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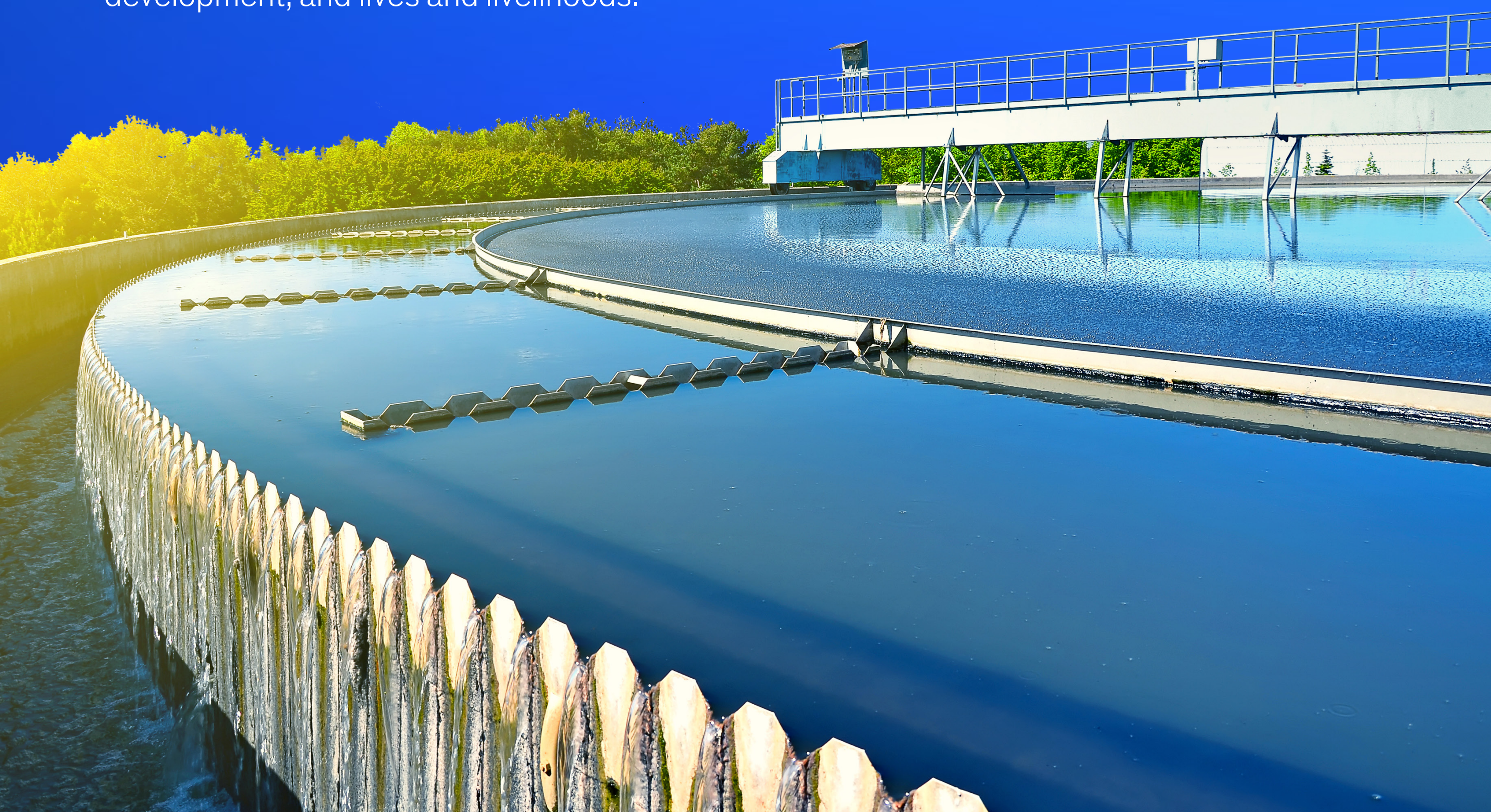
Perspective on

Water resilience: Closing the funding gap for utilities

State and local leaders are well positioned to help water and wastewater utilities solve challenges in financial health, infrastructure resilience, economic development, and lives and livelihoods.



“No water, no life.
No blue, no green.”

–Sylvia Earle

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Contents

Preface

Recent years have seen the publication of a number of reports about how water and wastewater utilities in the United States can become more resilient, particularly when it comes to addressing rapidly aging infrastructure, optimizing operational efficiencies, and contending with increasing water demand.

Many of these reports have focused primarily on how the federal government can help utilities overcome these challenges. In a 2024 publication, for example, the US Water Alliance's Value of Water Campaign identified the need for continued federal investment in the country's water infrastructure.[1] And in a December 2023 report, the National Association of Clean Water Agencies (NACWA) highlighted the need for additional federal funding.[2]

A number of federally funded tools and technical solutions for evaluating and mitigating risk for utilities have also emerged. The US Environmental Protection Agency, for instance, introduced several tools to help utilities assess the climate risk water utilities face, including the Climate Resilience Evaluation and Awareness Tool, the Resilient Strategies Guide for Water Utilities, the Water Network Tool for Resilience, and the Vulnerability Self-Assessment Tool (VSAT).

There has been significantly less discussion about how state and local leaders (including mayors and county offices) can help water utilities invest in resilience. We believe that this is the missing link in preparing the water sector for the years to come—and that state and local leaders can take critical actions today to strengthen water resilience. For instance, state-level funding authorities oversee state revolving funds (SRFs), public utility commissions can approve new rate structures, and mayors can help establish resilience-based targets. As an additional measure, state and local leaders can facilitate support for water utilities in their efforts to develop climate-resilient water infrastructure.
We recently surveyed 108 small and large water and wastewater utilities across the United States about the impacts of climate change. We then analyzed the findings and used them to identify ten strategic actions that, according to our estimates, could help state and local leaders reduce the sector's broader funding gap by $52 billion.

[1] *Bridging the gap: The power of investment in water*, American Society of Civil Engineers and Value of Water Campaign, 2024.
[2] *Resiliency in the balance: Funding challenges for clean water utilities in addressing climate adaptation*, NACWA, December 2023.

Executive summary

Across the United States, private and public water and wastewater utilities are highly fragmented (Exhibit E1). In fact, approximately 50,000 community drinking water systems and 16,000 public wastewater treatment systems supply the majority of the US population. To put this into perspective, the country's energy sector has only around 3,000 systems, including co-ops and publicly owned utilities. This means that while addressing the resilience of only 10 percent of water systems would have an outsize effect on the country's population, reaching all communities—especially rural ones—could require significant effort.

Water utilities are also underfunded. As critical water infrastructure ages, maintenance expenditures go up. Rising user costs (including for citizens) have been unable to close the funding gap. Although the Bipartisan Infrastructure Law (BIL) and other legislation provide funding to address this issue, our research shows the US water utility sector faced an estimated $110 billion annual funding gap in 2024 (nearly 60 percent of utilities' overall spending), primarily driven by significant investments in aging infrastructure, operating expenses, and water-quality regulations. By 2030, this gap could increase to approximately $194 billion.[1]

The growing gap in funding is created in part by the need for utilities to manage increasingly complex climate hazards, particularly around water stress and flooding. Water stress is driven by both supply and demand and refers to a combination of agricultural and industrial water use, policy changes, and climate change, while flooding includes pluvial (rainfall), fluvial (rivers), and coastal flooding. Both types of hazards could increase in the United States and globally, and although water utilities did not create these challenges, they must not fail to provide solutions as well as drinking water and wastewater services. If they do, the consequences for communities could be catastrophic.

Most water utilities in the United States could face adverse impacts from climate hazards in the near term. More than 70 percent of small utilities (serving fewer than 10,000 people) and more than 60 percent of large utilities (serving more than 10,000 people) could experience at least one climate-related water hazard by the early 2030s, including water stress or scarcity and pluvial flooding, when some climate models predict global warming will exceed the 1.5°C goal outlined in the Paris Agreement.[2] In our recent survey, representatives of roughly three out of five utilities reported being underprepared to deal with future climate hazards. Representatives of small utilities in particular were less likely than large utilities to say they feel prepared.

In the face of both funding shortages and increasing environmental challenges, water and wastewater utilities could benefit from becoming more resilient—that is, strengthening their financial and operational health to enable them to plan, manage, and recover from external threats. If utilities closed today's $110 billion funding gap, they could be much better prepared to tackle new and more complex climate challenges through operational changes and infrastructure investments.[3]

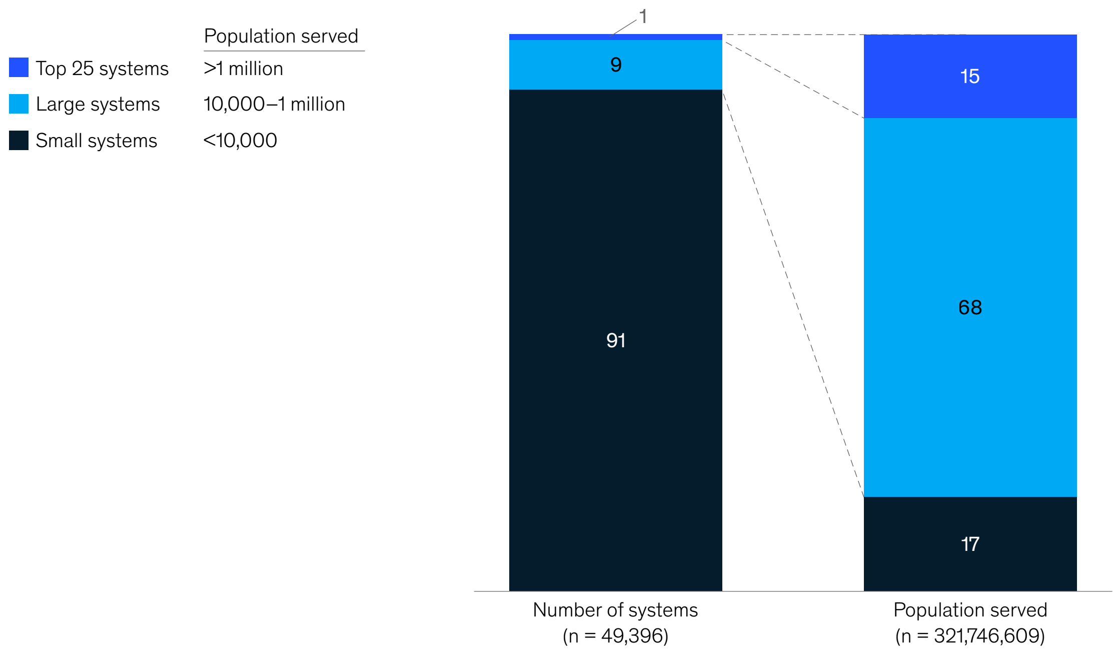
However, water and wastewater utilities cannot simply become more resilient on their own. The sheer number of small utilities is one major barrier. Only about 10 percent of small utilities maintain plans to protect their operations from climate risk, and most face difficulties gaining the resources and expertise needed to improve operational and financial health.

1 For more, see "Funding gap calculations" in the methodology section of this report.
2 For more, see "The Paris Agreement," UN Climate Change, accessed February 26, 2025.
3 This report focuses on physical threats, but resilience can also encompass other challenges, such as cybersecurity and talent shortages. For more on overcoming these challenges, see "What are the options for strategies to include in plans?," *Resilient strategies guide for water utilities*, EPA, updated January 17, 2025.

Exhibit E1

Large water systems, which serve anywhere from 10,000 to one million people, account for the vast majority of populations served.

Water systems by size, % of total



Note: Figures may not sum to 100%, because of rounding.
Source: EPA Water System Summary

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Our analysis suggests that state and local leaders can provide the operational, technical, and financial assistance that the highly fragmented utilities landscape needs to solve these challenges. This report identifies ten key actions state and local leaders can explore to help utilities close 25 to 45 percent of the nearly $110 billion annual funding gap. These actions all use existing funding sources and fall into the following three categories:

1. optimizing existing funding sources (approximately 5 to 10 percent of the funding gap), including innovating on existing rate structures, finding revenue opportunities, and maximizing existing state revolving funds (SRFs) and other programs
2. prioritizing resilience outcomes (approximately 5 to 10 percent of the funding gap) by developing long-term resilience planning
3. enabling operational efficiencies (approximately 15 to 25 percent of the funding gap) by supporting technology adoption, regionalization of the sector, and consolidated capital expenditures

While fully closing the gap will require rethinking how water systems are funded across the country, state and local leaders can play key roles in making existing funding go much further, thus boosting resilience for water and wastewater utilities. In the long term, working to close the funding gap could have positive economic as well as environmental effects.[4] And for state and local leaders, working to solve challenges in the water and wastewater sector in their communities can put them at the cutting edge of innovation.

[4] Hazard mitigation funding covers the following hazard types: riverine floods, hurricane surges, hurricane winds, and wildland–urban interface fires.

Chapter

1

A likely increase in water-related risks for utilities

Water stress typically occurs because of a shortage of supply (for example, due to drought) or increased withdrawals (for example, high demand from agricultural, industrial, and residential use). Supply can be stressed by climate variability or change (boosting drought in some places), while demand can grow in response to population increase, food demand, rising water use by industry, and policy choices.

Although utilities do not directly cause water stress, they are ultimately responsible for providing water to citizens and therefore must contend with increasingly expensive and difficult trade-offs in securing water supply and meeting rising demand. When water utility infrastructure is compromised to the extent that it cannot provide water services, emergency recovery becomes much more difficult.

Water stress is already starting to take effect in several parts of the United States, most notably in Western states, and these pressures are expected to increase in the years to come (Exhibit 1).

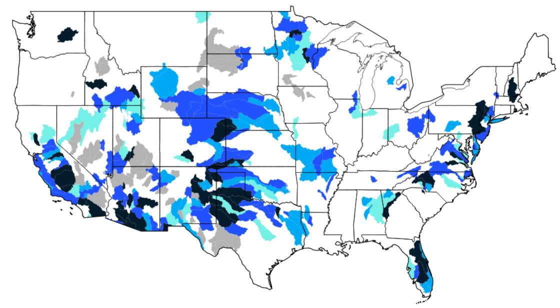
Exhibit 1

Water stress is projected to worsen in the Western United States.

Level of water stress[1]

Today (~1.1°C scenario)[2]

- **Chronic** (demand exceeds supply on average)
- **Frequent shortage** (demand exceeds supply at least once per decade)
- **Infrequent shortage** (demand exceeds supply at least once per 30 years)
- **Borderline** (increase in withdrawal or decrease in supply could result in water stress)
- **Low demand** (excluded due to very low demand)

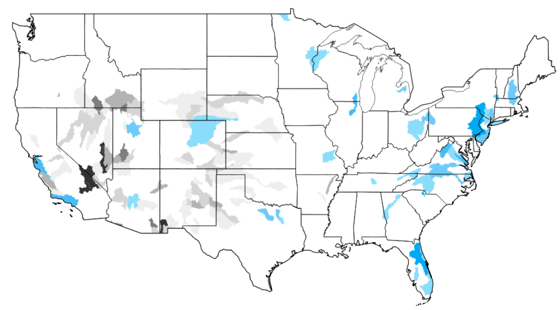


Change from 1.1°C to 2°C[2]

Change, in years per decade, of water stress

<–5

>5



Water stress is a measure of how often demand exceeds supply at the basin level. Projected changes in demand are combined with climate change impacts on availability. Projected changes in supply are caused by changes in precipitation and evaporation.

The Central and Western US are expected to experience increased water stress. This is projected to occur through a combination of decreasing supply due to drought and increasing demand (eg, for irrigation), even in optimistic socioeconomic scenarios for demand.[3]

Some Eastern basins are also expected to remain water stressed, despite some improvements through reductions in demand from the electricity sector in the scenario shown here.

[1]Water stress is an indicator of competition for freshwater resources, based on water supply and demand modeled at the water basin level. Water demand includes domestic, industrial, irrigation, and livestock consumptive and non-consumptive uses. Water supply includes the impact of upstream consumptive water users and large dams.
[2]Global modeling limits specific local considerations and nuances of water stress. The modeling does not consider water infrastructure (eg, pipes, reservoirs), although major interbasin transfers are included through Urban Water Blueprint data. A single scenario is considered for demand and supply, and future scenarios carry inherent assumptions around policy and the pace of physical climate change.
[3]WRI Aqueduct Water Risk Atlas.
Source: Edwin Sutanudjaja et al., "PCR-GLOBWB 2: a 5 arcmin global hydrological and water resources model," Geoscientific Model Development, June 2018, Volume 11, Number 6; Global Change Assessment Model (GCAM) water withdrawal model; McKinsey Climate Analytics; NEX-GDDP-CMIP6 data set; Urban Water Blueprint

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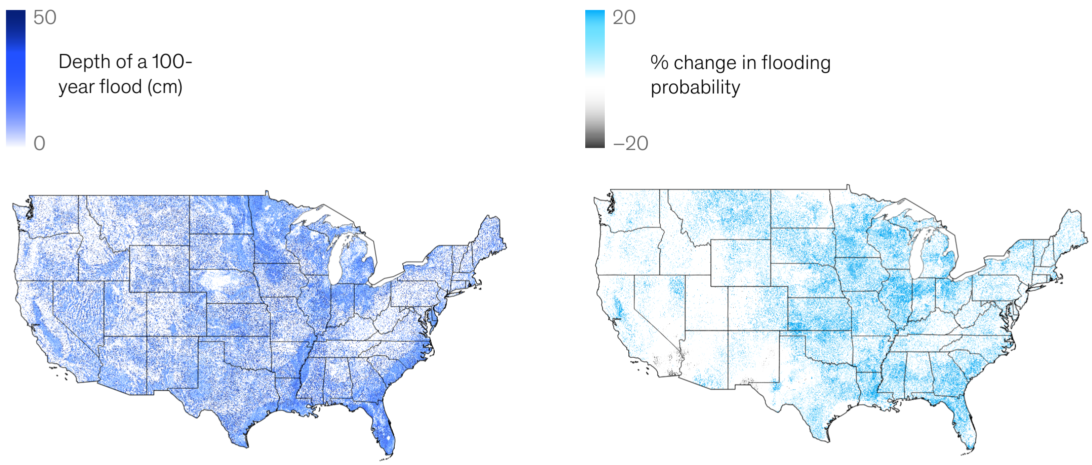
On the other end of the spectrum, excessive rainfall would lead to increasingly frequent flooding, particularly in areas lacking bodies of water or wetlands, damaging critical water infrastructure (Exhibit 2). For instance, inland flooding results not only from extreme rainfall but also from urban planning choices, particularly in Eastern states, while projected changes in flooding from rivers will likely vary by location. At the same time, rising sea levels are likely to increase coastal flooding. Indirect pressures on utilities from extreme weather include supply chain disruption for critical goods and materials and increased insurance costs in vulnerable areas.

Exhibit 2

Pluvial flooding could become more frequent in the Eastern United States.

Pluvial flooding,[1] depth and change in probability of 100-year pluvial flooding

Today (~1.1°C scenario)[2] **Change from 1.1°C to 2°C**[2]



There are three types of flooding: fluvial (rivers overflowing), **pluvial** (flash or surface flooding from heavy rainfall without the presence of water bodies), and **coastal** (inundation of coastal land).

The frequency of pluvial floods could increase across the US, especially in the eastern half. Projected changes in riverine flooding vary greatly by location. Coastal flooding is likely to increase because of sea level rise.

[1]Fathom-Global 3-0 flood projections. Depth is shown for a 100-year flood event (1% annual probability) and is the 90th percentile within 1 km gridcells. Probability change is based on % change in return period for a flood with the depth of present-day 100-year flood event.
[2]Warming levels are increases in global mean temperature above preindustrial temperature and occur at different times in different climate models.
Source: Fathom; McKinsey Climate Analytics

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Although water stress is often associated with Western states and flooding with Eastern states, the reality is that nearly all states have utility systems at risk of both. In fact, mapping the locations of water utility systems[1] against projections of water stress and flood risk shows that 47 states have at least one utility facing water stress (Exhibit 3). In addition, more than 50 percent of utilities in 12 states, including Florida and New Jersey on the East Coast, are expected to face water stress in more than 50 percent of their water systems by 2030.[2] And all 50 states have utilities at risk of flooding by more than 50 centimeters in a 100-year flood.[3]

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[1] "Community water system service area boundaries," EPA, accessed July 25, 2024.

[2] Projections are based on impacts to both water availability and water withdrawals. The 1.5°C scenario includes climate change impacts on water availability (ssp360) coincident with withdrawal for 2030, taken from Global Change Assessment Model (GCAM) simulation results. GCAM is driven by the Shared Socioeconomic Pathway SSP3, which represents high challenges for mitigation (regionalized energy or land policies) and adaptation (slow development) along with climate policy corresponding to Representative Concentration Pathway (RCP) 6.0, in which greenhouse gas emissions peak around 2080 then decline.

[3] There are three types of flooding: fluvial (rivers overflowing), pluvial (flash or surface flooding from heavy rainfall without the presence of water bodies), and coastal (inundation of coastal land); this analysis shows only pluvial flooding because it is the most widespread across the United States.

Exhibit 3

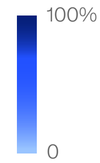
Utilities are expected to face two primary climate-related hazards in the coming decades: water stress and flooding.

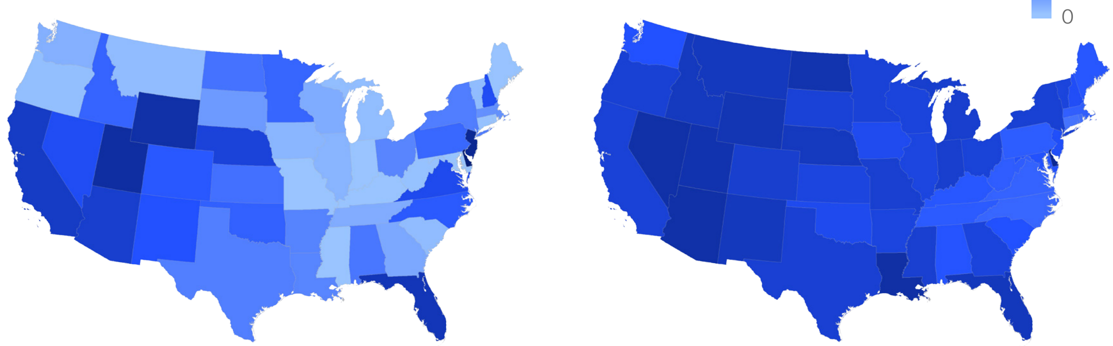
Water stress

% of utilities facing water stress, 1.5°C scenario

Flooding

% of utilities facing flooding, 1.5°C scenario





Note: Likelihood of water stress and flood risk is based on 1.5°C scenarios. Percentages for each state are calculated with >0 cm flood risk (including 0–25, 26–49, 50+). Percentages for water stress are categorized as borderline, infrequent shortage, frequent shortage, or chronic stress.
Source: McKinsey Climate Analytics

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Chapter 2

More vulnerability for small utilities

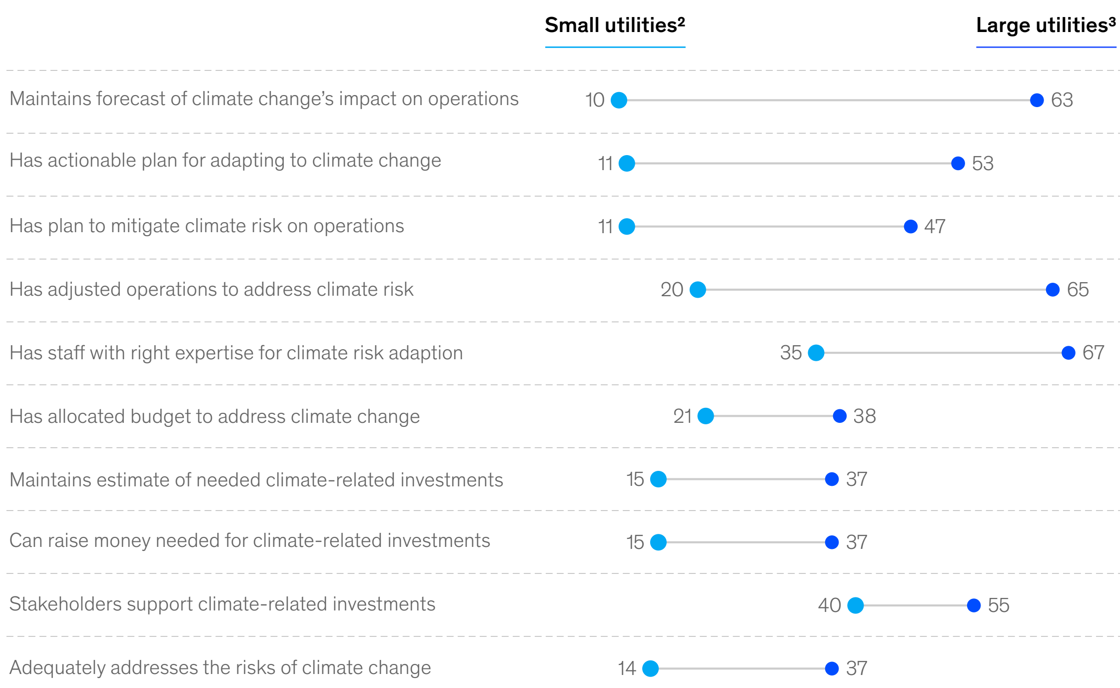
Small utilities are more vulnerable to climate impacts compared with large utilities. In fact, utilities serving fewer than 500 people currently account for 60 percent of utilities that are chronically stressed (that is, where demand exceeds supply). This gap would increase if global average temperatures rose to 2°C above preindustrial levels, with small utilities representing 64 percent of those facing chronic stress.

According to our survey, large utilities feel better prepared than small utilities to address the impending impacts of climate change (Exhibit 4). This higher confidence is primarily driven by the expertise of employees at large utilities in adapting to climate risk and higher stakeholder support for infrastructure investments. At the same time, small utilities feel they lack the necessary resources and expertise.

Exhibit 4

Survey results show a number of climate risks could present a greater threat to small utilities compared with large utilities.

Survey questions,[1] % saying "agree" or "strongly agree"



[1] Analysis run for 31,000 towns in the United States; materiality defined as 3+ months of severe or worse drought, 15 cm of 100-year flooding; assumes impact to towns will be the same for utilities; ie, number of small towns facing water-related hazards will be equal to the number of small utilities facing water-related hazards.
[2] Defined as utilities serving <25,000 customers.
[3] Defined as utilities serving >100,000 customers.

Source: US Water Utility Survey, n = 106 (2024)

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Chapter 3 The infrastructure funding gap for water utilities could reach $194 billion by 2030

Today's funding for water utilities comes mostly from three sources: user fees (66 percent), federal funding (18 percent), and municipal bonds (16 percent). Without additional efforts, utilities and the communities they serve could find themselves short on capital, particularly for infrastructure, at a time when water systems are more critical than ever (Exhibit 5). Our research shows that investments in resilience currently account for about 10 percent of total expenditures.

The funding gap analysis assumes that total expenditures and all costs (except for resilience) grow by 4.1 percent, based on Global Water Intelligence (GWI) projections for water and wastewater utilities in 2030. Resilience costs are estimated to grow by 8.9 percent CAGR, based on select water utilities' investment in resilience projects, using the 2022 Clean Watersheds Needs Survey (CWNS) from the US Environmental Protection Agency (EPA) and select power utilities for corroboration. In a business-as-usual scenario, the funding gap could increase to nearly $194 billion by 2030, in part because utilities need to invest in infrastructure resilience more quickly than in other costs, such as routine maintenance. However, it's worth noting this estimate does not include costs to water utilities resulting from current federal legislation related to water quality.[4]

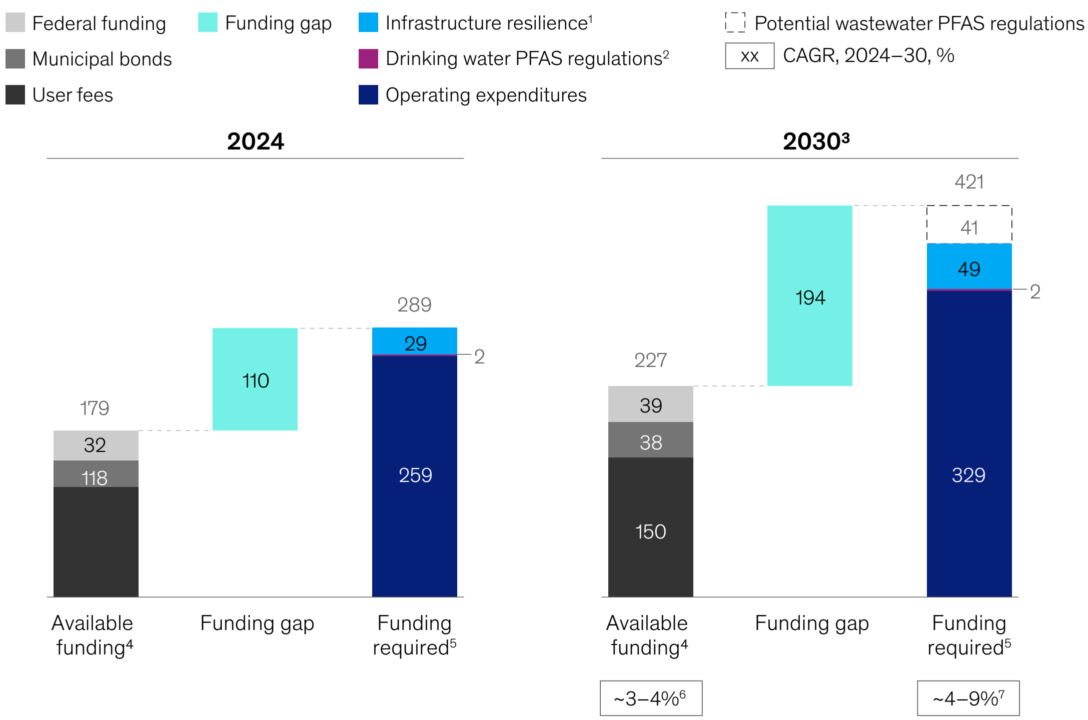
[4] As of September 2024.

Without additional efforts, utilities and the communities they serve could find themselves short on capital, particularly for infrastructure, at a time when water systems are more critical than ever.

Exhibit 5

Utilities already face a funding gap of about $110 billion that could grow to about $195 billion by 2030.

US utility water and wastewater funding needs and requirements, selected years, $ billion



[1]Resilience calculated as ~10% of total expenditures based on select water utilities' total investment in resilience as a percentage of total operating expenditures and capital expenditures.
[2]Drinking water PFAS costs uses US Environmental Protection Agency (EPA) cost estimate of $1.5 billion annually.
[3]Projections are based on impacts on both water availability and water withdrawals. The 1.5°C scenario includes climate change impacts on water availability (ssp360) coincident with withdrawal for 2030, taken from Global Change Assessment Model (GCAM) simulation results. GCAM is driven by the Shared Socioeconomic Pathway SSP3, which represents high challenges for mitigation (regionalized energy and land policies) and adaptation (slow development) along with climate policy corresponding to Representative Concentration Pathway (RCP) 6.0, where greenhouse gas emissions peak around 2080 then decline.
[4]Based on data from Congressional Research Service, EPA, and Global Water Intelligence.
[5]*Bridging the gap: The power of investment in water*, American Society of Civil Engineers and Value of Water Campaign, 2024; Minnesota Pollution Control Agency; National Association of Clean Water Agencies; funding includes the EPA's 2022 Clean Water Watersheds Needs Survey and the 7th Drinking Water Infrastructure Needs Survey and Assessment.
[6]Estimated CAGR based primarily on 4% user fee and bond growth and projected 3% federal funding growth.
[7]Assumes total expenditures grow at ~4.1% based on GWI projects for water and wastewater utilities; 8.9% CAGR for resilience investment based on select water utilities' investment in resilience projects compared with other categories as well as EPA's 2022 CWN Survey and some power utilities for corroboration.

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Chapter

4

State and local leaders can help close the funding gap—without securing additional federal or state funds

Our survey asked representatives from utilities to rank the support needed to address future impacts of climate change. Respondents identified three (out of seven) categories as most necessary: funding, prioritization, and operational support. With these categories in mind, we quantified ten strategic actions to help utilities secure up to $52 billion in funding, or 25 to 45 percent of the projected funding gap (Exhibit 6).

Many of these strategies can be implemented today. In fact, a number of real-world examples are already in evidence, as illustrated in the following sections. And although these strategies are not necessarily easy to implement, each has the potential to be scaled across states. The strategies in this report focus on actions for state and local leaders, but utilities and industrial players can also help close the funding gap by taking complementary actions (see sidebars "What can utilities do to best serve their communities?" and "Balancing industrial water use").

Securing additional funding (70 percent of respondents)

Water utilities are aware of the increasing funding gap for water and wastewater infrastructure and are looking for solutions. Our survey respondents identified funding as the top area in need of support among seven potential support areas. This includes maximizing state revolving funds (SRFs), considering new business models and rate designs, expanding access to non-water SRF funding, and greenlighting alternative revenue opportunities outside of rate increases.

Maximizing state revolving funds. SRFs, which include EPA grant funding and state contribution matches, provide low-interest financing for local water infrastructure projects. Water utilities submit project-specific applications for SRF loans or grants, which are then vetted, approved, and administered by state agencies. There are several actions state-level funding authorities can explore to enhance SRF use, such as providing resources for utilities to build predictive cash flow modeling and issuing bonds against SRFs to leverage additional funding. This maximization does not necessarily imply new funding as much as leveraging existing resources, which are currently underutilized. Although the Bipartisan Infrastructure Law (BIL) has significantly increased the funding offered to states under the Drinking Water and Clean Water State Revolving Funds (roughly doubling previous funding levels[5]), projects coming out of the SRFs have not kept pace (Exhibit 7).

Federal funds are often supplemented with funding at the state level, including direct pay-ins and municipal bonds. This means state leaders can look into their SRFs to evaluate potential opportunities to increase the pipeline of projects and more fully use existing funding, particularly for smaller utilities. Funding is also highly concentrated. Our research shows that only 100 utilities account for approximately 50 percent of funding, and only about 2,900 systems received funding under the EPA's Drinking Water State Revolving Fund from 2020 to 2023. Improving accessibility through greater technical assistance support and dedicated outreach to smaller utilities could also help scale the number of projects funded under an SRF and accelerate investments in both resilience and general capital projects.

[5] "Water infrastructure investments," EPA, updated February 5, 2025.

Exhibit 6

State and local leaders could potentially apply levers to mobilize funding, prioritize resilience, and enable efficiencies.

State leaders | Local leaders | Both

Category	Lever	Funding gap reduction potential, $ billion	Description
1. Securing additional funding	A. Maximizing state revolving funds (SRFs)	1–2	Increasing lending capacity and disbursement rates of SRFs through fund structure adjustments (eg, rolling acceptance)
	B. Considering new business models and rate designs	0.2–0.3	Approving the increase of fees and alternative rate structures where appropriate (eg, seasonal pricing)
	C. Expanding access to non-water SRF funding	0.2–0.3	Supporting utilities in their efforts to access sources of funding that have traditionally not been directed to water utilities and providing grant-writing support
	D. Greenlighting alternative revenue opportunities outside of rate increases	4–9	Authorizing utilities to access new revenue opportunities beyond raising fees on users (eg, stormwater charges, waste monetization, connection fees)
2. Prioritizing resilience	A. Planning for long-term resilience at the state level	6–12	Creating state-level resilience offices, establishing resilience funds, and providing the necessary support to direct more funding to long-term resilience projects
	B. Setting resilience targets	0.4–0.7	Establishing local targets around resilience (eg, reduced water usage) with potential mandates and incentives to help reduce strain on utilities
	C. Building a resilience data repository	*Enabler*	Compiling a statewide repository of effective resilience plans that have been successfully implemented to save utilities' time and labor
3. Enabling operational efficiencies	A. Supporting technology integration	3–7	Providing funding to integrate new technologies into utilities (eg, advanced metering infrastructure, predictive maintenance) and derisking new technologies (eg, supporting tech incubators)
	B. Promoting regional cooperation and efficiencies	5–6	Providing incentives for utility regionalization, offering financial and legal support, and providing merger strategy support
	C. Promoting capital efficiencies	6–16	Enabling cooperative purchasing agreements across municipalities, streamlining permitting process, supporting qualified project development and planning
Total funding gap reduction potential		27–52	

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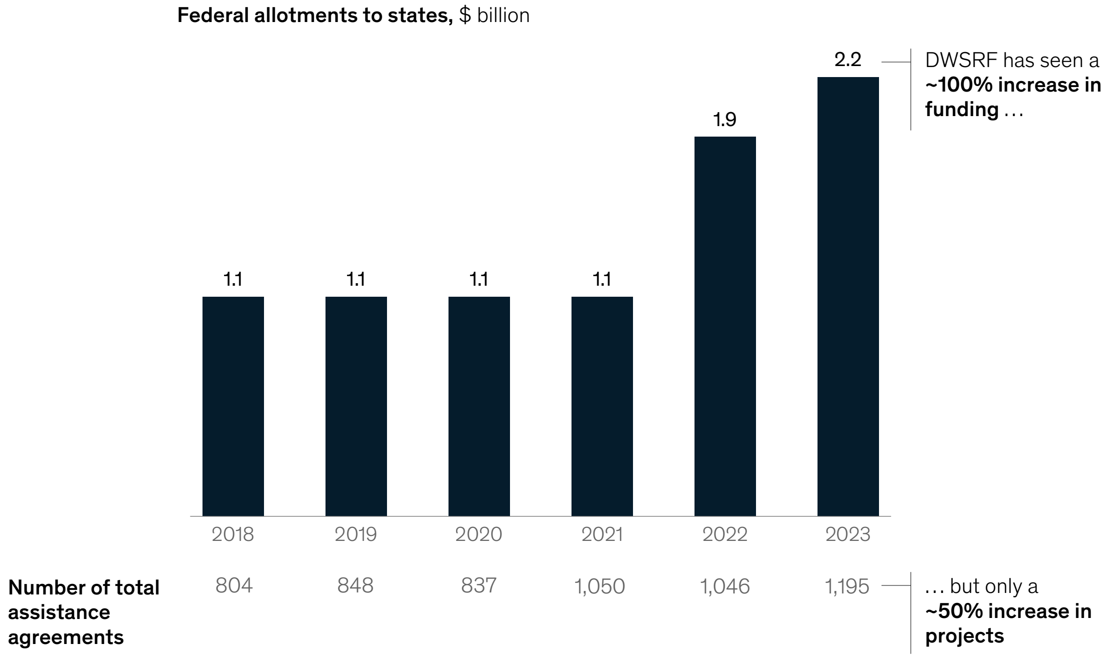
Exhibit 7

State revolving funds have seen significant fund increases but slower project growth.

Drinking Water State Revolving Fund (DWSRF) funding and projects, 2018–23



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On this point, the EPA runs an annual Training and Technical Assistance for Small Systems Funding program to provide greater investment to small systems to expand their financial and managerial capacity.[6] The program provided $30 million to smaller water systems in its 2024 funding round. These types of investments can help smaller systems develop the ability to address the types of funding opportunities (such as applying for SRF funds) that are normally out of reach for capacity-strapped organizations.

Considering new business models and rate designs. State and local water boards and public utility commissions can consider prioritizing new rate structures and models that allow utilities to prioritize needed resilience actions, such as water conservation, while maintaining or increasing funding for operations and supporting affordability. For example, such models could increase fixed-cost recovery mechanisms by installing a "peak" pricing rate to account for periods that typically see higher periods of water stress (such as during the summer months). They could also adjust the rate structure to include data points beyond consumption (by charging a fee to service locations with larger frontages as a proxy for locations with more physical infrastructure). The mix will likely vary from one system to the next, but updating the broader rate structure to more accurately reflect true system costs could support utilities in making the necessary investments in resilience. Such adjustments may become increasingly critical as pressures mount to reduce total consumption levels, which would affect existing revenue bases.

[6] "EPA announces $30 million to help small and rural communities protect public health, drinking water, and local waterways," EPA, October 4, 2024.

Expanding access to non-water SRF funding. Utilities could also benefit from additional public funding opportunities that do not come from SRFs, such as capital outlay funds dedicated to infrastructure and environmental bonds (also known as green bonds). Green bonds, which are similar to normal municipal bonds but with added transparency into the environmental impact of the project, can be an attractive alternative because they typically don't require additional legislation, making them a faster route for securing project funding both from the community and the broader private investor market. In addition, under the BIL, several transportation-focused programs were either established or expanded to include funding for resilience efforts, including BUILD and PROTECT.[7] States and local governments can apply to these programs to secure funding for transportation resilience efforts that frequently affect water systems, such as stormwater runoff or water pumps. For rural water systems, the US Department of Agriculture (USDA) also maintains multiple programs to support watershed improvements and other water-related activities that could bolster investments outside of more urban areas.

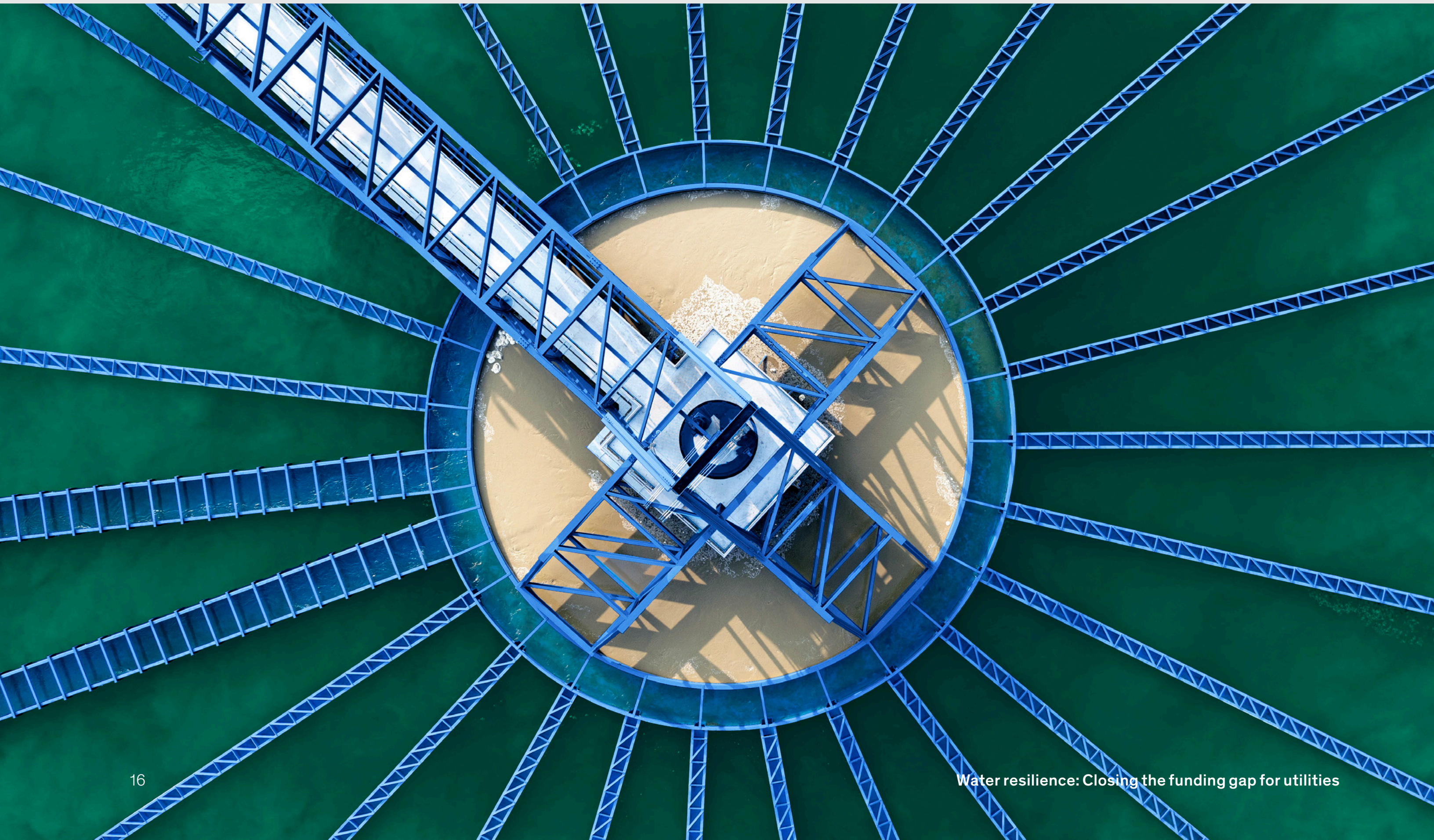
[7] Better Utilizing Investments to Leverage Development (BUILD) grant program and Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (PROTECT).

Deep dive: Maximizing state revolving funds

States can consider tapping into the Water Infrastructure Finance and Innovation Act (WIFIA) program to further support state revolving funds. WIFIA provides secured or direct loans for specific water and wastewater infrastructure projects that exceed $20 million in costs (or $5 million in rural areas).[1]

In addition, the Environmental Protection Agency recently announced the selection of 29 environmental finance centers to assist communities nationwide in accessing federal funding for water infrastructure projects aimed at enhancing public health and environmental protection. This initiative focuses on helping underserved communities secure federal funding for water infrastructure improvements.[2]

[1] "What is WIFIA?," EPA, updated June 6, 2024.
[2] "Biden-Harris administration announces selection of 29 EPA environmental finance centers to help communities access funds for infrastructure projects," EPA, November 4, 2022.



To secure additional funding, state and local governments will likely need to expand the pipeline of "shovel ready" projects likely to receive external capital investment. This could mean prioritizing parallel efforts to build capabilities at the local level through broader technical assistance, more-effective project planning, and additional expertise engagement.

Greenlighting alternative revenue opportunities outside of rate increases. State and local public utility commissions can approve alternative revenue opportunities that account for the full cost of water services without increasing standard rates. Additional revenue streams include monetizing the production of renewable natural gas at wastewater treatment plants[8] or implementing stormwater charges.[9] On this point, the Water Utility Climate Alliance (WUCA) offers a number of plans and publications to help water and wastewater utility executives and government officials prepare for and respond to climate change issues.[10]

Prioritizing resilience (33 percent of respondents)

The second most important area for survey respondents is prioritizing resilience at the leadership level (either through communication or, potentially, regulations). Resilience refers to the overall improvements the sector needs to make to its operations, in part to contend with vulnerabilities from climate change. Priorities here include planning for long-term resilience at the state level, setting resilience targets, and building a resilience data repository.

Planning for long-term resilience at the state level. State environmental agencies could explore the creation of specialized resilience teams that help utilities develop and implement long-term resilience plans, as well as secure additional funding. State and local agencies can also potentially use permitting tools in a way that prioritizes project resilience. A number of major US cities have already adopted the US Water Alliance's One Water approach, which helps utilities better collaborate with local communities.[11] For instance, the City of Denver recently enacted its first citywide water strategy, which aims to manage regional water and land use by enabling multiple agencies with unique responsibilities to collaborate around water management.[12]

Setting resilience targets. State and local leaders could benefit from creating risk-informed targets to provide guidance for utilities and cities coordinating resilience efforts. And county sustainability officers can conduct assessments to understand resilience needs and provide direction for state-level climate plans. These targets can be based on both demand (reducing water consumption) and supply (increasing water reuse). Many states and local governments already have some supply regulations in place but may benefit from setting more ambitious goals.

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[8] For more, see "Wastewater treatment biogas-to-renewable natural gas facility receives honorable mention," City of Phoenix, April 30, 2020.
[9] For more, see "Stormwater utility fee," Durham, North Carolina, accessed June 28, 2024.
[10] "Plans and publications," WUCA, accessed February 27, 2025.
[11] *One Water roadmap: The sustainable management of life's most essential resource*, US Water Alliance, December 2016.
[12] *Denver One Water plan*, City and County of Denver, September 2021.

Deep dive: Expanding access to state revolving funds unrelated to water

Multiple examples illustrate how local leaders can help expand access to non-water revolving funds to support their water efforts. Some city leaders have designed bonds to finance projects that mitigate stormwater runoff and enhance community resilience. Others have passed bills to support organizations with grant writing and project planning when applying for federal funding. And some governments have secured funding to support the planning and engineering of pumping stations for public transit systems, enabling greater resilience in case of flooding.

Deep dive: Planning for long-term resilience

When it comes to planning for long-term resilience, New Jersey's Department of Environmental Protection (DEP) and Georgia Environmental Finance Authority have both awarded additional points for state revolving fund applications that incorporate resilience into planned investments. The New Jersey DEP requires that sponsors submit a Resilience Assessment with project financing applications.

The Resilience Assessment was designed to ensure that water infrastructure projects funded through the New Jersey Water Bank can withstand climate and extreme weather events while contributing to the state's climate resiliency priorities. This may include a vulnerability analysis assessing the proposed project's exposure to rising sea levels and extreme weather events, adaptation strategies to address the identified vulnerabilities, and a risk tolerance assessment, among other factors.

Beyond resilience targets, states can look to set standardized benchmarks and goals for system performance. In 2023, Louisiana launched a water report to grade the system health and performance of its approximately 1,000 water systems.[13] Creating objective standards and measures could help foster accountability, for which greater state and local support and attention is needed.

Building a resilience data repository. Chief resilience officers (CROs) can help create a repository of effective resilience plans that have been successfully implemented by other water utilities in the United States. For example, in 2007 the San Francisco Public Utility Commission held a water utility climate change summit. After the event, 12 water utilities from across the country created the Water Utility Climate Alliance to share proven climate adaptation strategies.[14]

Enabling operational efficiencies (20 percent of respondents)
Building on the point around securing additional funding, survey respondents noted that high operating costs exacerbate the funding gap and limit their ability to invest in resilience. Enabling operational efficiencies includes supporting technology integration and promoting regional cooperation and capital efficiencies.

Supporting technology integration. A variety of technologies can help utilities improve operational efficiencies and thereby increase their capacity to make investments in resilience, including advanced metering infrastructure (AMI),[15] digital twins,[16] intelligent asset management, smart metering, energy-efficient appliances, and predictive maintenance.[17] Such efforts can help reduce energy consumption, reduce pipe leakage, and achieve reduction in non-revenue water,[18] among other results, and they often allow utilities to use these cost savings to fund capital needs. State economic development offices can also derisk new technologies for utilities by supporting technology incubators and helping smaller utilities pilot and deploy operational technologies.

Promoting regional cooperation and efficiencies. Collaboration and resource sharing across water systems can provide the advantage of economies of scale. This is an acute need in the water industry, where utilities are highly fractured. Coordinating systems to act regionally rather than individually could help address issues of scale and give underresourced utilities more time and resources to invest in resilience. Multiple stakeholders, including state resource control boards, local councils, and not-for-profits, might explore ways to support utility efforts to increase regional scale.

[13] "Community Drinking Water Accountability Rule," Louisiana Department of Health, accessed February 26, 2025.
[14] "About us," WUCA, accessed June 28, 2024.
[15] For more, see Evan Polymeneas, Adam Rubin, and Humayun Tai, "Modernizing the investment approach for electric grids," McKinsey, November 11, 2020.
[16] For more, see "What is digital-twin technology?," McKinsey, August 26, 2024.
[17] For more, see "A smarter way to digitize maintenance and reliability," McKinsey, April 23, 2021.
[18] "Digital water utility in cities: Optimizing resources," Waltero AB, May 8, 2024.

Deep dive: Setting resilience targets

For decades, residents of Albuquerque, New Mexico, depended solely on groundwater for their drinking water. By the mid-1990s, however, it became clear that the aquifer below the city was being depleted at an unsustainable rate. In response, city officials laid out an ambitious plan in 1997 to reduce water consumption. The Water Resources Management Strategy included a target of reducing water use per capita by 30 percent in ten years. After this goal was achieved, a new target was set. By 2015, total water use per capita was reduced by almost 50 percent from 1990, thanks to these efforts.[1] This conservation plan involved careful coordination with the local utility. Today, the Albuquerque Bernalillo County Water Utility Authority offers more than $1 million in rebates each year to reduce water demand, including subsidies for xeriscaping, water-efficient appliances, and the use of native plants in gardens.[2]

In another example, leaders in Loudoun County, Virginia, invested in dedicated water-reuse infrastructure as a way to support local data centers, which process approximately 70 percent of the world's internet traffic. Ten years later, that infrastructure includes 20 miles of dedicated reuse pipeline and delivers more than 800 million gallons of reused water annually. Furthermore, the county is planning to invest approximately $400 million in an expansion to its reclamation facility to process 16.5 million gallons per day.[3]

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[1] *Water 2120: Securing our water future*, Albuquerque Bernalillo County Water Utility Authority, 2016.
[2] "One Water Spotlight: Albuquerque, New Mexico," US Water Alliance, accessed June 28, 2024.
[3] "Reclaimed Water Program," Loudoun Water, accessed December 8, 2024; Capital Improvement Plan 2023-2032, Loudoun Water, accessed December 8, 2024.

Deep dive: Supporting tech incubators

From 2015 to 2017, the Nevada Governor's Office of Economic Development provided more than $3 million in funding to establish a partnership with WaterStart, a Las Vegas–based start-up incubator driving water infrastructure innovation in the driest state in the country. WaterStart is also supported by several regional water systems, each providing up to $50,000 in annual partnership funding. In exchange for funding support, WaterStart allows regional players such as the Southern Nevada Water Authority to pilot novel water efficiency innovations. By partnering with the Governor's Office of Economic Development, WaterStart enables water conservation projects to connect more easily with the state's economic development incentives, effectively expanding the available funding pool and attracting water start-ups to the region.

Nevada's support of WaterStart has paid dividends: The state has received praise for its exemplary water governance, and Las Vegas has become a global water tech hub, attracting cutting-edge start-ups and top water industry talent. As of 2023, the city of Las Vegas had reduced per-capita water consumption by 58 percent (compared with 2002) thanks to innovative efficiency improvements.[1] At the time of this report's publication, WaterStart has funded nearly $4 million across 47 pilot projects in Nevada.[2]

Similarly, two major cities in the Great Lakes region have worked to translate their surrounding natural resources into opportunities to build water hubs of the future.

Milwaukee launched its Water Centric City initiative in an effort to bring together stakeholders from across the region to build a hub for water leadership and innovation. Today, the initiative convenes utilities, universities, economic development organizations, environmental organizations, local government agencies, and private sector partners to invest in new technologies, pilot sustainability and resilience programs, conduct research, improve watershed health, and build up the overall water sector in the local economy.[3]

In 2016, Chicago launched its own water initiative, Current, to invest in a water tech hub, pulling together key stakeholders, investing in new technologies, and supporting an expanding sector of the local economy. As of 2023, Current had raised $28 million, launching nine pilot programs and supporting more than 30 new water technologies.[4]

[1] "Drought and conservation measures," Las Vegas Valley Water District, accessed February 26, 2025.
[2] Website of WaterStart, accessed October 11, 2024.
[3] "Water Centric City Initiative," City of Milwaukee, accessed December 9, 2024.
[4] *2023 impact report: A watershed year*, Current, December 2023.

Deep dive: Regional scale

The Ohio communities of Coshocton and West Lafayette regionalized to solve decades-old problems. Coshocton, an industrial community, faced underutilization due to industrial decline, leading to increased residential water rates. West Lafayette, on the other hand, struggled with aging infrastructure that required costly improvements and quality concerns caused by groundwater contamination.

To address these challenges, state and local leaders took a proactive, collaborative approach to build a regional water system. Elected officials from both communities spearheaded negotiations to ensure that the merger was beneficial for both Coshocton and West Lafayette. To better inform these negotiations, the Ohio Rural Community Assistance Partnership (RCAP) conducted an independent study on these communities, which allowed local leaders to support their decision to merge with data.

State agencies also provided crucial support, including helping the communities secure funding. The involvement of state agencies in the regionalization process also reassured residents about the feasibility and benefits of the merger.

Perhaps most important, local leaders engaged in extensive community outreach and education through public meetings, information sessions, and transparent communication. To further solidify the trust of residents, a water advisory committee with equal representation from both communities was established.

Promoting capital efficiencies. State and local leaders can implement several strategies to promote capital efficiencies, which could likely help utilities apply cost savings toward investments in resilience. This may be possible by considering the following actions:

- *Streamline permit applications*. A centralized permitting agency could reduce the complexity of the permit application processes, potentially avoiding costly delays.[25]
- *Facilitate cooperative purchasing agreements*. Coordinating cooperative purchasing agreements across multiple local utilities could help smaller utilities gain scale in purchasing consumables (such as treatment chemicals) or contracted services for capital projects. By purchasing higher volumes, utilities can potentially gain access to more competitive pricing for goods and services and reduce their capital expenditures.
- *Explore predevelopment planning*. Before undertaking potential new infrastructure projects, water and wastewater utilities will need to conduct costly feasibility studies and detailed engineering plans, among other things. Local and state leaders can support utilities by offering predevelopment funding for qualified projects. This money can even come in the form of SRF loans with 0 percent interest.

[19] "Accelerating permitting to help achieve US clean energy goals," McKinsey, June 18, 2024.

Deep dive: Predevelopment funding

Predevelopment funding is an essential financial resource that helps with initial costs associated with planning and preparing for a project before construction starts. For example, New York offers the Engineering Planning Grant, which helps municipalities initiate preliminary planning to position them to secure financing and complete their wastewater, sewer, and water quality projects. The City of Kingston received a $25,000 engineering planning grant to conduct long-term adaptive planning for its wastewater treatment plant. The implementation of this plan will be financed through low-interest loans from the Clean Water State Revolving Fund.

What can utilities do to best serve their communities?

Although the focus of this report is on actions that state and local leaders can take to enable utility resilience, utility leaders also have critical roles to play.

Plan with best available forecasts. To fully understand and begin to address the scale of future investments required, utilities should ensure they are using the best available projections on future climate hazards and environmental conditions for system planning. The Water Utility Climate Alliance's 2022-2026 Strategic Plan addresses this challenge, offering a comprehensive guide for water resource managers.[1]

Make the case for investment. Many resilience investments also create operational cost savings for utilities. Utility leaders can quantify the benefits, show the return for making a resilience investment, and make a clear case for the benefit to customers.

Educate leaders on system needs. Utility leaders can communicate proactivelyto municipal leaders, state leaders, and the community about the criticality of water and wastewater infrastructure, the scale of the challenge, and the benefits of adequate investment.

[1] *Water Utility Climate Alliance strategic plan 2022-2026*, WUCA, accessed February 26, 2025.

Balancing industrial water use

The recent expansion of data centers in the United States has increased difficulties in balancing industrial water use with municipal needs. This trend is expected to accelerate in the coming years, with rising use of AI[1] driving demand for vast amounts of natural resources, including water for liquid cooling and producing electricity. Requirements vary by data center, but larger ones can consume well more than a million gallons a year; ten to 50 AI responses can use as much as 500 milliliters of water.[2] According to a recent paper by Environmental Research, nearly a quarter of all data centers worldwide are located in the United States.[3] In addition, approximately one-fifth of the direct water footprint for these servers comes from moderately to highly water stressed watersheds, while nearly 50 percent of servers are fully or partially powered by power plants in water-stressed regions.

To mitigate the impacts of this growing industrial demand, regions could start by pushing data centers to track water use more holistically. Currently only about half of data centers actively track water consumption, limiting transparency into the additional demand on water systems.[4] Cities in which new data center projects are being built could also look to price the cost of greater water demand into agreements with developers. In Stillwater, Oklahoma, for example, the developer for a new data center project has agreed to contribute to water and wastewater infrastructure investments as part of its development deal with the city.[5]

[1] "AI power: Expanding data center capacity to meet growing demand," McKinsey, October 29, 2024.
[2] Pengfei Li et al., "Making AI less 'thirsty': Uncovering and addressing the secret water footprint of AI models," arXiv, Volume 4, January 15, 2025.
[3] Md Abu Bakar Siddik, Arman Shehabi, and Landon Marston, "The environmental footprint of data centers in the United States," *Environmental Research Letters*, 2021, Volume 16, Number 6.
[4] Rich Miller, "Uptime: Most data centers still not tracking environmental impact," Data Center Frontier, September 20, 2021.
[5] "Stillwater's data center project," Stillwater, Oklahoma, accessed February 26, 2025.

Chapter

5

The benefits of investing in resilience

The future economic benefits of investing in water resilience can outweigh up-front costs. Considering how to best prioritize these types of investments not only helps safeguard physical assets and lives but also supports broader economic stability, suggesting that such investments are essential for sustainable development.

By investing in resilient infrastructure now, utilities, cities, and states could reap long-term environmental and economic benefits by reducing future costs associated with climate-related recovery and repair. The National Institute for Building Sciences estimates that every $1 spent on mitigating hazards such as floods, hurricanes, and fires can save $6 in future costs related to extreme events, such as those associated with economic disruptions, property damage, public health crises, and fatalities.[20] And a recent US Chamber of Commerce report estimated that every $1 spent saves an additional $7 in long-term economic health benefits from reduced disruption.[21]

In addition to cost savings, utilities have an opportunity to create significant benefits for local communities through investment in water infrastructure. For example, investing at levels that maintain the investment of the BIL could save around $16 billion annually in economic activity, preserve 13,000 jobs each year,[22] and reduce personal income losses by approximately $12 billion.[23]

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[20] "National Institute of Building Sciences issues new report on the value of mitigation," National Institute of Building Sciences, January 11, 2018.
[21] "The preparedness payoff: The economic benefits of investing in climate resilience," US Chamber of Commerce, June 25, 2024.
[22] Yearly average of jobs (13,000) for 2024 through 2033, based on estimates from *Bridging the gap: The power of investment in water*, American Society of Civil Engineers and Value of Water Campaign, 2024.
[23] Yearly average of personal income ($12 billion) for 2024 through 2033, based on estimates from *Bridging the gap: The power of investment in water*, American Society of Civil Engineers and Value of Water Campaign, 2024.

Conclusion

The importance of clean water cannot be overstated, and state and local leaders are well positioned to contribute toward solving critical challenges around infrastructure, economic development, and lives and livelihoods. At the same time, the water sector funding gap is projected to increase, leaving many water utilities with less money to invest in resilience. Small utilities are particularly vulnerable to extreme weather events, such as droughts and floods.

There is no time to waste. A number of tactical actions can be taken today without expending any additional funds, helping close a meaningful portion of the funding gap facing water and wastewater utilities as well as laying the groundwork for increased investment in resilience in communities.

Methodology and assumptions

This report is the result of a collaboration among water-industry stakeholders in 2024. The data were sourced primarily from the EPA's Clean Watersheds Needs Survey (CWNS) and other EPA or federally provided data, in addition to the secondary sources listed below. Climate and risk analyses were conducted by McKinsey's Climate Analytics team of data scientists, who are focused on the impacts of climate change across a range of topics.

Funding gap calculations

Our funding gap analysis uses the Value of Water (VOW) Campaign's *Bridging the gap: The power of investing in water* (2024) as the basis for the estimated costs of total expenditures in 2024, specifically $270 billion.[24] The VOW Campaign's report uses data from the 2012 CWNS, which estimates the dollar value of wastewater, stormwater, and other clean-water infrastructure needs in the United States.[25] Our report replaces the EPA's 2012 figures with updated data from its 2022 CWNS. Other data in the VOW report, such as the EPA's 7th Drinking Water Infrastructure Needs Survey and Assessment,[26] were the most recent data available and were left unchanged.

Our estimation of the available funding bucket comes from the Congressional Research Service, Global Water Intelligence (GWI), and the EPA. Estimated CAGR is based primarily on 4 percent growth in user fees and bonds and projected 3 percent federal funding growth, in line with historical growth.

The portion of total expenditures going toward investments in resilience was calculated at around 10 percent, based on data from select water utilities. The figure comes from total investment in resilience as a percentage of total operational and capital expenditures.

Finally, the funding gap analysis assumes that total expenditures and all costs (except for resilience) grow by 4.1 percent, based on GWI projections for water and wastewater utilities in 2030. Resilience costs are expected to grow by 8.9 percent CAGR, based on select water utilities' investment in resilience projects, using EPA's 2022 CWNS and select power utilities for corroboration.

Climate risk maps

This report focuses primarily on flooding and water scarcity. However, the following physical climate-related risks could also affect utilities: increased rates of infrastructure degradation, salt intrusion in source waters, power and service interruptions because of extreme weather events, and increased operating costs from flooding.

[24] *Bridging the gap: The power of investment in water*, American Society of Civil Engineers and Value of Water Campaign, 2024.
[25] "Clean Watersheds Needs Survey (CWNS) – 2012 report and data," EPA, updated May 2, 2024.
[26] "EPA's 7th Drinking Water Infrastructure Needs Survey and assessment," EPA, updated January 17, 2025.

Sizing the financial impact of the ten-lever solution

We consulted a number of industry experts, case studies, and government reports to estimate the financial impact of the ten actions, or levers, detailed in this report. That said, estimated total funding is not exhaustive across all water project opportunities—for example, we were not able to include private investments from green banks.

Category 1: Securing additional funding
Maximizing state revolving funds. This lever calculates the additional funding that would be available if all underperforming[27] states matched the percentage of funding utilities received from the EPA as a percentage of the money awarded to SRFs. The average amount of SRF assistance as a percentage of federal grants is 235 percent across all 50 states plus Puerto Rico, according to McKinsey analysis. Thirty-one states (plus Puerto Rico) fall below this average. This sizing seeks to account for the difference in the size of states' SRFs and the potential value of increasing those SRFs. It also calculates the value if all underperforming states matched the average rate at which a particular SRF is giving out funding. The average amount of SRF assistance as a percentage of available SRF funds is 93 percent across all 50 states plus Puerto Rico. Altogether, there are 36 states plus Puerto Rico for which this percentage could be increased further.

In addition, utilities are eligible for non-water SRF funding. Other potential funding alternatives also include decarbonization funds or grants, such as the State of Washington's Climate Commitment Act; funding to help increase energy efficiencies, such as investments offered by the Office of Energy Efficiency and Renewable Energy; and funding earmarked for innovation, such as the Center for Sustainable Infrastructure's Innovation Lab.

[27] The analysis took the average ratio of SRF assistance to federal capitalization grants. States that were below average are defined as underperforming states.

The average amount of SRF assistance as a percentage of available SRF funds is 93 percent across all 50 states plus Puerto Rico. Altogether, there are 36 states plus Puerto Rico for which this percentage could be increased further.

Considering new business models and rate designs. Many water systems in the United States have not implemented seasonal rate structures. This lever estimates the additional revenue captured when utilities in states prone to drought implement seasonal peak pricing for four summer months, increasing rates by 4 percent. Estimated rate increases were based on a utility's rate hike from winter to summer months in the United States. Sizing assumes that water demand does not change when seasonal pricing is implemented and excludes utilities that have already implemented this type of pricing.

Expanding access to non-water SRF funding. Non-water SRF funding refers to the amount of money from federal programs utilities can use to fund water resilience efforts—in other words, programs for which water resilience is an eligible use of funding, if not the primary use. Several programs under the BIL, including the RAISE and PROTECT programs established by the Department of Transportation (DOT), provide funding for projects such as stormwater drainage. This lever uses the current percentage of DOT funding for utilities as a proxy for how much additional federal funding from similar programs (including programs under DOT, EPA, and the Bureau of Reclamation) could be accessed by water utilities.

Greenlighting alternative revenue opportunities outside of rate increases. Multiple types of revenue were considered to size the financial impact of this lever. This list is not exhaustive and excludes other revenue opportunities such as recycled water sales, inspection fees, and more. The opportunity for additional revenue may be much bigger than calculated.

1. Waste monetization sizes the total addressable market of renewable natural gas production among US wastewater treatment plants, assuming wastewater treatment plants with flow of more than 7.25 million gallons per day (MGD) have the capability to monetize their waste. Wastewater treatment plants with this flow size are typically adept at producing renewable natural gas, generally have anaerobic digesters in place, and have infrastructure that makes production costs more favorable.
2. Stormwater charges estimate the total stormwater revenue potential in counties that are prone to coastal, riverine, and pluvial flooding. Revenue sizing excludes jurisdictions that already have stormwater fees—approximately 24 percent.[28] Calculations consider price tiering models based on impervious surfaces and flat fee structures in the United States and apply these fees to the number of residential homes and their lot size in the United States. Data on residential lot sizes were pulled from the US Census Bureau.
3. Updating sewage and water connection fees estimates the incremental revenue opportunity when small utilities serving fewer than 1,250 people increase water and sewage connection fees, based on 2013 and 2023 water and sewage connection prices. Prices were multiplied by the number of new commercial and residential buildings (approximately 1.5 million) built per year, based on data from the US Energy Information Administration[29] and US Census Bureau,[30] respectively. The calculation accounts only for the number of new buildings in towns with utilities that serve fewer than 1,250 people. This analysis assumes wastewater systems serve a similar share of the population.

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[28] "Balancing stormwater infrastructure costs," National Governors Association, January 18, 2022.
[29] "Commercial buildings have gotten larger in the United States, with implications for energy," US Energy Information Administration, December 3, 2020.
[30] *Monthly new residential construction*, US Census Bureau, January 2025.

Category 2: Prioritizing investments in resilience

Planning for long-term resilience at the state level. Our funding gap analysis assumes that resilience investments grow faster (at about 9 percent CAGR) than non-resilience investments (about 4 percent CAGR), which is GWI's annual projected CAGR for future expenditures by 2029.[31] This calculation assumes that by proactively investing in resilience today, utilities will be able to ensure that their investments in resilience match the growth in costs of other expenditures—that is, that resilience grows at about 4 percent.

Setting resilience targets. Resilience targets can include both targets to reduce water consumption and to increase water reuse or supply. This lever estimates the total operational savings generated from implementing consumption reduction targets to reduce system demand. Previous case studies show that water conservation targets reduced per capita demand by 26 percent over a ten-year period (2005–15), which is estimated to have reduced water-treatment operating expenditures by approximately 3 to 5 percent.

Building a resilience data repository. Building a data repository supports the impact and decision-making of the other levers. Therefore, no financial savings were assigned to this lever.

Category 3: Optimizing operational efficiencies

Supporting technology integration. This lever estimates the potential savings in energy, maintenance, and labor operating expenses when utilities integrate digital technologies—such as advanced metering infrastructure, predictive maintenance, and energy retrofits—into their operations. We apply a 10 to 20 percent savings value to maintenance operating expenditures. This savings estimate is based on previous digital-integration work with utilities and includes savings in national capital expenditures (of 20 to 30 percent).[32] The financial impact of investing in technology incubators was not sized, because of a lack of public information on impact.

Promoting regional cooperation and efficiencies. This lever calculates the savings in labor costs when water systems in the United States regionalize. Calculations show that regionalization efforts may reduce labor costs by 38 percent. This lever also includes the estimated government funding to be received per merged entity. The lever sizes only the merging opportunity for US utilities serving fewer than 1,750 people and does not account for mergers with utilities serving more than 1,750 people. Approximately 72 percent of US water utilities (that is, community drinking water systems) serve fewer than 1,750 people, based on data from the EPA. This analysis assumes wastewater systems serve a similar share of the population.

Promoting capital efficiencies. This lever estimates how much water and wastewater capital expenditures could be reduced if all utilities in the United States participated in cooperative purchasing agreements (CPAs). Previous municipal CPAs show that such agreements can result in 5 to 15 percent in savings.[33] In addition, this lever folds in additional capital expenditure savings when permit approval processes are shortened, assuming that faster permit approval times can directly reduce the time and money spent on capital improvement projects.

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[31] "GWI WaterData," Global Water Intelligence, accessed February 28, 2025.
[32] *The Power & Gas Blog*, "How to use analytics to improve water asset management," blog entry by McKinsey, March 1, 2021.
[33] "The benefits and risks of cooperative purchasing," ELGL, October 22, 2019.

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