of that facility for a contracted period. A public agency may also fully transfer a water facility or system to the private sector, relieving the local government of the burden of long-term operation and maintenance costs and allowing the private company to collect fees from taxpayers.

While not appropriate or preferable in every instance, partnerships with the private sector are an underutilized tool in the water sector for meeting regulatory demands, making system improvements, and bringing new efficiencies and technologies to system operations. Such partnerships allow publicly run water systems to:

- Contractually offload system operating risks;
- Improve service at lower cost;
- Depoliticize rate increases; and
- Secure needed capital improvements for aging infrastructure.

With their economies of scale and service efficiencies, private companies can bring savings in water system O&M costs of 15 percent to 30 percent, according to one estimate.[83] This is at least anecdotally consistent with some successful P3 projects. For example, having a private company design, build, and operate the Tolt Treatment Facility was estimated to save Seattle's public water system 40 percent over a conventional project delivery approach. Figure 13 provides examples of some of the types of partnerships with the private sector that have been pursued.

The rationale behind pursuing a P3 often varies. In instances of system acquisition, for example, the sale of the system may provide a financially strapped local government with needed resources to invest in other community priorities or relieving it of a liability it was poorly situated to handle. For individual projects, P3s have helped systems meet environmental standards or pursue innovative (and perhaps more cost effective) projects, as was the case in Prince George's County, MD. In fact, one of the primary benefits of P3s is the ability of the public partner to transfer agreed upon risks—such those inherent in complying with regulatory standards—to the private sector.

According to survey from the American Water Works Association, 78 percent of respondents indicated that their utility was not considering a P3.[93] While not appropriate in every instance or the solution to every challenge facing the water industry, P3s in their many forms should be an option for some communities to help reach their goals. Too often, water and wastewater utilities do not even consider alternative management and delivery approaches or P3s despite the potential performance improvements, cost savings, and other benefits that can be gained.

Figure 13. Examples of Water P3s

Project	Type	Summary
Bayonne Concession Project, NJ	Water and Wastewater	A 40-year concession agreement with private companies allowed the financially strained City of Bayonne to address a backlog of capital needs, high debt, and a history of deferred maintenance.[84]
Clean Water Partnership, Prince George's County, MD	Stormwater	Prince George's County used a Design-Build-Operate-Maintain approach to tap into private sector expertise in meeting environmental standards and furthering local economic and community goals. The project invests in decentralized stormwater management installations covering 2,000 acres (with possible expansion).[85]
Davis-Woodland Treatment Plant, CA	Drinking Water	The cities of Woodland and Davis joined together to construct a surface water treatment plant and related infrastructure using a 15-year Design-Build-Operate agreement and SRF loans, which project sponsors estimate shaved at least a year off the project schedule.[86]
Fairview Township, York County, PA	Wastewater	The small community in Fairview Township sold its wastewater treatment system to a private company. This sale ensured that urgent repair needs of the system of 4,000 customers can be met without the municipality taking on additional debt. New projects taken on by the private water provider include the construction and installation of nearly 40,000 feet of new water and sewer mains, 6 new sewer pump stations, 2 new water pressure reducing stations, and 48 new fire hydrants.[87]
Lake Pleasant Treatment Plant, Phoenix, AZ	Wastewater	The project included a new 80 mgd water treatment plant and related facilities. The City of Phoenix used the Design-Build-Operate approach to increase the speed of construction, foster technological innovation, reduce risk, and achieve lifecycle cost savings. The city had estimated $30 million in savings by using a P3 approach, though notably customer usage and operating conditions failed to meet original projects.[88]
Rialto Concession Project, CA	Water and Wastewater	The City of Rialto entered into a 30-year concession agreement in 2012. Along with agreeing to improve, manage, and operate the city's water and wastewater assets over the contract term, Rialto's private partners raised over $170 million in initial capital funds—$26 million in private equity and $146 million in privately placed debt.[89]
Tampa Desalination Plant, FL	Drinking Water	Using multiple service delivery methods, the Tampa Bay Region contracted with private partners for the construction of one of the nation's largest seawater desalination plants. The primary purpose behind pursuing an alternative delivery approach was to develop new technology and transfer risk under complex circumstances.[90] Tampa's private partners are responsible for the operation, management, and maintenance of the new plant.
Tolt Treatment Facility, Seattle, WA	Drinking Water	Seattle Public Utilities used a Design-Build-Operate approach for a new water treatment facility, leveraging the technological innovation of the private sector to comply with drinking water standards and saving an estimated 40 percent over a conventional project delivery approach.[91]
Vista Ridge Pipeline, San Antonio, TX	Drinking Water	Amid drought conditions and concerns about its future supply of water, the San Antonio Water System (SAWS) entered into a contract with a private consortium—now led by Garney Construction—to design, build, and finance a 140-mile pipeline. The project, expected to be completed by 2020, will expand San Antonio's water supply by 20 percent by transporting water from the Carrizo-Wilcox aquifer system to San Antonio.[92]

Key Recommendations:

Promote full optionality. In *Bridging the Gap Together: A New Model to Modernize U.S. Infrastructure,* BPC outlined how supporting a full range of options for collaboration between the public and private sectors is essential to promoting innovation and modernizing infrastructure.[94] In particular, states, cities, and counties must provide the support to allow P3s to happen—through enabling legislation, development funds, and capacity building. They must also work to ensure that, in all instances, the public interest is placed front and center.

Give states the option to make private utilities eligible for CWSRF funding. Allowing states to provide CWSRF funding to private water utilities helps to level the playing field with the public sector in accessing this critical source of credit assistance. The DWSRF already allows private utilities to receive assistance, though some states have elected not to provide it to private companies.

Remove state volume caps on private activity bonds (PABs) for water projects and alternative minimum tax (AMT) applicability. PABs are a federally-supported program that can help catalyze infrastructure P3s. PABs are issued by a public user, potentially a public water utility or local government, on behalf of a private partner. Interest on PABs issued for the purpose of financing public infrastructure is exempt from federal income taxes, making them more attractive to potential buyers than privately-issued bonds. Thus, the cost of capital for the private sector is reduced to an amount closer to what a publicly-financed project could expect. Qualifying water projects should be exempted from the cap on the amount of PABs that may be issued in each state. S. 1229, the "Move America Act," introduced by Senators John Hoeven (R-ND) and Ron Wyden (D-OR), would accomplish similar aims, proposing a modified version of PABs, known as Move America Bonds, that can also be converted by states to tax credits.[95] While Move America Bonds would have a volume cap equal to 50 percent of a state's current PAB volume cap, they would not be subject to the Alternative Minimum Tax—a move that would increase interest from investors subject to the tax. Along with other terms that make them favorable to partnerships with private entities, such changes would bring more private capital into the market for water and wastewater projects than currently available.[96]

Remove constraints to asset sales/leasing. Most municipal infrastructure projects are financed by tax-exempt bonds. When a municipality enters a sale or lease agreement with a private partner for an infrastructure asset, one originally financed with tax-exempt debt, it must "defease," or repay, the remaining debt so that the benefits of the tax exemption do not transfer to the private partner. Options for defeasance are currently limited and can be costly. This constraint also limits the utility of SRF funds: When a water system is transferred to a private provider, grants or loans from the SRFs must often be repaid (at least partially) instead of being assumed by the new private owner and thus continuing to benefit the rates of the system's customers. More flexibility in these rules—e.g., by expanding the types of "alternative uses" for which a community can use the proceeds of a sale or lease without triggering defeasance requirements—would empower the public and private sectors to develop solutions to water infrastructure challenges that meet local needs.

Provide EPA's Water Infrastructure and Resiliency Finance Center (WIRFC) with sufficient staff and resources. With area expertise and stable funding, WIRFC can be a valuable clearinghouse for best practices on P3s, assist localities and states on innovative projects, and serve as a one-stop shop for information on building financial capacity and accessing federal

funding. With so many water systems lacking either the technical expertise or appetite to pursue P3s, WIRFC can promote lessons learned from around the country and elevate practices that put the public interest first and deliver modern, efficient water infrastructure at lower costs.

Amend the Community Reinvestment Act of 1977 to give financial institutions credit for investments in pay for success (PFS) projects. PFS projects are structured to leverage the capital and innovation of the private sector to produce a positive social outcome. In this model, the private sector—and sometimes philanthropic investors—provide upfront capital to a service provider to fund a social service. If that service provider successfully achieves agreed-upon outcomes (e.g., mitigating stormwater runoff), the government repays investors—including a financial return—often using the savings achieved in the process. If predetermined outcomes are not achieved, the investors bear the loss. Interest in PFS projects is growing and could have many cost-saving applications in the water sector. Encouraging financial institutions to pursue such investments could attract private capital, particularly social impact-focused investors, to enter this space.

Strengthen Customer Assistance Programs

An EPA survey—summarized in Figure 14—of nearly 800 drinking water and wastewater utilities found that more than a quarter of utilities offer CAPs, though larger utilities were far more likely to provide such programs.[97] Similarly, in a survey from the trade association for the nation's publicly owned treatment works, the National Association of Clean Water Agencies, two-thirds of respondent wastewater utilities reported having an assistance program for struggling customers.[98] These aid programs are critical not only because they provide much needed help to low-income Americans, but because they lay the groundwork for utilities to incorporate the full cost of providing water and wastewater services into their rates. These utilities are adopting CAPs in the absence of any national direct financial assistance.

Figure 14. Customer Assistance Programs Offered by Water and Wastewater Utilities

Type of Utility Reviewed	Number of Utilities Reviewed	Number of Utilities with 1 or More Programs	Total Number of Programs Identified
Large Utilities (>100,000 people)	620	190 (30.6%)	308 (84.4%)
Medium Utilities (10,000-100,000 people)	175	38 (21.7%)	57 (15.6%)

Source: U.S. Environmental Protection Agency[99]

To help ensure that affordability-challenged communities receive the same public health protections provided to other areas and to assist low-income consumers in small systems with high rates due to compliance costs associated with the SDWA, the EPA's National Drinking Water Advisory Council (NDWAC) recommended in 2003 and reiterated in 2009 that a federal Low-

Income Water Assistance Program (LIWAP) be adopted.[100] Though the NDWAC's recommendation has appeared in various pieces of legislation, nothing has been passed into law.[d]

Such a program could theoretically be modeled on either LIHEAP, which helps low-income households pay their electric bills, or the Weatherization Assistance Program (WAP), which enables low-income families to permanently reduce their energy bills by making their households more energy efficient. LIHEAP, administered by the U.S. Department of Health and Human Services, is a block grant program with funding allocated annually to states, tribes, and territories to operate home energy assistance programs. Alternatively, WAP, administered by the U.S. Department of Energy, provides funding to all states and territories, which in turn allocates their shares to local governments and nonprofit agencies for energy-efficient purchases and repairs. Both programs are targeted to low-income populations and vulnerable groups, including older adults, people with disabilities, and families with children.

One roadblock to utility-provided customer assistance, as mentioned previously, is the fact that many low-income Americans do not actually pay a water utility bill, instead absorbing the costs of any rate increases through rents. Or, in places with rent increase restrictions, rising costs are absorbed by the owners of multifamily properties (generally buildings with more than 5 housing units) and ultimately contribute to the decline in affordable housing preservation. Households in multifamily housing in which the owner pays the water bill for all apartment units are not less affected by rising costs, but are certainly harder to reach and assist. In these cases, a water system might be asking: What role do they have in providing assistance? What options are available? Who are the customers they need to reach and what is their burden?

More research is needed on the best practices to assist both hard-to-reach and low-income households. However, some jurisdictions have developed (or are developing) innovative programs to ensure that vulnerable populations within their service areas can afford water and sanitation services and avoid shut-offs from the system. Notable examples include:

California's AB 401: In 2015, the California Legislature passed AB 401, a law directing California's State Water Resources Control Board to develop a statewide water affordability program.[101] The Water Board is in the process of determining how to structure such a program—working through technically difficult details such as program eligibility, funding, and administration. The Luskin Center at the University of California-Los Angeles has developed four options for the Water Board to consider, based on three state energy assistance programs.[102] Following a series of public meetings across California, the Water Board has until February 2018 to present its final plan for funding and implementing the program to the state legislature. As the first large-scale effort to adopt a water bill assistance program at the state level, its implementation and effectiveness could have important lessons for other states and the debate over an equivalent federal program.

Detroit's Water Residential Assistance Program (WRAP): To avoid shut-offs in Detroit, the Detroit Water and Sewer District and Great Lakes Water Authority began working with a local non-profit organization, the Community Action Alliance. The result,

[d] For example, see H.R. 2328, the "Low-Income Sewer and Water Assistance Program Act," sponsored by Rep. Marcia Fudge (D-OH), which would establish a limited pilot program providing federal grants to public water systems to assist low-income households in maintaining access to sanitation services. Available at: https://www.congress.gov/bill/115th-congress/house-bill/2328.

WRAP, works with utility customers to develop a payment plan that includes at least partial payments each month to avoid disconnection from the system.[e] The program is funded through one-half of a percent of Great Lakes Water Authority revenues. Qualified residents with water usage exceeding 20 percent of average household consumption are also eligible for a home water audit and up to $1,000 for conservation measures. At current funding levels, the program is unable to fully meet existing customer needs.

Philadelphia's Tiered Assistance Program (TAP): Recognizing that more than 40 percent of the city's water utility customers were delinquent in paying their water bills (amounting to $242 million in uncollected revenue), Philadelphia is in the process of rolling out income-based, fixed water bills for low-income households.[103] Residents whose incomes fall below 150 percent of the federal poverty level are eligible. The city estimates that as many as 60,000 households are eligible for the program.

Seattle Utility Discount Program (UDP): In the City of Seattle, the water/wastewater utility, Seattle Public Utilities, and electricity provider, Seattle City Lights, share the same billing system. This allows the water/wastewater utility, SPU, to provide a water credit on low-income customers' electricity bills, assisting non-water account holders who still bear the burden of higher water rates.[104] As discussed, water bills (but not electricity bills—which are more commonly sub-metered) are often paid by a renter's landlord, who recoups those expenses in rent and rent increases. The shared billing system in Seattle has allowed its utility to target assistance for customers who may ultimately be burdened by increasing water rates, but do not pay a bill directly.

Notably, with the exception of the work being done in California, these programs are locally administered and funded. Smaller systems may have difficulty replicating successful CAPs. Even in a city like Detroit, which may have the size to manage and administer a CAP, limited funding can also undermine the effectiveness of such programs over the long run.

Key Recommendations:

Consider options for a federal water assistance program for low-income Americans. In recent years, several water stakeholder groups have recommended the creation of a federal program to help low-income Americans afford basic water services. The task force has identified three options for Congress to consider in structuring such a program:

- Option 1: Establish a low-income water assistance program modeled on LIHEAP.
- Option 2: Establish a water loss prevention program modeled on WAP.
- Option 3: Amend and coordinate existing low-income assistance programs to promote water efficiency and affordability.

Considering federal budget constraints, it seems the best immediate step is to look at existing federal programs to determine if assistance to low-income households can include water efficiency and affordability in their program missions, along with a

[e] Further background information on the program can be found the BPC Water Task Force's first brief, *Understanding America's Water and Wastewater Challenges*. Available at: https://cdn.bipartisanpolicy.org/wp-content/uploads/2017/05/BPC-Infrastructure-Understanding-Americas-Water-and-Wastewater-Challenges.pdf.

reasonable increase in appropriations. For example, WAP and LIHEAP (to a more limited degree) can fund home energy audits and weatherization measures. Typical weatherization measures may include insulation, heating and cooling systems repairs or replacement, and the installation of energy efficient lighting and appliances to lower household energy bills. It may be feasible for local providers to couple energy audits with water audits or, when recommending or installing energy efficient appliances, prioritize water efficient models. Such an approach has the benefit of using existing administrative infrastructure, e.g., in the allocation of resources and eligibility verification, to avoid duplicative costs.

For the lowest-income Americans, synergies between water bill assistance and existing federal housing programs likely already exist too. The vast majority of low-income Americans are, in fact, renters. As discussed previously, such households may be affected by rising water rates but may not pay a bill directly. Many federal housing programs—such as HUD's Housing Choice Voucher program—are designed to align rents with a household's ability to pay. In calculating and providing rent subsidies, maximum allowable amounts of housing assistance account for utility costs, including water bills when they are paid by the tenant.

A primary conclusion of the BPC's Housing Commission, which released recommendations for a new direction in federal housing policy in 2013, was that long-term rental assistance in the U.S. should be realigned to focus on households with the greatest needs.[105] The commission recommended that federal rental assistance be made available to all eligible households with incomes at or below 30 percent of area median income who apply. Such a proposal could, in effect, ensure that extremely-low-income Americans have access to water services. However, federal housing programs as currently structured fall far short of providing all eligible households with assistance. In total, HUD's three main programs assist 4.7 million households, just one-quarter of the roughly 20 million households that are eligible for assistance.[106]

Discourage states from adopting laws that limit customer assistance programs. EPA, USDA, and water stakeholders must work together to educate states about the impact of laws that limit the ability of utilities to develop and implement customer assistance programs. For example, Philadelphia's innovative income-based rate program could not be replicated across the country due to state laws that prohibit utility customers from paying different rates for the same service.

Encourage Conservation

While water-efficiency measures and appliances are increasingly common, particularly in water supply restricted parts of the country, households and utilities can do more to conserve. Every year, there are roughly 240,000 water main breaks in the United States. Every day, about 6 billion gallons of treated drinking water are lost due to leaky pipes.[107] Preventing these losses can help maximize system revenues, reduce energy use and operating costs, improve water quality, address failing infrastructure within a system, and mitigate the impacts water resource restrictions—whether from drought or contamination. Water audits, plumbing fixes, water efficient appliances and fixtures, and other measures can also help make water bills more affordable.

Efforts to manage demand, promote conservation, and limit water loss can take many forms. As discussed, rates can be set to

reflect the full costs of water services and encourage customers to conserve. Rebates, retrofits, water audits, and public campaigns can similarly promote voluntary reductions in water use. In its paper on innovation in the water industry, BPC's Water Task Force has also explored the application of smart metering and other innovative technologies to further conservation goals.[108]

Key Recommendations:

Codify EPA's WaterSense Program. WaterSense, a companion program to Energy Star, is a voluntary partnership that labels high-performing, water-efficient products. To date, the program has saved consumers $32.6 billion in water and energy bills, along with 1.5 trillion gallons of water conserved.[109] At a cost of about $3 million a year for EPA to administer, WaterSense has been a cost-effective means of promoting water efficiency ($1,100 saved by consumers for every $1 spent by the federal government). An evaluation of the program by the EPA's Office of Inspector General reiterated that WaterSense has been "well-designed and managed," resulting in consumer and industry confidence and a good return of investment.[110] Legislative proposals to formally establish the program in law have been introduced many times over the last few years, but been unsuccessful. S. 1137, the "Clean Safe Reliable Water Infrastructure Act," introduced by Sens. Ben Cardin (D-MD), John Boozman (R-AR), James Inhofe (R-OK), and Tammy Duckworth (D-IL), would similarly codify the program, highlighting the bipartisan support the program can attract.

Clarify that water conservation rebates and runoff improvement programs for homeowners are exempt from federal taxes. Several jurisdictions, particularly those who have faced drought conditions in recent years, have turned to conservation efforts to protect their water supply. As discussed, conservation rebates and runoff improvement programs can have the added benefit of lowering costs for individual customers and utilities. The Water Conservation Rebate Tax Parity Act, introduced by Rep. Jared Huffman (D-CA) and Rep. Dana Rohrabacher (R-CA), would clarify homeowners do not need to pay income tax on water conservation rebates. This would extend similar treatment under the federal tax code to water conservation efforts as currently exists for energy conservation, ultimately supporting their continued use to promote water efficiency.

Encourage states to adopt laws that standardize the use of water loss audits. EPA, USDA, and water stakeholders must work together to promote policies to control and monitor water loss. While some states have adopted such requirements, many lack any formal policy to track and manage this information, despite clear evidence that water loss results in wasted resources and innovative solutions currently exist.[111]

Promote Innovation

Along with many applications to promote conservation, other water technology innovations—whether new devices, processes, or financial structures—can help to reduce the costs associated with treating, delivering, or discharging water and wastewater more generally and provide better services to consumers. Yet the water industry has been slow to adopt innovations even currently on the market, let alone invest in researching and developing new technologies. While there are many reasons the water industry is starved for innovation, the key barriers include risks to human health and the environment of implementing any new technologies, insufficient funding for R&D, cost prohibitive technologies, and regulatory standards. In particular, some

states, in an effort to comply with EPA stormwater regulations, have adopted environmentally-friendly technologies that can be more sensible, low-impact, and cost-effective than traditional infrastructure. These solutions may provide a more affordable avenue for disadvantaged communities to meet their regulatory burdens.

In *Increasing Innovation in America's Water Systems*, BPC's Water Task Force did a deeper dive into these barriers and outlined opportunities to lower the risks and costs associated with adopting innovative solutions.[112] Specially, the task force's recommendations focused on:

- Increasing collaboration, to set the conditions for innovation and establish a proving ground for new technologies;
- Modernizing utility management, funding, and financing processes and procedures, to promote the transfer of risk and build TMF capacity; and
- Reducing regulations that unnecessarily deter innovation.

Educate the Public

Public engagement and education is critical to any affordability strategy. Much more needs to be done to inform the public about the state of the nation's water infrastructure. Water is viewed more as a certainty, rather than as a commodity that must be monitored, conserved, and maintained. For example, cities across the country have been sued by irate customers when they imposed fees to pay for federally mandated stormwater improvements.[113] Some strategies to make water services more sustainable and enhance utility management, such as the regionalization of water and wastewater systems, also run into public opposition despite their clear merits.

BPC's Task Force, in its first brief, highlighted the work being done by the U.S. Water Alliance, which has created free sample public service announcements that local utilities can use to educate consumers about the complexity and costs of providing water and sewer services. However, for the public to fully appreciate the value of water and the costs of providing services, much more public education and outreach will be needed.[114]

The water industry and policymakers must work in unison to more concertedly communicate to the public the value of water. As needs and therefore rates increase, infrastructure needed to deliver water services must be recovered at full cost. Despite public perceptions, access to water is not free. Water utilities must strive to be transparent and inclusive, providing straightforward information about the costs of maintaining and improving their infrastructure and providing services, as well as candid information about their continued ability to meet federal water standards, especially health-based standards.

Conclusion

As proposed, a strategy to safeguard affordability based on the approaches we have outlined could significantly lower costs, encourage the financial sustainability of water systems, and promote improved public health outcomes. While it is difficult to model the exact impact of these proposals, prior research has proven demonstrable benefits. For example, Dr. Janice Beecher, an expert in rate-setting and water utility operations, estimated utilities could reduce costs by 5 percent or more for each of the following if adopted: "efficiency practices (planning, management, and operations), integrated resource management (supply side and demand side), technological innovation (capital and operating), and industry restructuring (consolidation, privatization, and market-based approaches)."[115]

Though the task force has provided some pragmatic steps to tackling this challenge, we recognize the limitations of a single report. Further study is needed to:

- Operationalize asset management strategies, including the full accounting of life-cycle O&M costs, at water systems of all sizes;
- Identify opportunities to assist harder-to-reach populations and explore potential connections between customer assistance programs and other anti-poverty efforts;
- Explore the nuances in safeguarding affordability between providers of drinking water, wastewater, and stormwater services; and
- Document the full range of partnership opportunities in the water industry and the extent to which various practices have been pursued.

While there are many challenges and complicating factors to the issues faced in the water industry, most systems face a pretty straightforward problem: Rates need to rise to accommodate rising costs, but any increases may jeopardize the affordability of water services for a system's lowest-income users. All water stakeholders can do more to ensure that Americans have access to safe, clean water and waste disposal. Providing these services well and efficiently promotes public health, protects the environment, and supports economic growth.

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