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Water Report

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As the U.S. water sector navigates new challenges, opportunities abound in resiliency efforts



As the U.S. water sector navigates new challenges, opportunities abound in resiliency efforts



About the author

Donnie Ginn is executive vice president and water solutions group portfolio leader at Black & Veatch. Ginn’s expertise includes water and wastewater facilities, collection and distribution systems, and combined sewer overflow and water conveyance tunnel programs. He has supported clients with planning and implementing billions of dollars of water infrastructure, saving hundreds of millions of dollars through innovative and cost-savings solutions. Ginn is passionate about helping utilities, technology companies, and state and local governments implement sustainable and resilient water solutions in a financially responsible manner.

Fig. 1

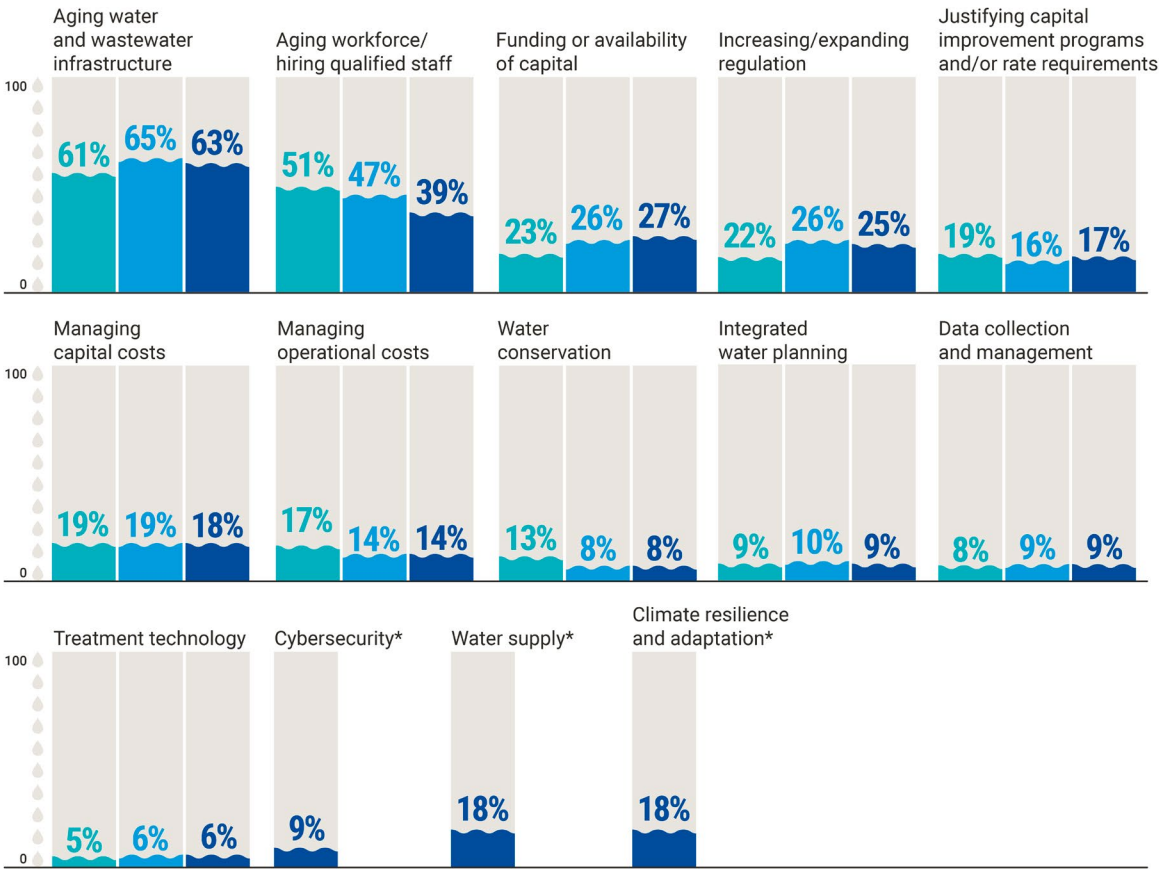
From your perspective, what are the most challenging issues facing the water, wastewater and stormwater industry today?

(Select the TOP THREE most challenging issues)

Source: Black & Veatch 2025 Water Report survey

2023 2024 2025

* New areas of concern in the 2025 survey



While advancements in cybersecurity, new data collection and management systems, and innovations in resiliency drive the U.S. sector forward, the water industry is navigating a wave of other headwinds, including aging infrastructure and workforce, “forever chemicals” and questions around funding availability.

The *Black & Veatch 2025 Water Report* — based on expert analyses of a survey of 680 U.S. water industry stakeholders — shares a story of challenges mixed with opportunities. Among 63% of respondents, aging water and wastewater infrastructure remains the top challenge facing the industry, followed by aging workforce (39%) and funding or availability of capital (27%) (Figure 1). These concerns remain consistent compared to prior years, but this year’s survey also included cybersecurity at 9%, water supply at 18% and climate resilience and adaptation also at 18%. Newer challenges mean new opportunities for solutions-oriented thinking that ultimately benefits communities across the country.



Regulatory uncertainty

With each new election cycle comes regulatory and funding changes that impact downstream water utilities. Currently, deregulation is anticipated, and the question on everyone’s mind is how utilities are responding. According to our survey, half of respondents do not plan to make changes to their priorities.

While most in the sector remain steadfast in their priorities, the potential of a changing tide of regulations and funding mechanisms continues to cloud the horizon for strategic planning requirements. It appears that half of utilities do not plan to make any changes based on potential relaxed regulations (Figure 2). As regulations have the possibility to subside, it appears many utilities are holding strong to previous guidelines that direct their processes.

Cybersecurity defenses more important than ever

As cyberattacks increase in severity and frequency, it is more important than ever for utilities to safeguard their communities and resources. Gone are the days when a cyberattack was only an informational technology (IT) threat; instead, more sophisticated attackers have figured out how to impact operational technology (OT) or industrial infrastructure.

As utilities look to protect their operations, they have one thing in mind: their community’s safety and public welfare (Figure 3). Ranked as one of the highest priorities among respondents, it paints a picture of utilities that are mindful of the importance of OT cybersecurity, far beyond just compliance (ranked fourth) or due diligence (in last place).

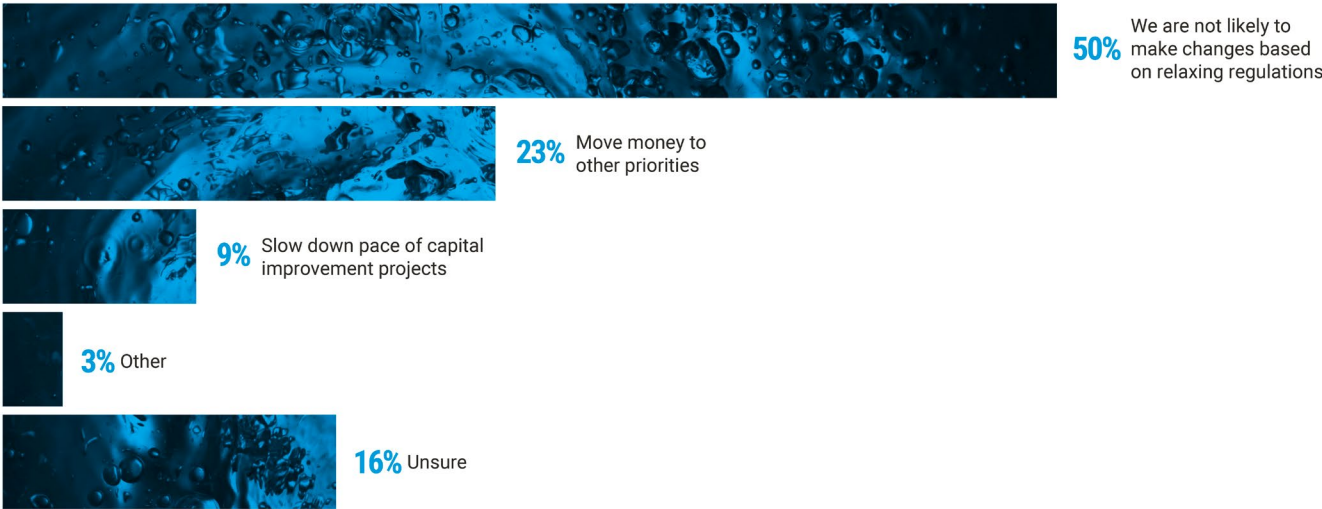
A robust cybersecurity program benefits water stakeholders across the country, including those depending on clean and reliable water as a daily necessity — i.e. everyone. With a further look into cybersecurity for the third year, this once-emerging want has become a crucial need.



If the new administration relaxes regulations, what changes do you think your utility would make to your priorities?

(Select all that apply)

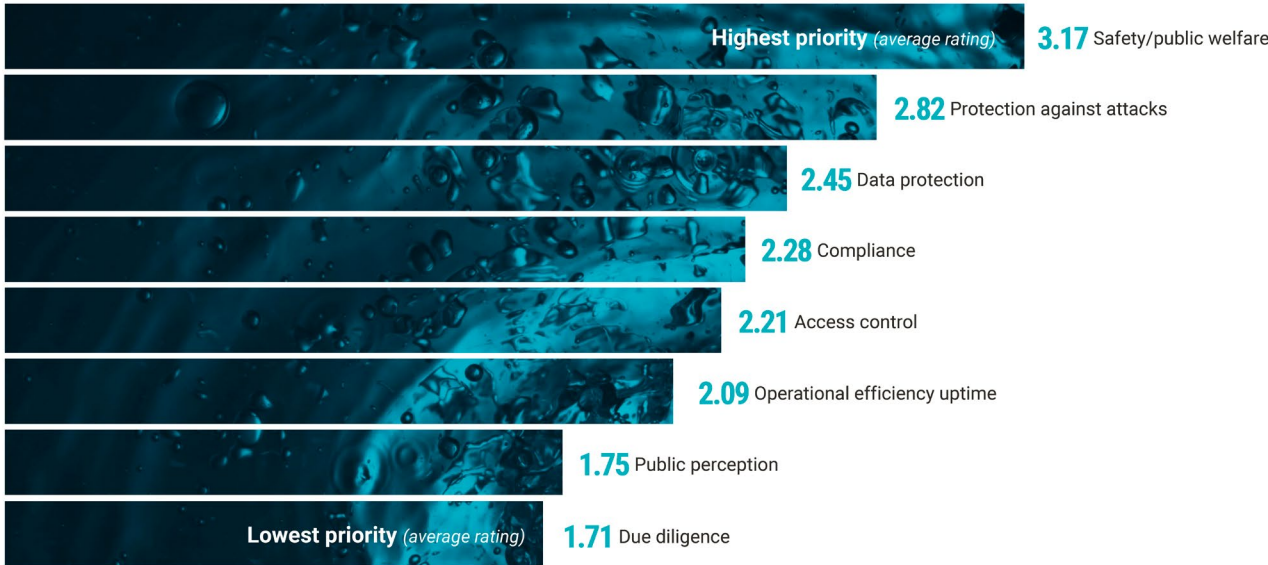
Source: Black & Veatch 2025 Water Report survey



How do you prioritize your investment in the security of your assets?

(Rank your top four)

Source: Black & Veatch 2025 Water Report survey

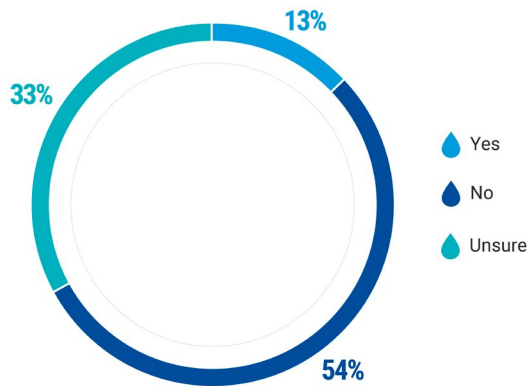




Has your organization factored the proliferation of data centers and technical manufacturer water needs into your short- and long-term resource planning?

(Select one)

Source: Black & Veatch 2025 Water Report survey



AI and data centers

As artificial intelligence (AI) becomes a growing part of our daily life, the need for hyperscale data centers accompanies it. The insight from AI and associated intelligence and efficiencies, including for water industry operations, requires increased water supply. Data centers generate heat and need water to cool them. As these data centers pop up across the country, water service providers are considering the implications of data center water requirements on community water planning. Increasingly, water utilities are in conversations with hyperscalers, colocators and ecosystem players on local requirements.

While data centers are top of mind for many, many respondents are not currently considering data center needs or are in locations where site planning is not active. More than half (54%) of respondents said “no” when asked if their organization has factored in the proliferation of data centers and technical manufacturer water needs into their short- and long-term resource planning. Is this number alarming, or are utilities just unaware of what they don’t know? [\(Figure 4\)](#)

The public has taken a closer look into the impact data centers have on water, but this doesn’t seem to have slowed the development of data centers. With a closer look at how water reuse can come into play, strides toward understanding alternative, more sustainable options may be the key in solving the data center water supply challenge.

Contaminants

While the regulatory landscape may shift in some areas, those involving PFAS remain surprisingly consistent — at least for now. In April 2024, the U.S. Environmental Protection Agency (EPA) announced the final National Primary Drinking Water Rule (NPDWR) regulating six PFAS. Under this regulation, utilities must test for, report on and mitigate PFAS contamination if present in levels that exceed the set-forth maximum contaminant levels (MCLs). While campaign promises and early-term federal cuts may decrease the EPA’s power, regulation around PFAS remains intact.

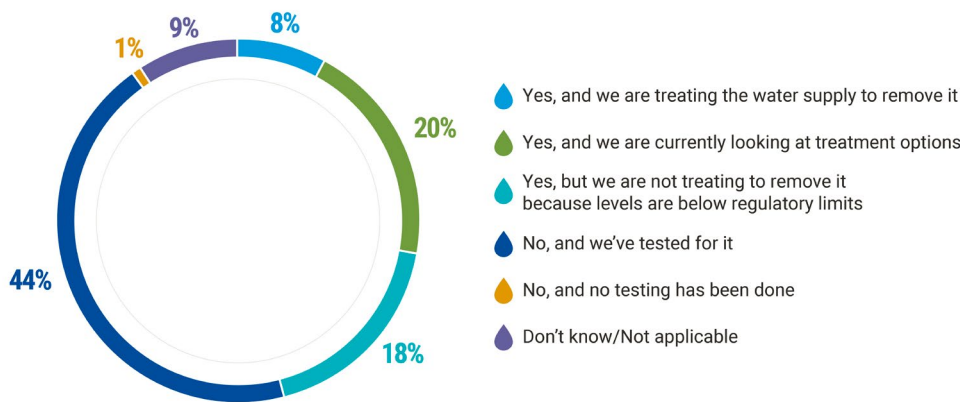
With 46% of respondents noting that PFAS has been detected in their water supply, the time to act is now [\(Figure 5\)](#). But, it won’t be cheap. [A study conducted by Black & Veatch on behalf of the American Water Works Association \(AWWA\)](#) estimated the national cost for water systems to install treatment to remove perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) exceeds \$3.2 billion annually. Those costs comes out of the wallets of ratepayers, and with rising costs across the board, there will inevitable frustration.



Has PFAS been detected in your water supply?

(Select one)

Source: Black & Veatch 2025 Water Report survey



Bolder vision for utilities and EPCs alike will be the name of the game in ensuring clean, reliable and sustainable water supply for their customers and communities.



An eye toward the future

As presidential administrations change, so does the regulatory landscape. The survey for this report was conducted in February 2025, just a few weeks into the new administration, providing a snapshot of how utilities were responding to new changes in funding, policy and investment planning.

The data reinforced how water utilities remain true to their mission of delivering safe and reliable water — along with responsibly managing wastewater and stormwater. As the industry evolves, they are looking for innovation and ways to harness data to bolster their resilience. It comes at a time of challenges such as climate change impacts, increasingly sophisticated cyber attackers, the rise of hyperscale data centers and contamination threats.

A bolder vision for utilities and those helping guide them will be the name of the game in ensuring a clean, reliable and sustainable water supply for their customers and communities. 💧

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Adaptability is key amid
regulatory questions



Adaptability is key amid regulatory questions

With conflicting priorities amplified by their chronically aging infrastructure, the water and wastewater industries prefer things to be linear operationally when it comes to navigating the sea of regulations. Through the ebbs and flows, the sector has proven resilient.

The *Black & Veatch 2025 Water Report* — based on a survey of 680 water sector stakeholders — finds the industry fragmented with a plethora of competing priorities watching and waiting for policy changes that could influence operations and complicate planning. Things like water quality standards involving contaminant removal, climate change strategies and sorely needed infrastructure upgrades. And for the most part, the survey results indicate that most utilities don’t intend to make changes, at least for now.

As [Smart Water magazine](#) put it last November, “anticipated deregulation could bring short-term financial relief for water utilities by reducing compliance costs and easing federal oversight,” with benefits including greater flexibility by utilities to redirect resources to other priorities. But that deregulation may force utilities to weigh short-term cost benefits against possible environmental and public health risks.

Survey respondents showed a strong commitment to existing plans, with half saying they would not make any adjustments if regulations were relaxed. More than one in five said they’d shift money to other priorities, while 9% said they would slow the pace of capital improvement projects. (Figure 6).

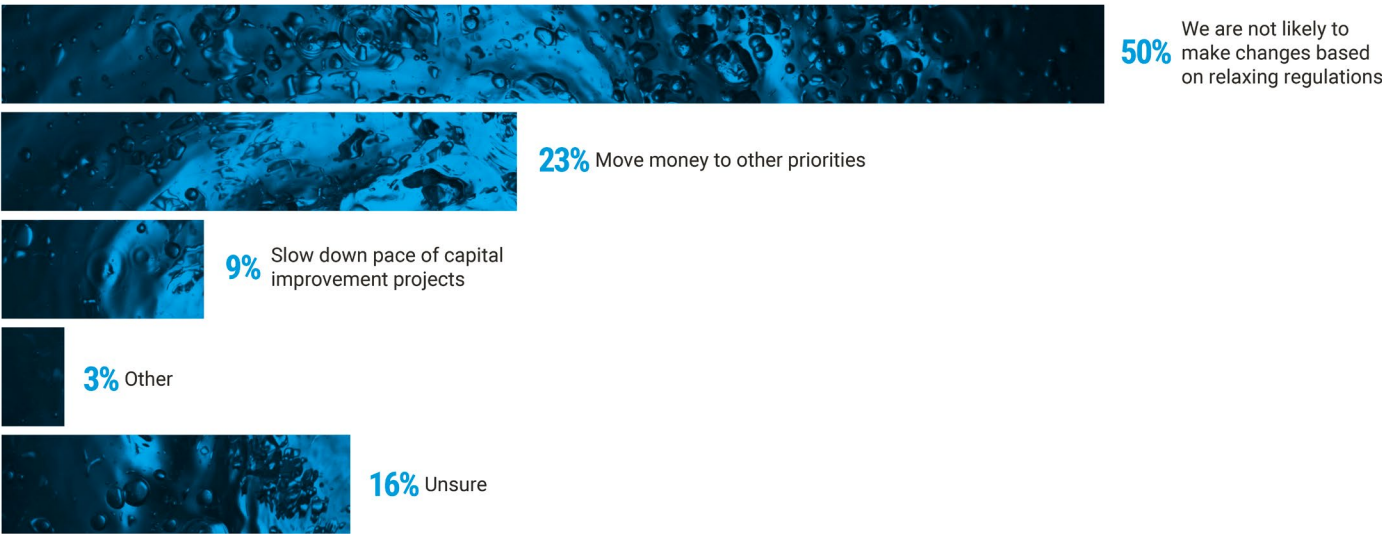
In recent years, few regulatory topics have drawn more attention than those meant to rid drinking water of per-and polyfluoroalkyl substances (PFAS) — or those “forever chemicals” that don’t degrade or do so slowly in the environment and can remain in a person’s bloodstream for life. In April 2024, the EPA issued its final [National Primary Drinking Water Regulation](#) for six forever chemicals, and drinking water utilities must



If the new administration relaxes regulations, what changes do you think your utility would make to your priorities?

(Select all that apply)

Source: Black & Veatch 2025 Water Report survey



comply by April 26, 2029. Design, bidding and construction timelines for PFAS treatment projects frequently require in excess of three years, leaving utilities a short window to implement a solution.

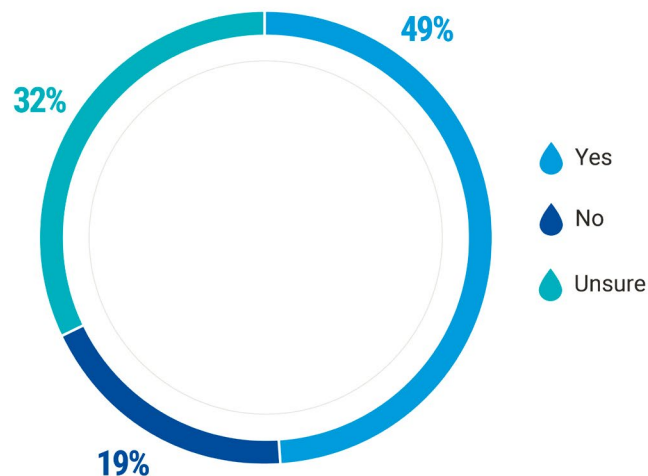
In January, [Black & Veatch announced](#) its selection by the American Water Works Association to develop [nationwide guidance for pilot testing treatment of PFAS](#). The goal: bring together minimum requirements and provide best practices for water utilities, regulators and engineers to equip the industry with the information needed to make informed decisions about PFAS treatment projects in a timely manner.



If current PFAS regulations are modified, will it impact your current approach to addressing your organization’s PFAS challenges?

(Select one)

Source: Black & Veatch 2025 Water Report survey



Naturally, the water industry’s eyes remain affixed on Capitol Hill for any policy changes involving PFAS. Some 55% of survey respondents say their utility or company has a program to address PFAS challenges in accordance with current regulations. But if those regulations are modified, roughly half of respondents (49%) say it’ll impact their existing approach to addressing those headwinds. One in five said it would have no effect, while one-third said they’re unsure (Figure 7). Long story short: those with PFAS programs already in place appear likely to tailor it to the new regulation, whether it’s more stringent or not.

When asked about their utility’s greatest limiting factor for addressing PFAS, the survey’s top response was “regulatory uncertainty” (32%), followed by “budgetary and/or rate payer considerations” (24%).

With no crystal ball, the industry is locked in a waiting game.

Regulations: Stubbornly on the mind

Across the spectrum of this report’s critical topics, thoughts about regulations frequently are part of the buzz:

When asked why their utility expects to add a new process or technology to their drinking water facilities, respondents’ top answer was “new regulation” (56%), followed by improvement of distribution water quality (44%) and enhance resiliency (40%). On the wastewater side, “enhance resiliency” (49%) took the top spot, followed closely by “new regulation” and “nutrient removal” (both 47%).

When asked what the greatest limiting factor in addressing nutrients in their utility’s wastewater, respondents’ top answers were “budgetary and/or rate payer considerations” (31%) and “regulatory uncertainty” (30%). Regulatory limits can dictate the cost for wastewater treatment upgrades and has an impact on ratepayers.

Twenty-eight percent of respondents say the adoption of a “polluter pays” approach would impact their PFAS or water reuse strategy.

As the water and wastewater sectors watch and wait, positive signs abound that they remain committed to their stewardship of the resources they’re obligated to nurture, ready to navigate regulatory uncertainty. Challenges and opportunities will present themselves with any shifts in policy oversight, making it incumbent upon those in the industry to adapt and accept in continuing to fulfill their mandate to provide safe, reliable water services. 💧

“ With no crystal ball, the industry is locked in a waiting game. ”

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A complex issue
requiring careful
navigation



A complex issue requiring careful navigation

Water and wastewater utilities are facing a myriad of often conflicting challenges when it comes to water contamination issues. Per- and polyfluoroalkyl substances (PFAS) — along with lead and copper — are top of mind due to stringent regulations. Nitrogen, phosphorous, pharmaceuticals, personal care products (PPCPs) and other contaminants also may pose a concern for utilities and their communities.

Based on data from a survey of 680 U.S. water sector stakeholders, the *Black & Veatch 2025 Water Report* analyzes the driving complexities, challenges and solutions as utilities move forward with managing water contaminants.

PFAS in drinking water: NPDWR significantly impacts utilities

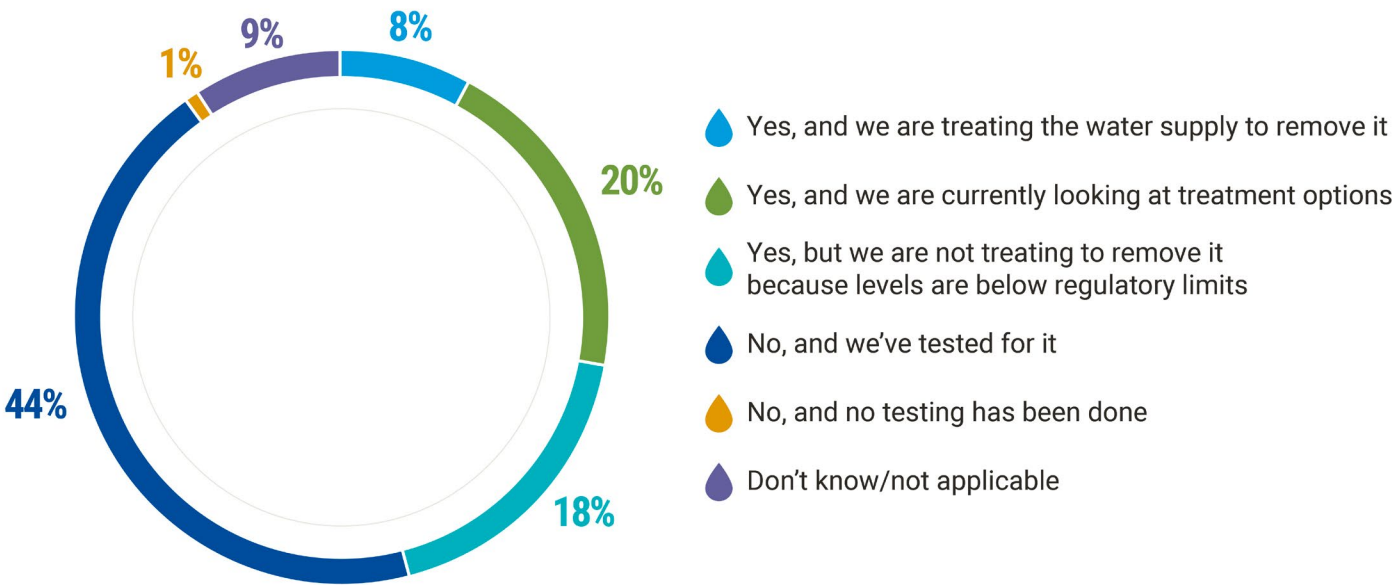
In April 2024, the U.S. Environmental Protection Agency (EPA) announced the final National Primary Drinking Water Rule (NPDWR) regulating six PFAS, commonly known as “forever chemicals.” Under this regulation, utilities must test for, report on and mitigate PFAS contamination if present in levels that exceed the set-forth maximum contaminant levels (MCLs).



Has PFAS been detected in your water supply?

(Select one)

Source: *Black & Veatch 2025 Water Report* survey



Since the announcement, drinking water utilities have been navigating its implications. Nearly half of survey respondents (46%) report that PFAS have been detected in their water supply ([Figure 8](#)), with most currently exploring treatment options. To address PFAS contamination, the majority of respondents in a separate question (68%) say their utility plans to pursue a main treatment plant upgrade.

While the EPA’s move will reduce exposure to harmful PFAS chemicals nationwide, it also comes with a hefty price tag. [A study conducted by Black & Veatch on behalf of the American Water Works Association \(AWWA\)](#) estimated the national cost for water systems to install and operate treatment to remove perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) to MCL levels exceeds \$3.2 billion annually. In response to the proposed rule in 2023, the AWWA predicted in a statement that “the vast majority of these treatment costs will be borne by communities and ratepayers, who are also facing increased costs to address other needs, such as replacing lead service lines, upgrading cybersecurity, replacing aging infrastructure and assuring sustainable water supplies.”

“ Nearly half of survey respondents (46%) report that PFAS have been detected in their water supply... ”



This prediction has proven accurate according to survey responses for this report. When asked how compliance expenditures have impacted their organizations, 51% cited “raised rates” as the top answer, followed by “delays of infrastructure projects” at 35%. It’s clear that these compliance costs are being pushed into rates, directly affecting customers, as well as impacting other priorities that are being deferred or canceled because of the PFAS compliance burden ([Figure 9](#)).

While mitigating harmful PFAS contamination is a crucial priority, utilities undoubtedly are feeling the squeeze.

PFAS in wastewater, biosolids: Uncertainty continues

While drinking water regulations for PFAS are now more defined, the federal regulatory status of biosolids and wastewater PFAS remains uncertain. New rules are expected to be revisited, such as the [designation of PFOA and PFOS as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act \(CERCLA\)](#), and some proposed rules have been withdrawn such as the [EPA’s proposed limited on PFAS chemicals in industrial discharges](#). The EPA release of the [Draft Sewage Sludge Risk Assessment for PFOA and PFOS](#) for biosolids, while not a regulation, is viewed as a step in that direction, although the pace and magnitude of rule changes (if any) are in question.

In the absence of federal direction, states are forging ahead with their own PFAS reduction approaches. Some states have proposed or enacted PFAS regulations for biosolids, ranging from strategies tying biosolids quality and requirements to industrial discharge controls, to soil or biosolids concentration limits and even land application bans.

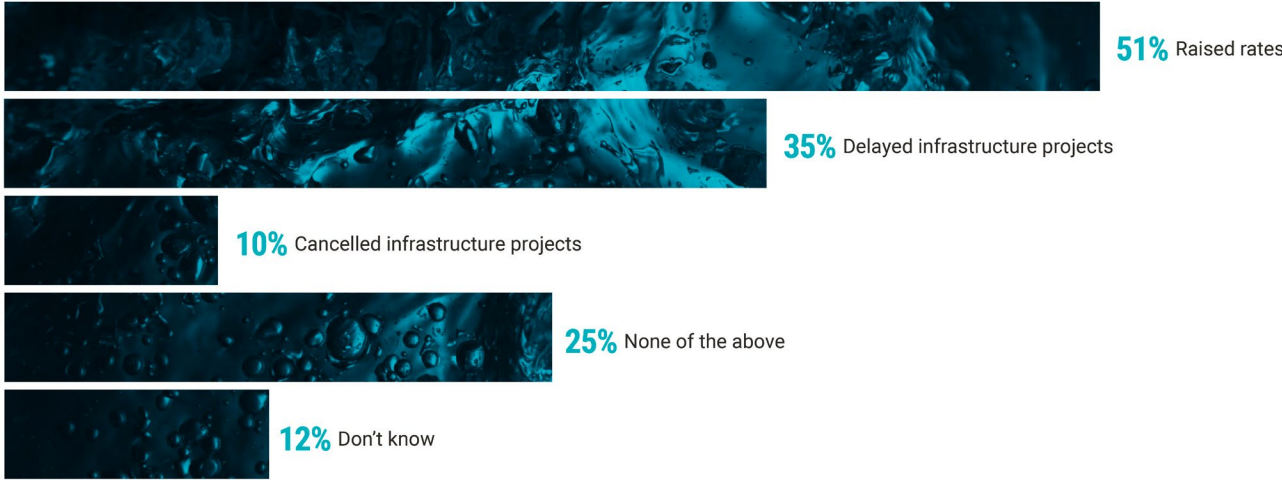
Additionally, California, North Carolina and many other states have started implementing PFAS monitoring requirements in their NPDES (National Pollutant Discharge Elimination System) permits (in line with EPA recommendations). This move to monitor PFAS puts communities in a stronger position to respond to potential future regulations and implement source control programs to identify and stop PFAS contamination at its source. Nearly six in 10 respondents (58%) report that they have tested their Water Resource Recovery Facility (WRRF) influent, effluent or biosolids for PFAS content. Additionally, 30% of survey respondents said their organization is using an industrial pretreatment program/source control method to address PFAS concerns, while 23% said they were employing new treatment processes and 8% are pursuing regulations to minimize PFAS in production. Wastewater utilities should consider [combining multiple approaches](#) to holistically manage their PFAS challenges ([Figure 10](#)).



Which impacts, if any, have compliance expenditures caused for your organization?

(Select all that apply)

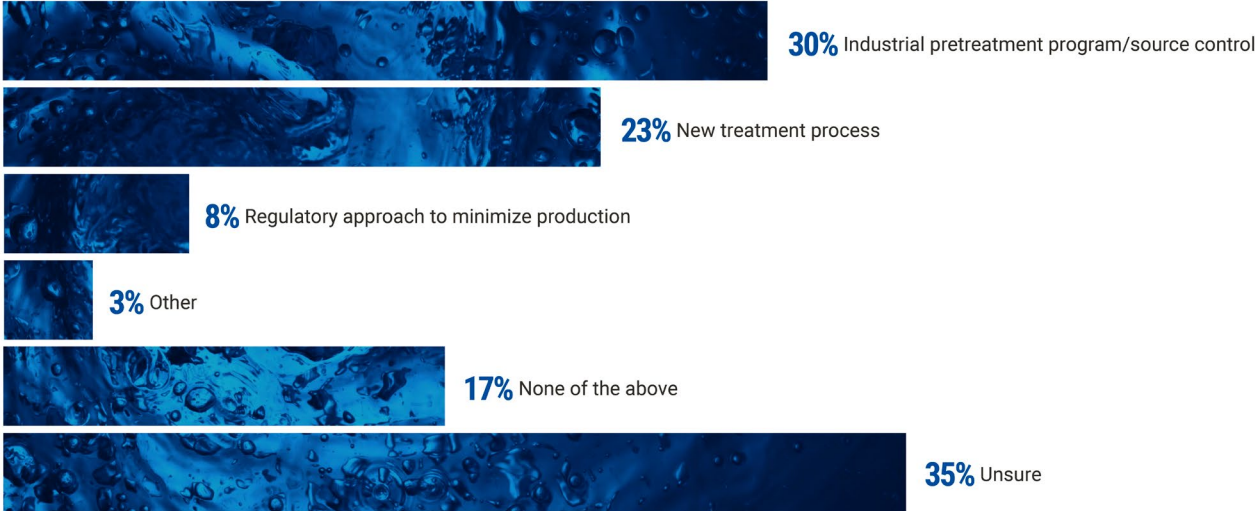
Source: Black & Veatch 2025 Water Report survey



Does your organization have plans to address PFAS concerns through any of the following methods?

(Select all that apply)

Source: Black & Veatch 2025 Water Report survey





Lead and copper rule: Utilities make progress

For the first time, utilities are contending with three overlapping regulations — the Lead and Copper Rule (LCR), Lead and Copper Rule Revisions (LCRR) and Lead and Copper Rule Improvements (LCRI) — to address these contaminants in the public drinking water supply.

The latest LCRI outlined more rigorous requirements for homeowner outreach, which was felt by survey respondents. When asked what their biggest challenges were related to compliance, 41% pointed to “homeowner response to communications,” with 31% citing “approval to access private property.”

One-third of respondents cited “staffing availability,” aligning with a seven percentage point increase from 2024 in respondents planning to have an outside consultant manage lead service line replacements (Figure 11).

Despite these challenges, there’s a positive trend toward using predictive modeling. Half of respondents (51%) say they plan to use predictive modeling to estimate their remaining unknown service line materials. This proactive approach not only helps utilities plan their work more effectively but also enhances transparency and safety for customers. By adopting these advanced methods, utilities are better equipped to address potential risks and ensure the safety of the public drinking water supply.

Navigating contaminants amidst a complex landscape

In conclusion, water and wastewater utilities are navigating a complex landscape of regulatory requirements and contamination challenges. The introduction of new PFAS regulations has placed significant financial and operational burdens on utilities, compelling them to raise rates and delay other critical infrastructure projects as they work to assess and mitigate PFAS in the water supply. Meanwhile, the uncertainty surrounding PFAS regulations in wastewater and biosolids, coupled with state-level initiatives, adds another layer of complexity.

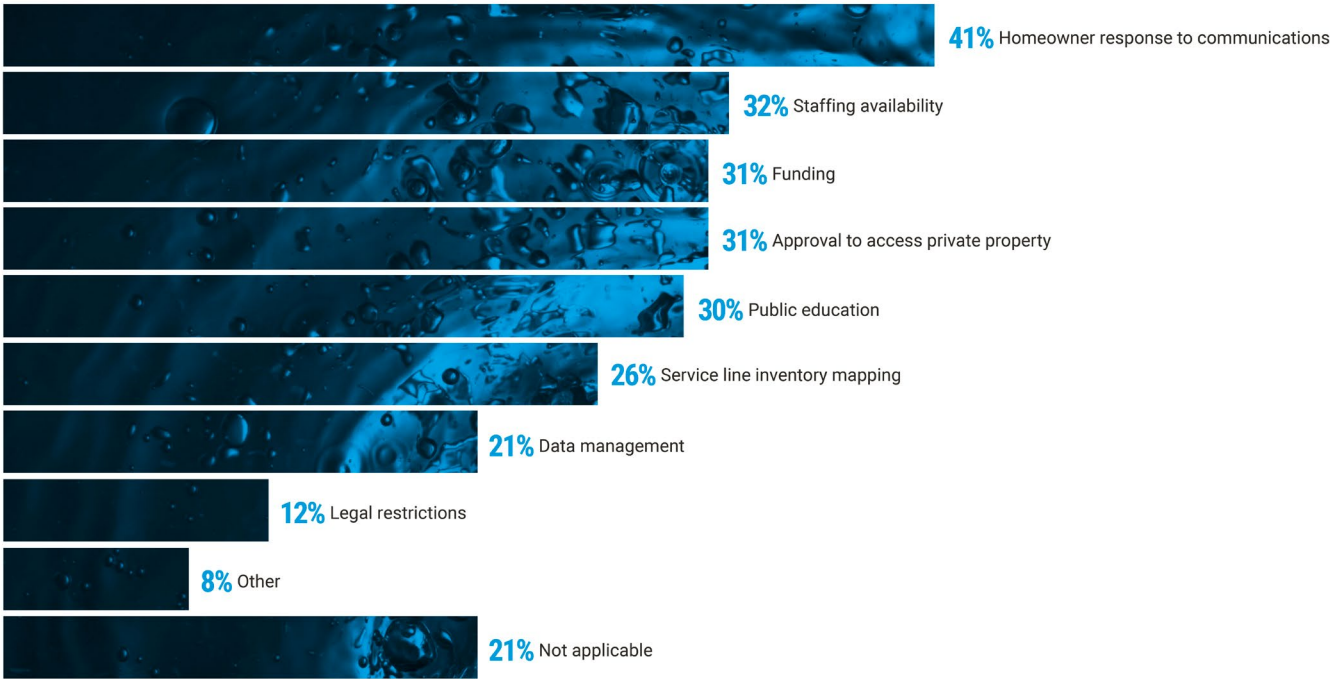
Utilities continue to address lead contamination in addressing lead contamination through innovative approaches such as predictive modeling. As they continue to adapt and innovate, utilities remain committed to ensuring the safety and sustainability of public water supplies for their communities. 💧



What are your biggest challenges related to Lead and Copper Rule compliance?

(Select all that apply)

Source: Black & Veatch 2025 Water Report survey



“ By adopting these advanced methods, utilities are better equipped to address potential risks and ensure the safety of the public drinking water supply. ”

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Resiliency drives
sustainability,
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Resiliency drives sustainability, and practicality guides action

As water supply concerns mount with the worsening impacts of climate change, water providers face a growing imperative: invest in resilience to ensure sustainability.

Such solutions — everything from efficient treatment processes and water reuse programs to effective leak detection enhancements and asset management — create system resiliency and are good for business, delivering cost savings over time while ensuring the investment is beneficial to the ratepayer and the utility alike. Resource stewardship generates public trust and goodwill, and investing in sustainable infrastructure enhances resilience to extreme weather or water scarcity, providing ample benefits across the board.

Two birds with one stone: Resilience, sustainability go hand in hand

As a practical matter, Black & Veatch defines “sustainable infrastructure” as ensuring that the world’s power, water and other human critical infrastructure is reliable, resilient, responsible, affordable and secure.

According to participants in the *Black & Veatch 2025 Water Report* survey of 680 stakeholders in the U.S. water sector, sustainability planning continues to be a core focus, with 78% of them indicating that either their utility or the municipality, and often both, have a sustainability plan ([Figure 12](#)). This highlights that respondents are looking ahead and planning for the future to embed greater sustainability and business resilience, especially as climate events become more frequent and prevalent.

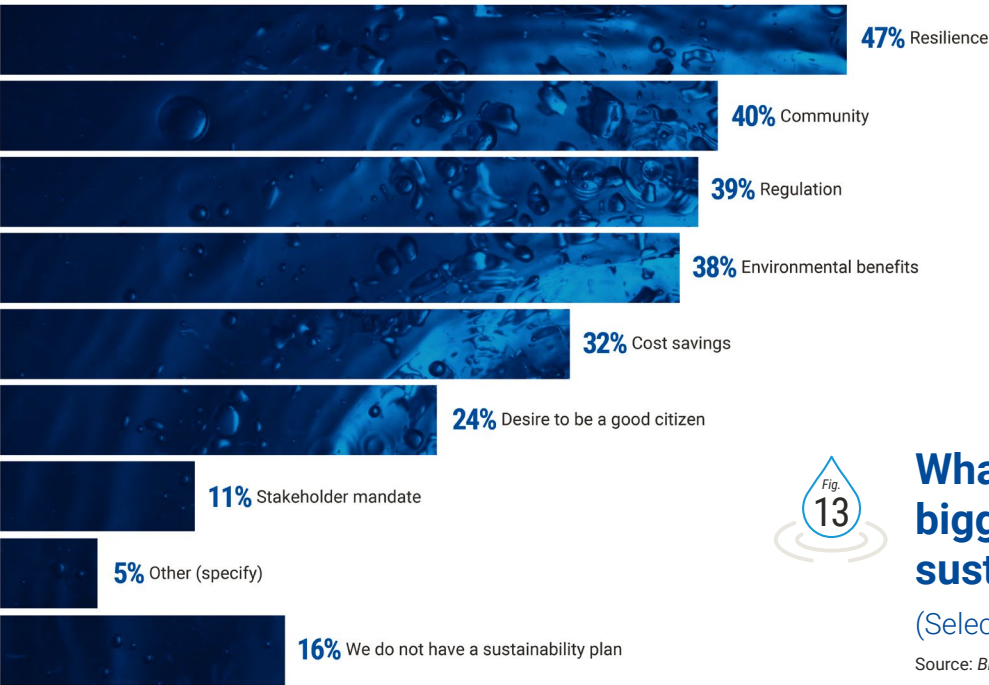
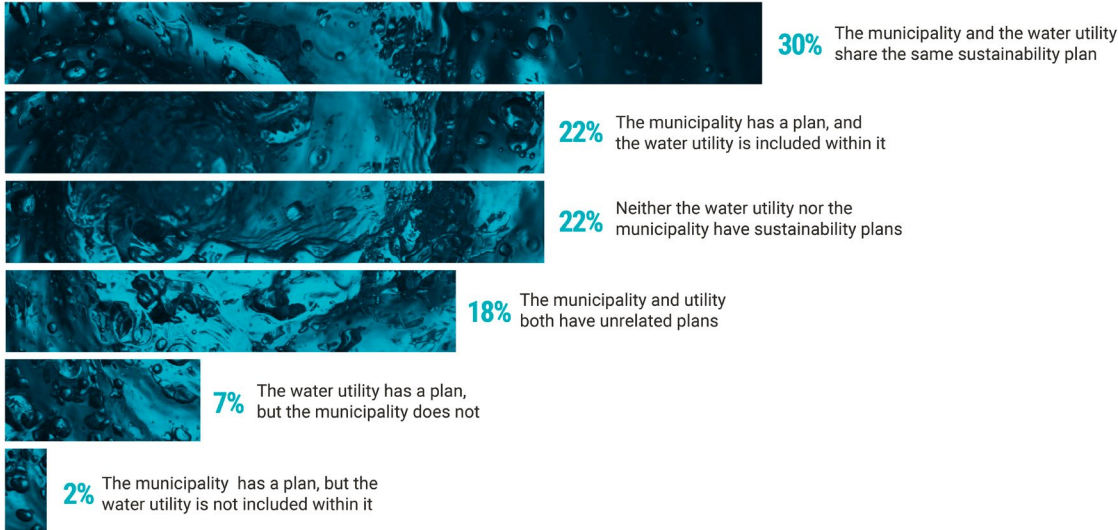
Nearly half of survey respondents (47%) named resilience as the top driver for their utility’s sustainability plan, followed by community (40%) and regulatory considerations (39%) ([Figure 13](#)). This is consistent with the growing recognition and focus across business, community and regulatory stakeholders on water as a critical and limited resource that needs to be conserved and managed even more carefully as population growth and water demand increases.



Which of the following situations best describes sustainability planning for your municipality and the water utility?

(Select one)

Source: *Black & Veatch 2025 Water Report* survey



What have been the biggest drivers of your sustainability plan?

(Select all that apply)

Source: *Black & Veatch 2025 Water Report* survey



Yet as drought continues to grip portions of the United States, making the adequacy of water resources in some regions a hot topic, just one-third (34%) of survey respondents said they're "very confident" in the resiliency of their water supply – down sharply from 45% in 2024.

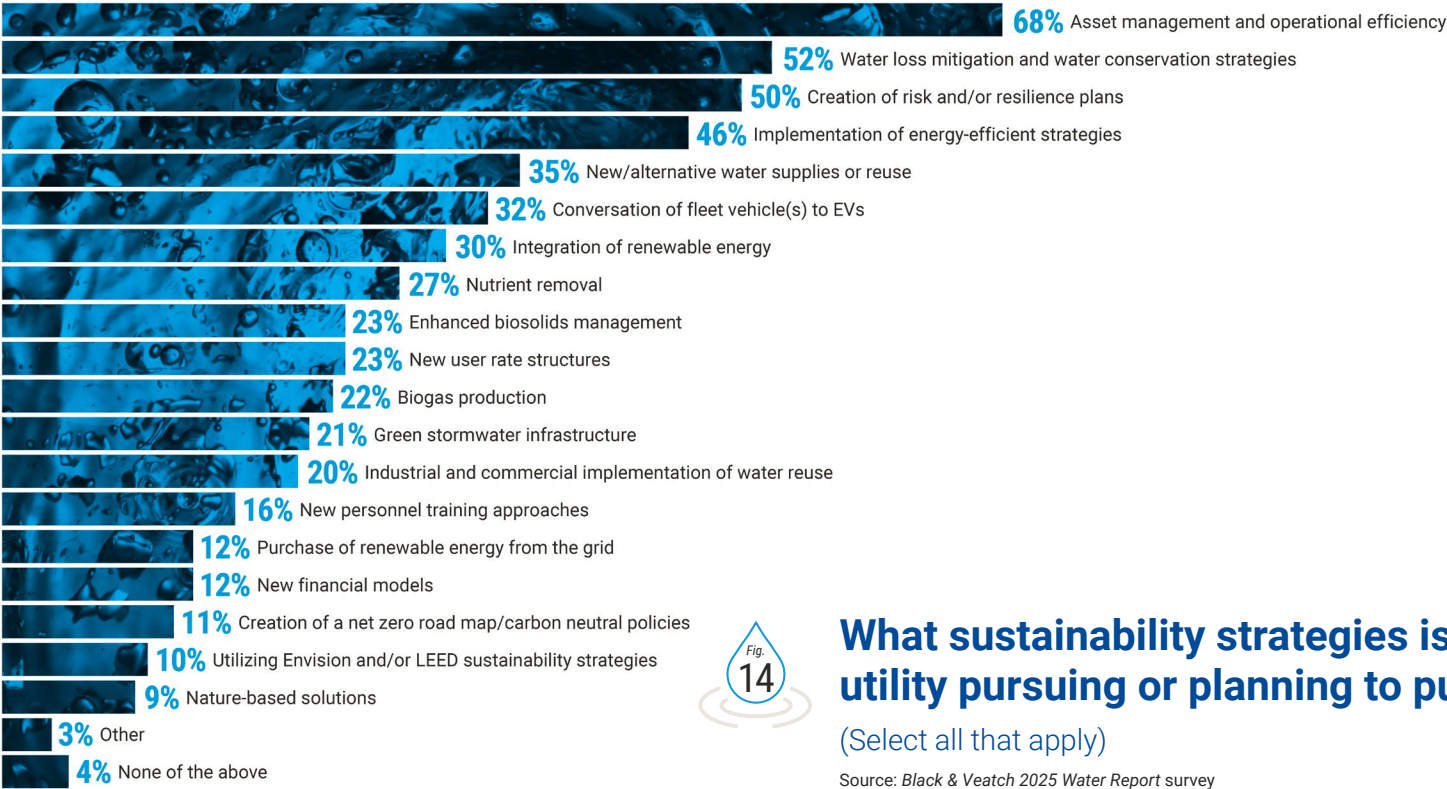
Resilience strategies: Taking actions for clear outcomes

This is reflected in the top strategies respondents are pursuing for sustainability, all being related to addressing and increasing resilience. When asked what sustainability strategies their utilities are planning to pursue, nearly seven in 10 respondents (68%) chose "asset management and operational efficiency" as a key strategy, while 52% cited "water loss mitigation and conservation strategies" and half said "creation of risk and/or resilience plans." Rounding out the top five: "implementation of energy-efficiency strategies" (46%) and "new/alternative water supplies or reuse" (35%) (Figure 14).

Money matters

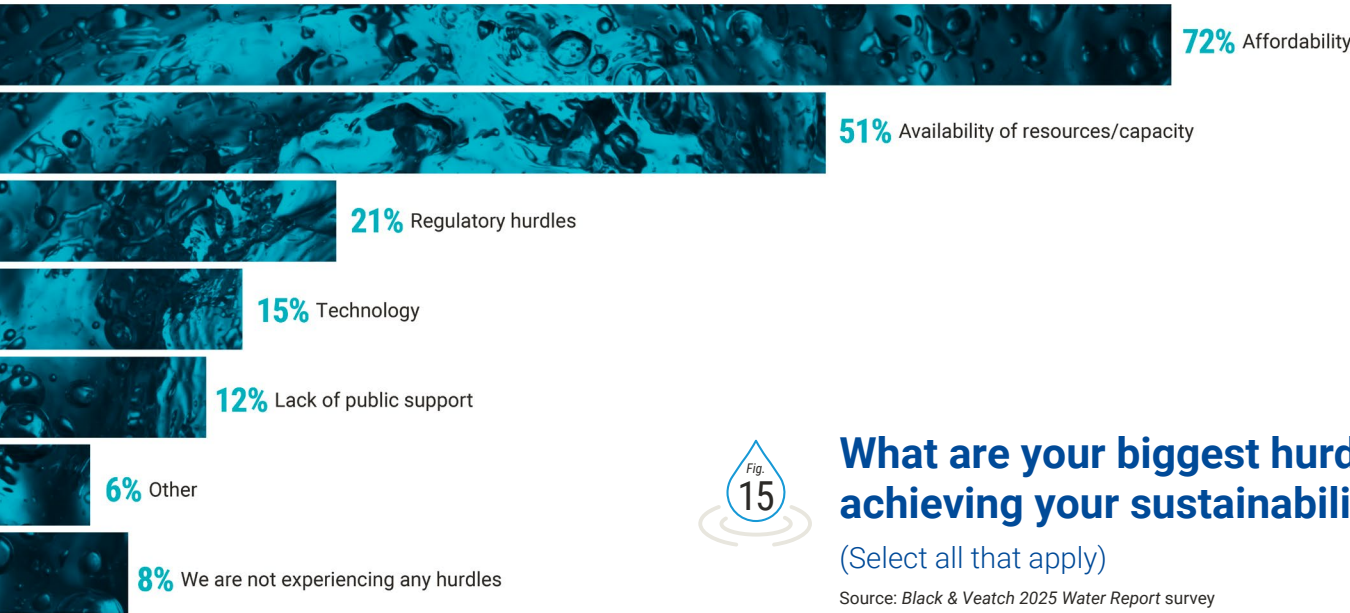
Throughout the survey results, the concerns of respondents are consistent. Nearly three-quarters (72%) said affordability was the leading impediment in achieving their sustainability strategy, while more than half (51%) noted they lacked the resources or capacity to tackle their goals (Figure 15). The persistent need to do more with less continues to challenge water providers as they seek practical and affordable strategies with limited human and financial resources.

These challenges — funding and personnel resources — give insight into the conflict between the sustainability strategies that utilities are pursuing and the timelines in which they can be realistically implemented.



What sustainability strategies is your utility pursuing or planning to pursue? (Select all that apply)

Source: Black & Veatch 2025 Water Report survey



What are your biggest hurdles in achieving your sustainability strategy? (Select all that apply)

Source: Black & Veatch 2025 Water Report survey



Aggressive timelines

Despite that, a majority of respondents share that they are actioning their top three strategies in the near-term and mid-term, with 60 to 70% implementing action in the near term (one to two years) and 80 to 85% implementing action within the next five years (Figure 16).

Actions in the nearest time horizon include key foundational building blocks that are important for implementing any priorities— financial modeling, personnel training and new rate structures.

Looking beyond two years, 44% see new water supplies or reuse within the next five years, given the early planning work and stakeholder engagement needed to set the stage for project implementation. The increased percentage may be linked to forthcoming implementation schedules on already planned projects. Along with reuse, alternative supply resources include stormwater, rainwater and desalinated seawater. The longer timeline for implementing these resources may reflect the timing and construction needed to make these resources available.

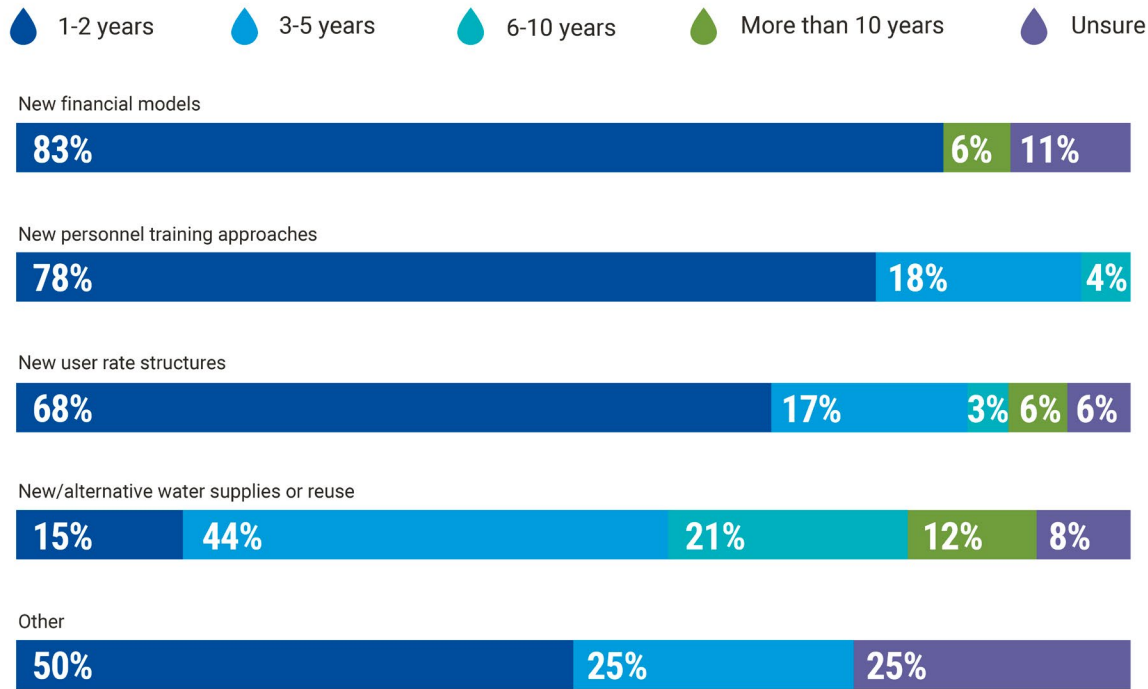
Of the 20 strategies that utilities plan to implement, 17 had a timeline survey pegged at 10 years or less by at least 80% of respondents. This indicates that attaining a resilient water future that also aligns with sustainability goals remains a substantial part of the activity water organizations have underway. More than half of respondents believe they'll reach their goals within the next decade.



What is your timeframe for implementation of each priority?

(Select one for each)

Source: Black & Veatch 2025 Water Report survey



“ ... attaining a resilient water future that also aligns with sustainability goals remains a substantial part of the activity water organizations have underway. ”



Water supply, prioritizing planning

Along with sustainability, the focus on water supply is crucial to communities that depend on reliable water. When asked if they would be able to provide water supply to a large industry coming to their area, 65% of respondents — a drop from 77% in 2023 — said they have sufficient system capacity and supply. There was a 5% rise in respondents noting they have capacity but not supply and a 7% uptick in having supply but not capacity ([Figure 17](#)).

Could this decrease in capacity and supply reflect a lack of optimism from a few years ago or is it an indication of a growing interest in water supply that now surpasses projected system capacity? As the country grapples with the proliferation of data centers across the United States ([a topic discussed at length elsewhere in this report](#)), the spotlight shines a light on the sizable amounts of water those businesses demand for cooling where peak demand generally occurs during summer. Utilities are working to understand their capabilities, regardless of whether they are truly located in a water-rich area.

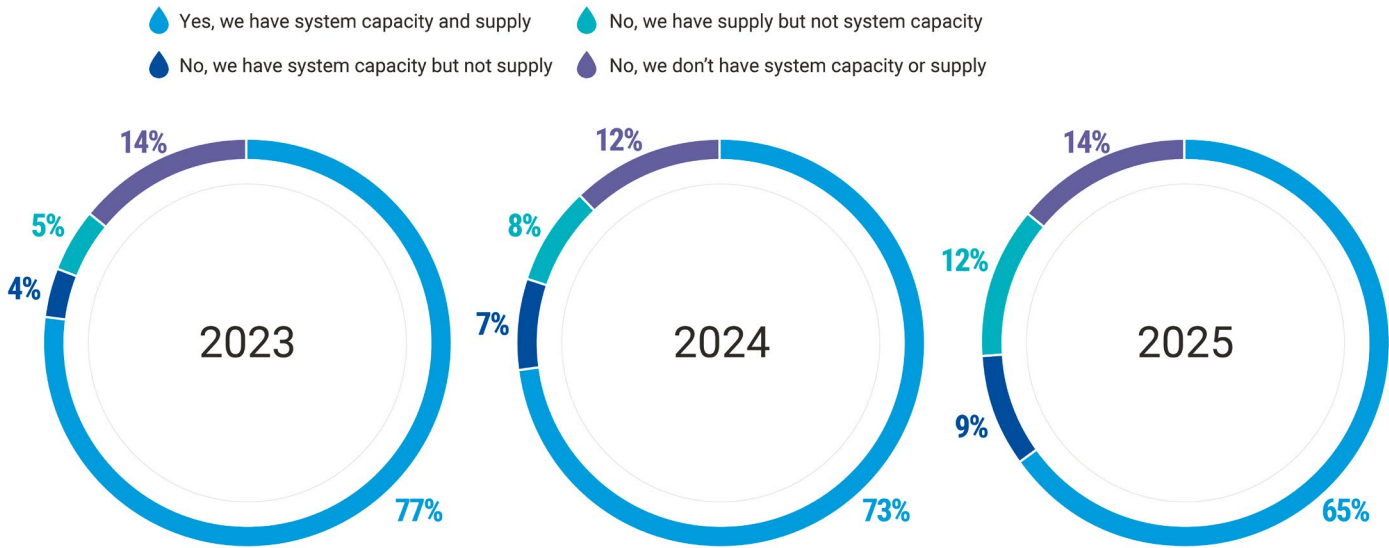
One way to get a read on all of it is with a “One Water” — or holistic, integrated approach to water management — lens, which focuses on all sources of supply types that a location may have, including such resources as surface water or potable water. From there, the utility assesses its demands, its uses for water and anything else that can be added to the water matrix such as stormwater, desalination and water reuse.

This type of planning and implementation is a holistic approach to a water supply problem that persists among utilities, and it ultimately could provide necessary planning for the days when water supply is extremely limited — begging the question of why more are not implementing this approach, as the survey for this report bears out.



Would you be able to provide water supply to a large industry coming to your area? (Select one)

Source: Black & Veatch 2025 Water Report survey



When asked if they’ve developed a One Water/integrated water supply plan, only 28% answered affirmatively. More than one-third (35%) said they didn’t know, 15% said “no but they need to do this in the future,” and 22% said “no, and they don’t see a need to do it.”

While the future of sustainability remains uncertain, utilities remain steadfast in their commitments to their communities, ensuring resiliency in the face of flooding, water supply issues and the litany of other headwinds the water sector admirably continues to weather. 💧

A “One Water”-integrated water supply plan provides critical planning for water forecasting and resourcing, but only 28% have developed such a plan.

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Data center growth
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Data center growth offers opportunity for creative, reliable water solutions

In the age of artificial intelligence (AI), cloud computing and other breakthrough technologies, data centers are the engine driving this advanced computing. Hyperscale data centers use AI servers that consume a lot of energy and generate significant heat.

Cooling that computing heat requires a supporting critical resource: **water**.

As concerns about climate impacts magnify worries about the adequacy of water resources, most leading data center companies have made sustainability commitments for both power and water. Many have “zero-carbon” and “zero-water” pledges they are aggressively working towards with ecosystem partners. The data center surge is opening up dialogue about the industry’s environmental footprint, leading to many significant cooling innovations in technology and water efficiency in the United States, the global leader in data center sites.

Breakthrough alternatives are being explored by both the data centers and the water providers to answer pressing questions: Where’s the water that’s needed going to come from? What non-potable options – reclaimed or recycled water, among others – offer the best solutions?

To what extent are the data centers, states and communities engaged and proactively thinking about

their water situation to meet this growing water demand? The short answer is that it’s developing, the *Black & Veatch 2025 Water Report* finds. Based on a survey of 680 U.S. water sector stakeholders, our annual water report for the first time in its 14-year run introduced the data center topic by taking the water industry’s pulse.

It’s technology, innovation and partnering with data center communities that’s the story.

Data centers: Expanding the search for power, water

While the tech industry long has relied on data centers to run everything from social media to financial transactions and email, new artificial intelligence (AI) technology requires ever-increasing computational power. As the need for this technology grows, so does the need for data centers and the investment appetite. Goldman Sachs, in a research newsletter last year, reported that large tech companies have ramped up capital expenditure to support generative AI development, with estimates that a staggering \$1 trillion will be spent over the next few years on data centers, semiconductors, other AI infrastructure and grid upgrades.

Certain locations in the United States have become hotbeds for such enterprises, with northern Virginia leading the way with its “Data Center Alley” – the world’s biggest concentration of data centers – followed by Texas, Ohio, Arizona, Illinois and Georgia. Smaller municipal areas now are attracting data centers that traditionally have clustered in “legacy markets” in large metropolitan areas where the energy and water they require are more available and sustainable.

This is the first time the water report has posed questions about demand for water from data centers. It’s clear that the demand is still emerging with only 14% of respondents noting direct demand for water from data centers – including the AI variety – in their area, though data centers are starting to be developed in secondary and more rural areas.

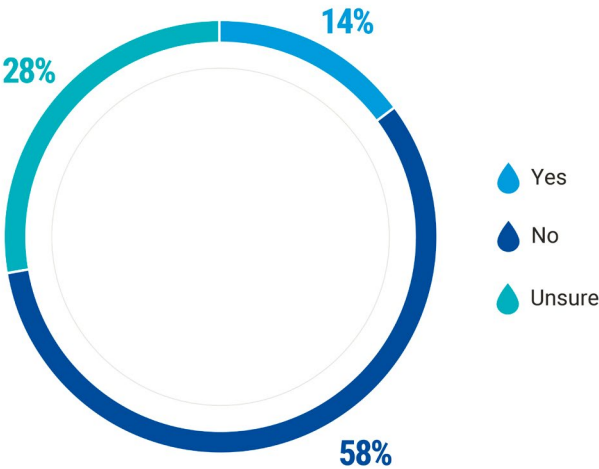
Depending on the geographic location and the cooling system, a data center may use millions of gallons of water a day.



Has the water demand from your organization been impacted by data centers?

(Select one)

Source: *Black & Veatch 2025 Water Report* survey



Nearly six in 10 respondents (58%) say data centers haven’t impacted water demand from them. An additional 28% report being unsure (*Figure 18*).

When asked whether they’ve seen an uptick in demand for recycled or repurposed water because of data centers or technical manufacturing, two-thirds said no. While just 12% replied affirmative, that number likely will increase, notably as data centers continue their growth and water repurposing accelerates as a viable cooling solution. Given the velocity and geographic concentration of data center growth to date, the largest water providers have been meeting the greatest share of the increasing water demands. It’s anticipated that in future surveys the data center impact will also be observed in the suburbs and rural areas.

As global law firm [White & Case noted in December](#), most technology companies have ambitious water-positive targets for their data centers’ operations and increasingly are exploring and applying technologies to reduce and minimize water usage.



A case in point: Microsoft. The leader in cloud computing and AI — with 300 data centers worldwide — [announced in December 2024](#) a new approach to cooling data centers in which water won’t be lost to evaporation, avoiding the need for more than 125 million liters of water annually for each data center. As part of that closed-loop system — what the company calls “zero-water evaporated designs” — water flows past heat-generating processing chips, funneling the heat to chillers before the water repeats that cycle. Microsoft said projects in Phoenix and Mount Pleasant, Wisconsin, will pilot the new system next year — and begin coming online in late 2027 — “as we work to make zero-water evaporation the primary cooling method across our owned portfolio.”

In the meantime, [Data Center Dynamics magazine reports](#) that Google is working with communities around the world to enhance clean water availability as part of its water stewardship program. [AWS is using AI to help protect water in various countries](#) as part of its program, according to Sustainability magazine. And ESG Lore reports, [Meta helped restore 1.5 billion gallons of water](#) in 2024.

The impact of data centers and technical manufacturers on short- and long-term water utility planning is still emerging. More than half of respondents (54%) say that’s not part of their short- or long-term planning — and one-third aren’t even sure (Figure 19). As demand for technology, AI and cloud computing increases along with corresponding demand for water, water utilities can be aware of the trend and ready to engage with ecosystem players to forecast supply.

Given their potentially high water need for computing demands, data centers have generated concerns in a few communities. Thirteen percent of respondents rated their perceptions about water usage by data centers and technical manufacturing coming to their area as slightly or very negative, both within the water authority itself and the community at large. Thirty-six percent voiced neutrality within the water authority, seven percent points more than in the community — numbers that could shift either way as more communities are educated about the pros and cons of data center water needs and their efforts in restoring water (Figure 20).

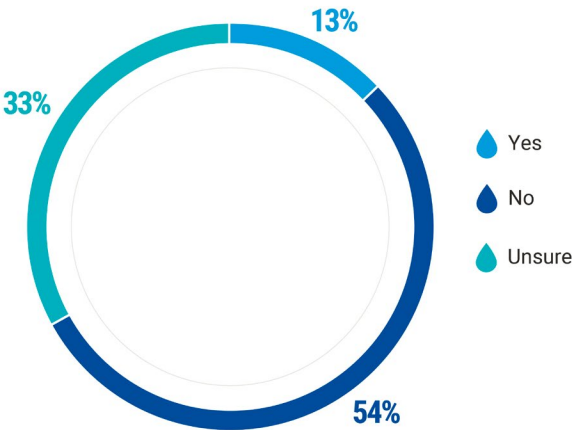
Locally, 11% of respondents said in a separate question their organizations welcome new demand from data centers or technical manufacturing, with 2% discouraging them. Half of respondents note their enterprises are neutral, as communities balance economic growth and change with natural resource supply.



Has your organization factored the proliferation of data centers and technical manufacturer water needs into your short- and long-term resource planning?

(Select one)

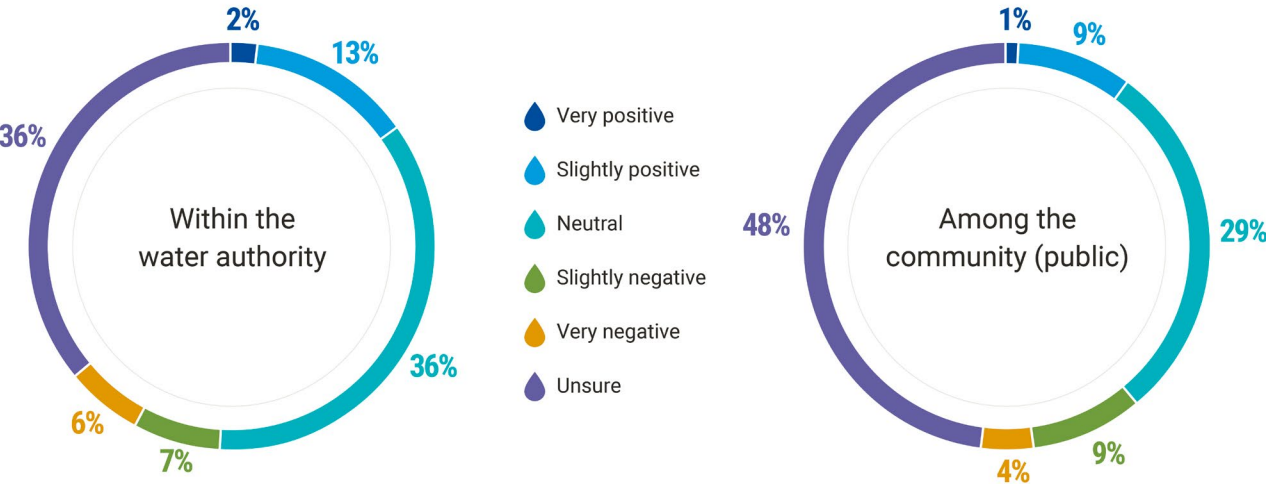
Source: Black & Veatch 2025 Water Report survey



What is the perception as it relates to water usage by data centers and/or technical manufacturing coming to your area?

(Select one for each)

Source: Black & Veatch 2025 Water Report survey



As data center locations balance out across the U.S. landscape, many communities are proactively completing water arithmetic, assessing the would-be impact of data centers on water and wastewater systems to sort out how much their infrastructure assets can handle. Other communities are diving all in, courting the development in the understanding they’ve got plenty of power and water for them and that data center tax dollars are a welcomed new revenue resource to their communities.

Whatever the case, there’s an awakening unfolding, as water utilities and communities explore and assess the implications of the new world of data centers. 💧

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Managing climate change impacts



Managing climate change impacts

Viable delivery of water and wastewater services 24/7/365 is the baseline expectation that individuals, communities and businesses have of their local water utilities. It's both the law and a basic human right. The responsibility for clear water is why agencies and utilities must know their vulnerabilities, mitigate them and ultimately eliminate them, if possible. When elimination isn't possible, resiliency is the next best option.

This is true with climate change. The *Black & Veatch 2025 Water Report* survey shows respondents are concerned about shifting weather patterns and increasingly extreme weather events. Their concerns align with areas where utilities feel especially vulnerable in delivering the level of service expected of them.

When asked which elements they would include in their definition of sustainability, 84% of respondents cited “infrastructure reliability,” up four percentage points from 2024. Seventy-two percent also include “water supply reliability” in their sustainability definition, ranking it second ahead of energy security and reliability (57%) (**Figure 21**).

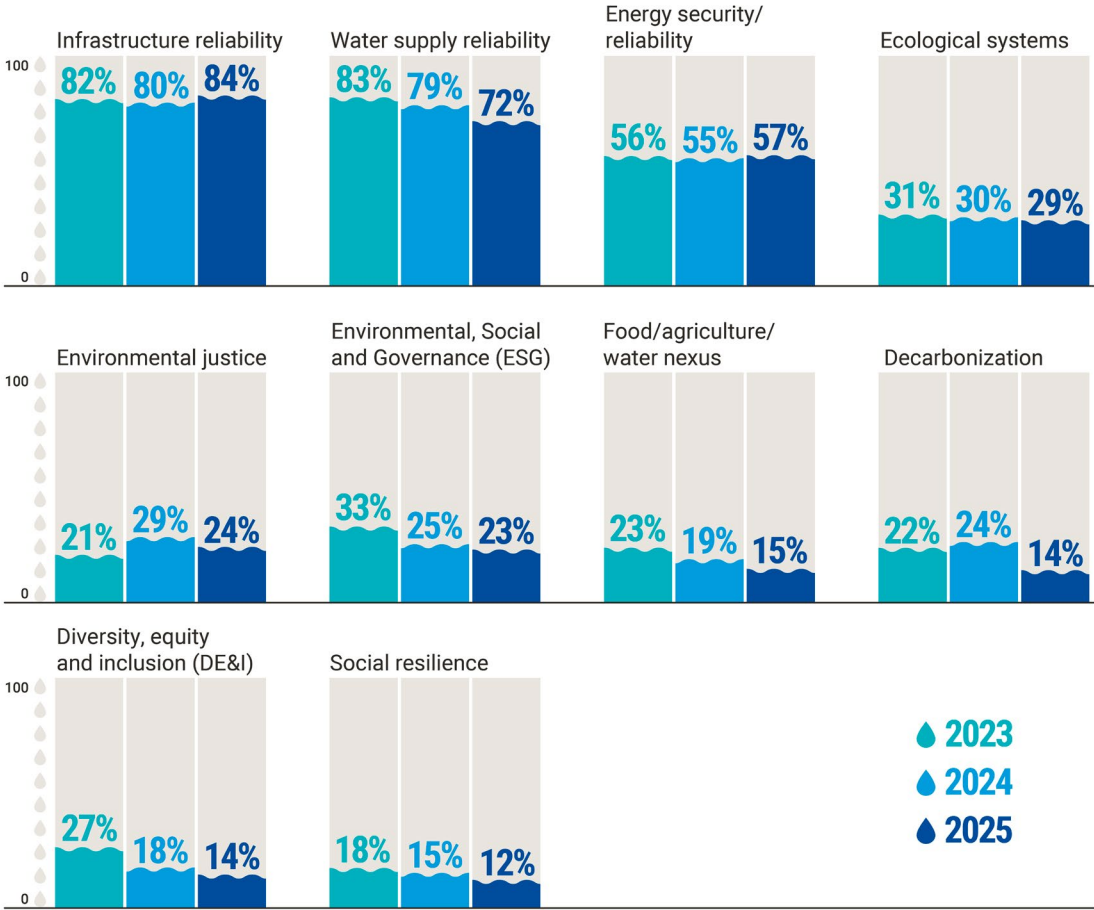
Given the concerns around reliability, it would be expected that most, if not all, utilities would have completed studies. But, the numbers show only 61% of respondents have conducted them, identifying aging infrastructure (70%), water supply (67%), power supply (64%) and droughts (63%) as primary vulnerabilities. These susceptibilities are the same as or directly impacted by respondents’ top three climate change concerns: changing participation patterns/ floods, drought and aging infrastructure.



What elements do you include in your definition of sustainability?

(Select all that apply)

Source: *Black & Veatch 2025 Water Report* survey



The survey also shows that utilities are actively mitigating climate-related risks, with:

- hardening their water infrastructure (48%);
- considering alternative water supplies (42%);
- aiming to enhance their resilience through new processes or technologies in wastewater treatment (49%);
- meanwhile, many have disaster response and recovery plans in place.

Altogether, we see a sector taking aim at the issue and adopting strategies and solutions to bolster its infrastructure, systems and practices. At the same time, as the survey shows, there is room to do more.



Challenged, but more in control?

The top climate change concerns identified in the Black & Veatch survey highlight reduced concern in most areas:

Changing precipitation patterns. Flooding can overwhelm water treatment plants and distribution systems, causing contamination, service disruptions and damage to other infrastructure. Drought reduces water availability, stressing water supplies, impacting water quality and increasing the cost of water.

Aging infrastructure. Pipes, pumps, treatment facilities and other infrastructure at or beyond their service lives can be ill-equipped to handle extreme events and changing patterns.

The cost of inaction. While the adoption of new technologies and upgrades to infrastructure require significant investments, they can create operational efficiencies to lower costs and better guarantee public health and safety in the long term. Added resiliency efforts to combat climate impacts can improve service reliability.

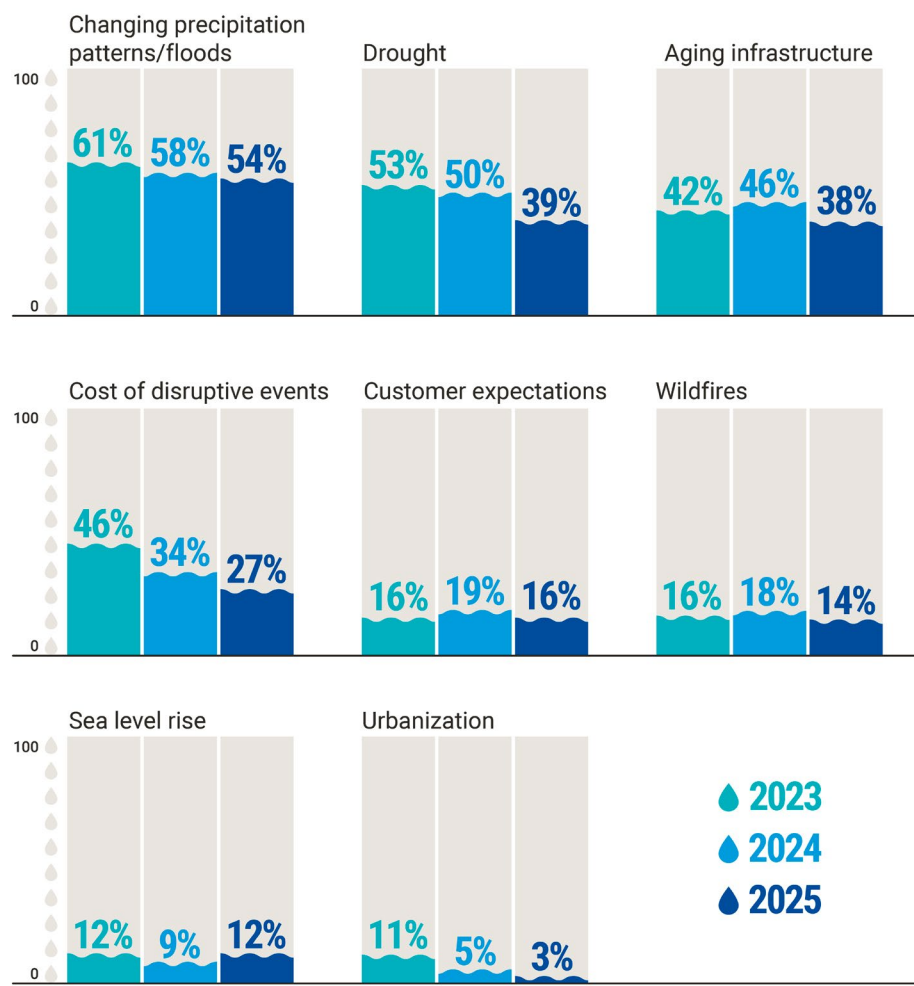
Interestingly, the survey reveals a year-over-year decline in six out of eight climate concern areas, with two sustaining concern at a low level (16% and 12%). Worries about changing precipitation patterns/flooding dropped from 61% in 2023 to 54% now. Concern about drought slid from 53% in 2023 to 39% in 2025. Worries about aging infrastructure fell from 42% in 2023 to 38% this year, while concern about the cost of disruptive events declined from 46% in 2023 to 27% now (Figure 22).



What are your top three concerns about the impact of climate change?

(Select up to three)

Source: Black & Veatch 2025 Water Report survey



The survey did not delve into why respondents seem less worried about these critical issues. However, Black & Veatch recent experience across the country points to how utilities have been addressing their vulnerabilities. Community water systems are required to do a risk and resilience assessment and update every five years. Many water utilities are now working through the second cycle of the requirement, indicating providers have developed a better understanding of their risks and are taking action to mitigate them.

Key strategies include addressing power reliability concerns through emergency backup generators, diversifying water resources against drought conditions, hardening systems against storm damage and implementing technologies like aquifer recharge and water reuse.

Utilities also have been readying themselves. Two-thirds of respondents have a disaster response plan, and an additional 11% are working on one. Nearly half of respondents (48%) have a disaster recovery blueprint or framework in place while 14% say that's in the works.

These results indicate that utilities might be gaining confidence in their ability to manage impacts from climate change. This level of planning and readiness signals that utilities are not only acknowledging the risks but are also taking tangible steps to fortify their systems to manage future climate-related disruptions.

“ These results indicate that utilities might be gaining confidence in their ability to manage impacts from climate change. ”



Opportunities to improve collaboration

The survey showed a continued decline in collaboration between local water and electric utilities ([Figure 23](#)). Nearly all respondents reported having a backup power plan — predominantly diesel-powered generators. However, effective management of the interconnections between water and energy systems is crucial. This has the potential to become even more important with the explosive growth of data centers and associated demand for power.

Another trend revealed in this year’s report is a dropoff in utilities participating in their local Federal Emergency Management Agency (FEMA) hazard mitigation plan. Compared with results from 2024, 11% fewer this year said they were participating, 3% more said they were not participating and 9% more were unsure.

Some utilities may not fully understand the benefits of hazard mitigation planning or the requirements for participation. Some may prioritize other operational needs over long-term planning efforts. In any case, without active participation in hazard mitigation planning, water utilities may be less prepared to manage natural disasters, risking service disruptions, infrastructure damage and water quality compliance issues. Additionally, participation in FEMA’s hazard mitigation plans is often a prerequisite for accessing certain types of federal funding and grants. Utilities that don’t participate may miss out on financial assistance for critical infrastructure upgrades and resilience projects.

Nature-based solutions can mitigate risks

Nature-based solutions (NBS) are a tool that utilities can use to mitigate their climate change-related risks by applying natural processes and features such as wetlands and green infrastructure to address environmental and societal challenges.

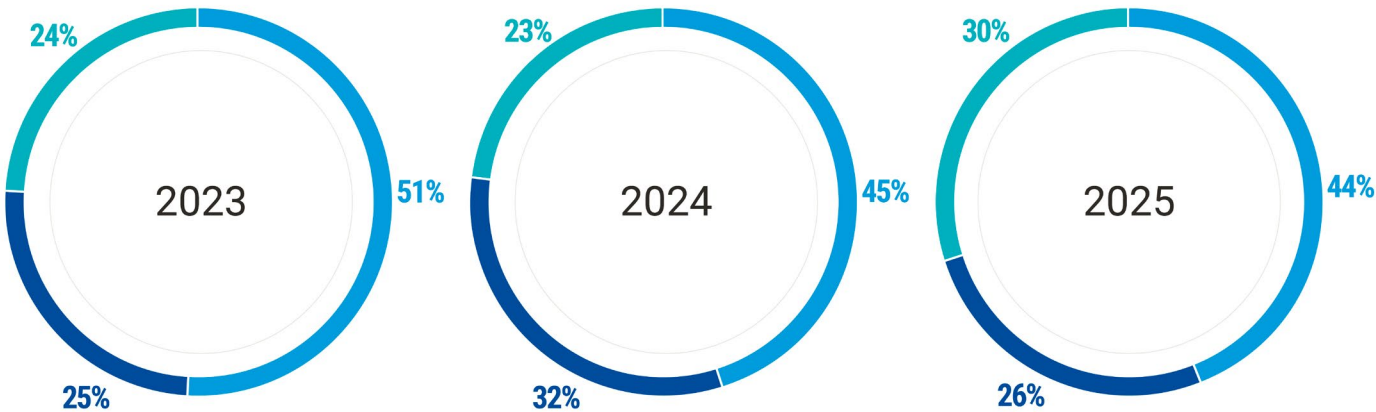


Do you currently collaborate with your local electric utility to gauge cross dependencies?

(Select one)

Source: Black & Veatch 2025 Water Report survey

Yes No Unsure



When respondents were asked what’s driving their integration of NBS, stormwater quality management (33%) topped the list, followed by a tightly bunched grouping of priorities involving regulations (28%), infrastructure protection (26%), innovative wastewater treatment (26%), flood management (25%), reuse (24%) and groundwater recharge (22%). However, 26% of respondents said they either aren’t working on such solutions or were unsure about it. These results show potential that greater adoption of NBS may give utilities another avenue to address their climate-related vulnerabilities.

Looking ahead

This year’s survey results underscore the importance of understanding one’s vulnerabilities and acting to mitigate them. By leveraging other strategies — from NBS and water conservation to digital water approaches — utilities can manage climate change even more effectively, keeping the clean water flowing as expected. 💧

“...by leveraging other strategies...utilities can manage climate change even more effectively, keeping the clean water flowing as expected.”

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Utilities navigate an ocean of ready-to-harness data



Utilities navigate an ocean of ready-to-harness data

For more than a decade, the annual *Black & Veatch Water Report* analyzing the state of the U.S. water industry has extolled the virtues of optimizing data. Such “digital water” can unlock vast rewards, delivering actionable and potentially transformational insights, enhancing investment returns and — maybe most importantly — augmenting resiliency by getting the most out of aging assets that have been a persistent industry challenge.

Adoption of data strategies has been slow, though an awakening may be underway. Utilities are getting more introspective about the merits and promise of data but grapple with a big issue: with the “silver tsunami” of veteran utility workers increasingly heading into retirement — taking their institutional knowledge of complex, aging systems with them. Are the right employees and training in place to make data truly work for them?

Based on a survey of 680 U.S. water sector stakeholders, the *Black & Veatch 2025 Water Report* shows promise and opportunity, beginning with the fact that six in 10 respondents say they have a digital solutions strategy — a super majority with room still for improvement.

On the road to great data-management maturity, there’s an inflection point: We have a data management strategy, now what?

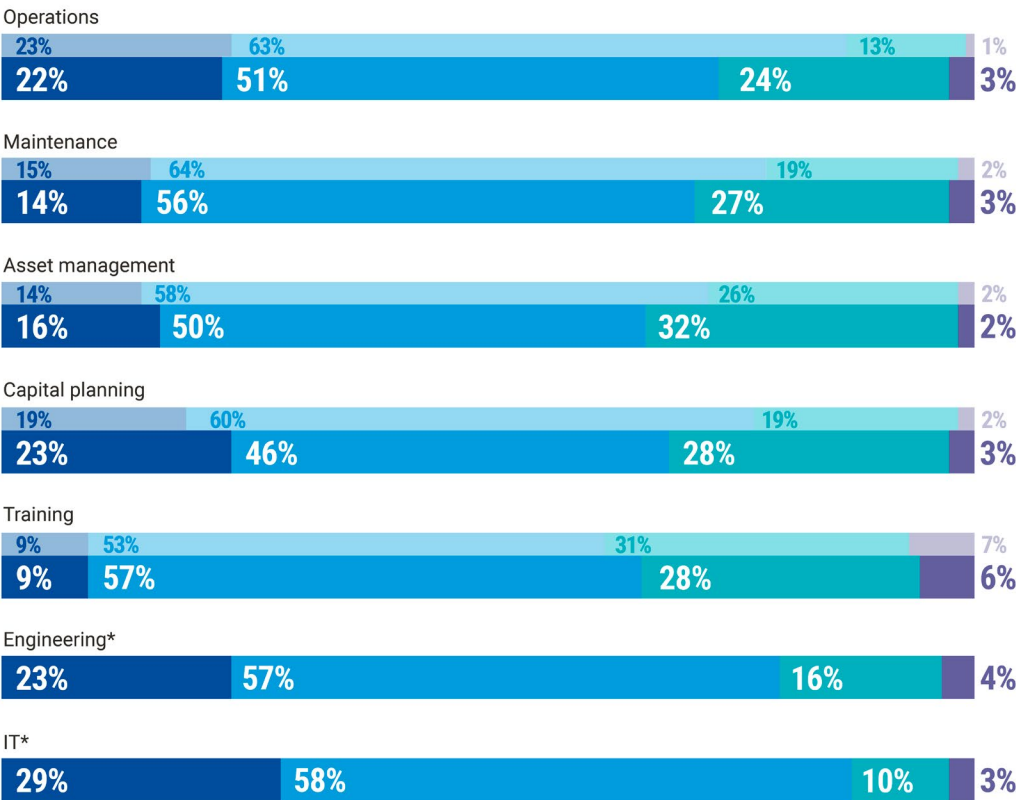
More respondents rated themselves as less mature on their data journey now compared to 2024, perhaps suggesting that utilities may be experiencing natural



How would you rate the maturity level using data or digital solutions for each of the following parts of your organization?

(Select one per row)

Source: Black & Veatch 2025 Water Report survey



growing pains when it comes to effectively implementing their data management strategy. Some 32% say they have low maturity when it comes to asset management compared to 26% last year, and only half say they’ve reached average maturity compared to 58% last year (Figure 24).

Data, data everywhere. What to do with it?

With a growing intention to adopt digital enablement, utilities have yet to match their aspirations to their output. According to our survey, 49% of respondents said they’re collecting lots of data but not leveraging it effectively, up from 42% in 2024.

While organizations are slowly moving up the maturity chain, their eyes are opening. What’s clear: A data strategy is not an out-of-the-box solution. That’s why in 2025, we see utilities revisiting their strategies and asking evolved questions such as, “What information is strategic? What data-driven decisions do we want to make as an organization? What change management strategies can we deploy?” The answers are crucial before terabytes of data can become useful in addressing persistent issues such as helping pinpoint and stemming water loss.



In addition, 60% of respondents said that they’re outsourcing engineering and technical staff. This reflects a recognized capability gap: Utilities understand that they don’t know what they don’t know.

When done right, digital water transforms utilities from reactive operators to strategic planners, driving efficiency, sustainability and long-term resilience. Ideally, the focus should not just be on buying a computerized maintenance management system (CMMS) but in training people effectively to maximize the power of the solutions. Twenty-eight percent of utilities — up from 19% in 2024 — say they’re getting both sides of this equation: collecting lots of data and leveraging it effectively (Figure 25).

That’s an important takeaway from this survey: Utilities understand that data maturity means having both the system and the trained workforce to set up the system, download the information and create learning systems and solid assessment and action processes for the data they collect. That’s especially important with the unfolding “silver tsunami” as half of the sector’s workforce could be retiring in the next five years.

‘That one data person’

Historically, utility staffing is stretched thin. Workers often are forced to wear multiple hats and do more with less. Those relegated to handle data-related tasks often aren’t sufficiently trained or connected to a data and insights community, leaving potential data insights and warnings unchecked. This acknowledgement is reflected in our survey; when asked which constraints impair or preclude utilities from adopting digital strategy solutions, 54% identified staffing resources and 37% identified funding (Figure 26).

Anecdotally, it’s something Black & Veatch sees consistently with its clients. There is one person doing IT, managing a database and maintaining a dashboard — ostensibly, simply putting out fires rather than proactively harnessing data. What’s more, experienced data professionals have great opportunities outside the utility space, and retention is an issue. This is in the context of legacy workers aging out of the workforce and taking their deep knowledge with them, making the balance between people and systems more critical than ever. An investment in memorializing their skills and experience is critical to maximizing value from a data management strategy. Efficient data use can relieve the pressure on fewer human workers.

Fig. 25

Which of the following statements best describe the current data management practice at your organization?

(Select one)

Source: Black & Veatch 2025 Water Report survey

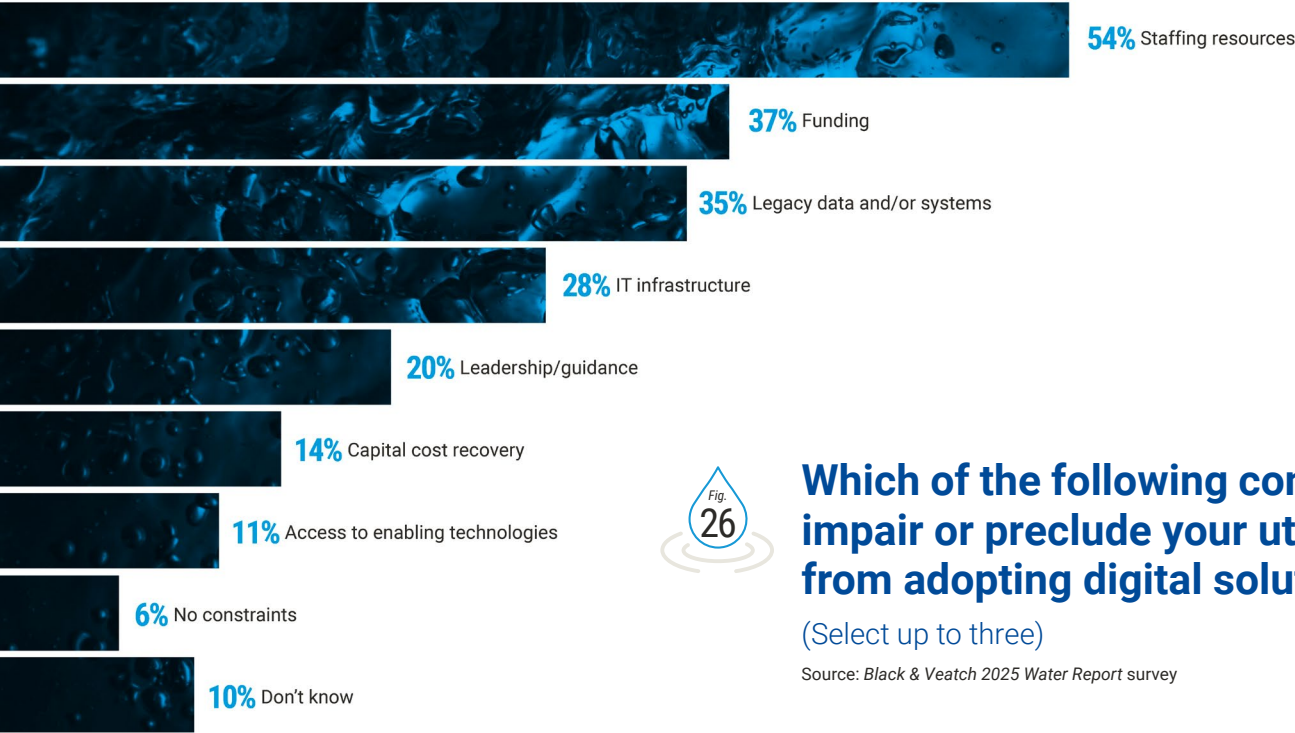
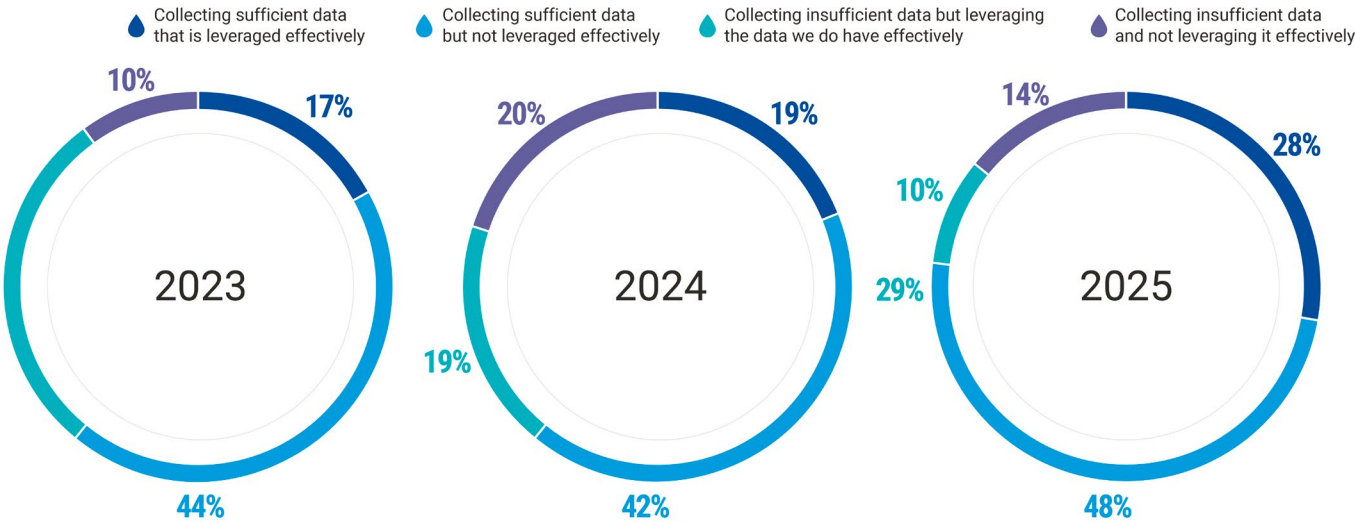


Fig. 26

Which of the following constraints impair or preclude your utility from adopting digital solutions?

(Select up to three)

Source: Black & Veatch 2025 Water Report survey

All water utilities can embrace their data-rich environments, realize the potential of their people to explore, assess, report and predict trends, and recognize the value of evolving into a learning system anchored by strong data management.

Digital water maturity: What's it look like?

It looks like an organized home for the data and plenty of trained caretakers. More specifically, it looks like a CMMS aligned with business processes such as asset management, frameworks, and risk and maintenance strategies paired with the staff to keep the data up to date. Yet for many utilities right now, it looks like a person standing before a tidal wave of data.

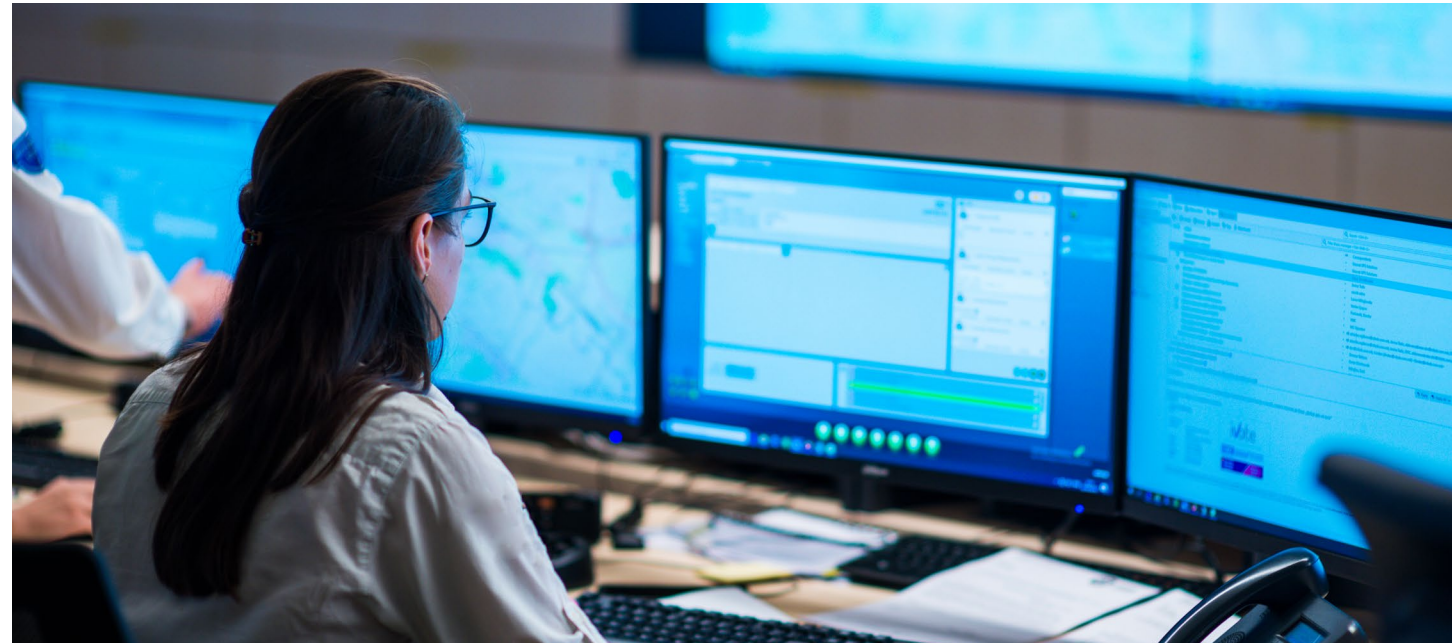
At such a dynamic time in the industry, water utilities forced with doing more with less are learning that data — along with artificial intelligence, machine learning and other advanced technologies — can help fill the chasm left when a growing number of veteran workers punch the time clocks for the last time.

For those who haven't discovered the benefits of data in managing infrastructure and other assets that in many cases are well past their prime, the time is now to embrace the exciting, informative and transformative digital frontier. This may take the form of significant investment or a more measured approach, but a leap towards a more meaningful understanding of your organization, ecosystem, challenges and opportunities awaits.

Utility workforce trends

For the past three years in a row, survey respondents have consistently rated “aging workforce/hiring qualified staff” as the second-most challenging issue facing the water, wastewater and stormwater industries today. This concern is only surpassed by “aging water and wastewater infrastructure,” highlighting the critical nature of workforce issues in this sector.

Infrastructure assets are not the only components of water utilities that are aging; experienced staff are retiring in droves. According to the *Black & Veatch 2025 Water Report* survey, 68% of respondents



report an increase in retirements or people leaving their organizations. The top three job categories affected by these departures are management/supervisors, operators and executives. These retirements of senior leaders pose substantial challenges for succession planning and knowledge transfer, risking the loss of valuable institutional knowledge and expertise.

Training emerged as a consistent theme throughout the survey data, identified as a crucial effort needed to mitigate cybersecurity threats, collect sufficient asset data and bolster emergency planning. Upskilling teams is essential across the board, especially in addressing cyber threats. When asked what would most help their organization improve its cyber posture, respondents ranked “training” as the No.1 answer, higher than “budget,” “cyber expertise” and “staff resources.”

Digital solutions hold promise for increasing efficiency, especially when staffing resources are limited. However, respondents cited “staffing resources” as the top constraint preventing their utility from adopting digital solutions. This creates a chicken-and-the-egg situation where utility staff lack the time and resources to adopt new systems that could ultimately save time and resources.

Addressing these workforce challenges will require a concerted effort in recruiting new generations of workers, succession planning, mentorship and investment in training programs. These initiatives are essential to ensure the sustainability and resilience of utility operations and teams. 💧

“...the time is now to embrace the exciting, informative and transformative digital frontier.”

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Robust water industry
defenses more crucial
than ever



Robust water industry defenses more crucial than ever

With cyber attackers growing ever more sophisticated, the need for cybersecurity – along with the right technology and best practices – grows, too. With the acceleration of AI and investment in digitalization, water operations are becoming more connected and exposed. As utilities make progress, so do cyber adversaries, creating a need for ever-improving security.

The *Black & Veatch 2025 Water Report* – based on a survey of 680 U.S. water sector stakeholders – identifies and discusses the key cybersecurity trends, top priorities and emerging challenges facing the water industry.

Safety, public welfare top priorities

When respondents were asked how their utilities prioritize their investment in operational technology (OT) cybersecurity, the number one response was safety and public welfare. The water industry is acutely aware of the real-world (also called cyber-physical) effects of a cyberattack on public, physical and environmental safety. Recent attacks on water systems underscore the importance of safety.

While safety and public welfare were the most highly prioritized, the other responses – things like access control, compliance, data protection and protection against attacks – all directly or indirectly support the goals of safety/public welfare and operational continuity ([Figure 27](#)).



How do you prioritize your investment in the security of your assets?

(Rank order the top four)

Source: *Black & Veatch 2025 Water Report* survey



Cybersecurity starts with assessment and a roadmap

Cybersecurity often breaks down into visibility and control – when you can see what is happening in your environment, you can do something about it. Assessments are often the first step in obtaining that visibility and control.

An initial cybersecurity assessment serves as an entry point, helping organizations understand their vulnerabilities and establish a baseline for improvements. There are an ample number of frameworks available to support OT cybersecurity assessments. For example, the U.S. Environmental Protection Agency’s (EPA) water cybersecurity assessment tool, the American Water Works Association’s (AWWA) cybersecurity risk management tool, NIST SP800-53/82, ISA/IEC 62443 and more.

The challenge with assessments is finding the expertise to effectively perform them. To conduct an effective assessment, at least one cybersecurity expert should facilitate it and clearly explain the objectives, as well as the importance and the benefits to the organization. Another important success factor is the participation of the subject matter experts (SMEs) in supervisory control and data acquisition (SCADA) IT, operations, maintenance and engineering.



Cybersecurity is an expansive and complex topic, making this a tall order for those whose day job isn't OT cybersecurity. Assessments typically include a significant educational component.

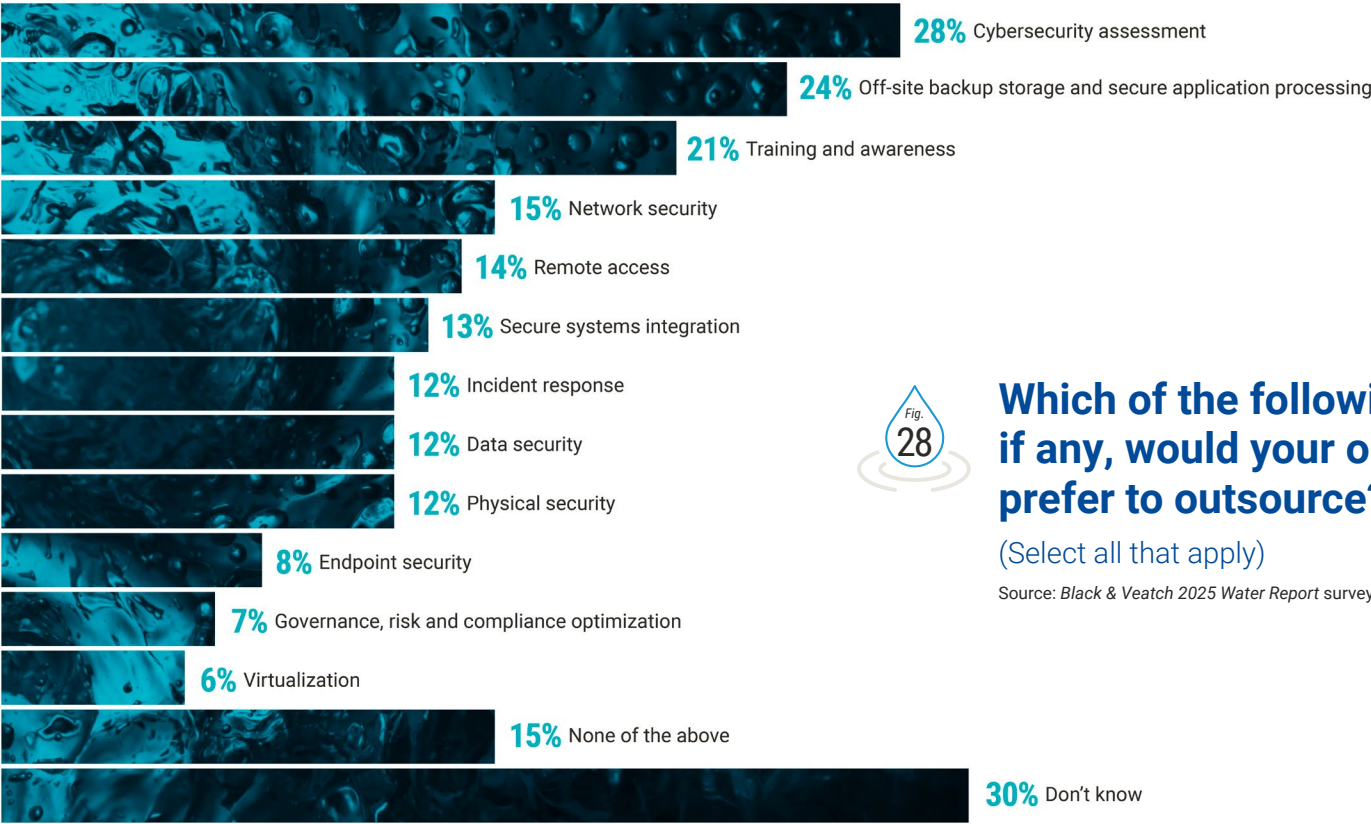
When respondents were asked which areas of cybersecurity their organizations prefer to outsource, 30% said they did not know (Figure 28). Since many respondents are unsure, they can assess their program in-house to identify areas to outsource. If not an assessment, then a workshop with a third-party vendor can help identify high-level gaps. Ideally, having a third opinion is the right move.

The (untrained) human factor

Many vulnerabilities begin with people. Respondents took this to heart. When they were asked what would most help their organization improve its cyber posture, two-fifths (40%) answered training, followed closely by budget or funding (32%), cyber expertise (31%) and resources (27%). One in five (21%) did not know, all of which ties back to training in some way (Figure 29).

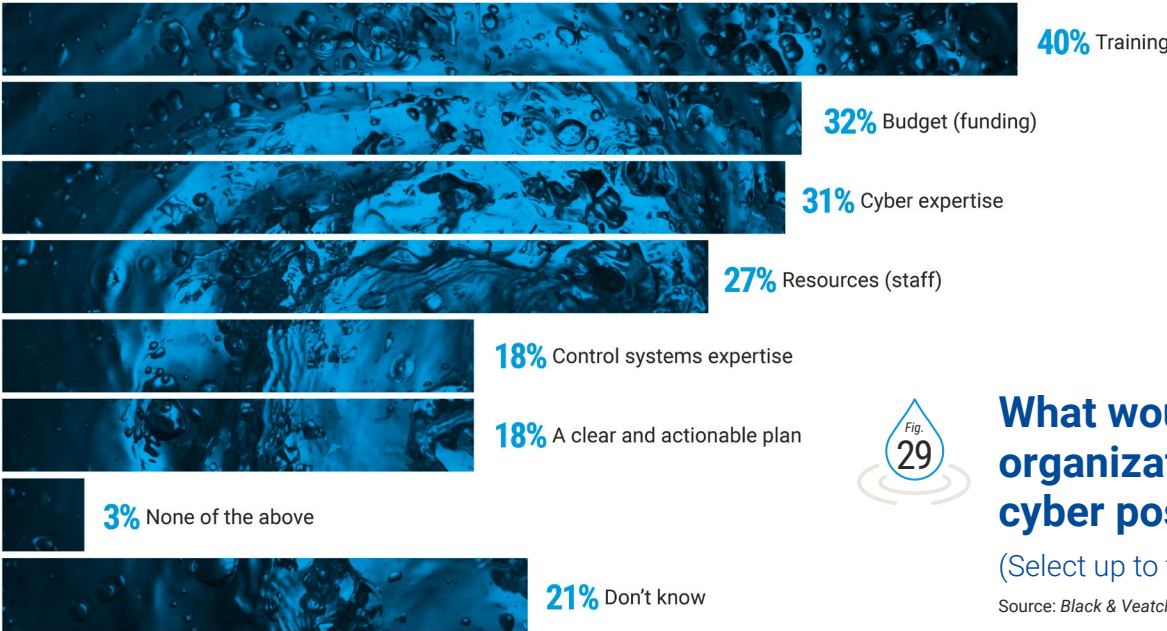
Cybersecurity training is more than technical instruction; it's a structured, ongoing effort to raise awareness and behavioral change across the organization. A successful training program is based on the utility's current cybersecurity culture and built upon business objectives, showing employees the impact even a small mistake can have on operational safety and business continuity.

Incorporating real-world examples of cyber incidents and their consequences to make it relevant, the training program should include tailored modules based on the roles and responsibilities the different groups will have when an incident occurs. Tabletop exercises are a great tool to build awareness and support personnel readiness.



Which of the following areas, if any, would your organization prefer to outsource?

(Select all that apply)
Source: Black & Veatch 2025 Water Report survey



What would most help your organization improve its cyber posture?

(Select up to three)
Source: Black & Veatch 2025 Water Report survey



Active involvement in cybersecurity

When asked if they preferred cybersecurity to be managed by internal staff or an external supplier, roughly two-thirds (65%) of respondents noted they preferred internal management. Notably, all responses indicated a desire for some level of internal involvement.

Budget realities and desire to have internal visibility and control over cybersecurity are driving cyber programs to have key internal involvement. However, the lack of expertise, experience and capabilities create the need to seek help from experts (Figure 30).

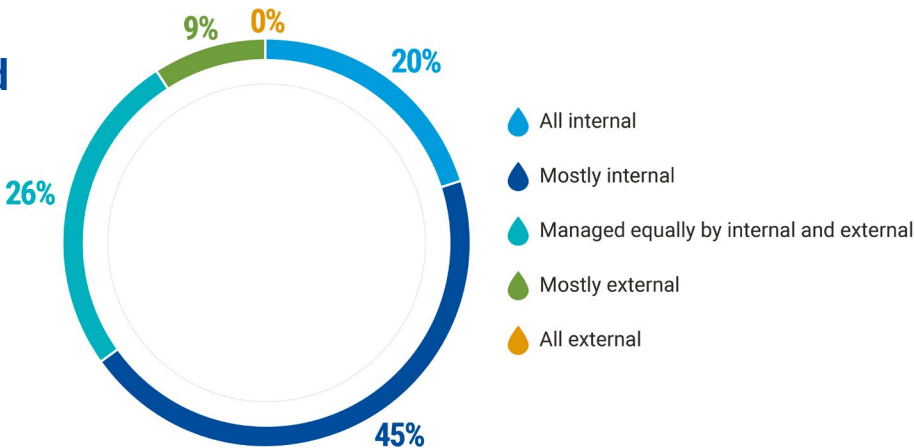
Budgets significantly influence the type of cybersecurity organization a utility can build. An ideal approach combines internal resources for day-to-day activities with external cybersecurity experts for developing, implementing and helping operate robust programs. This mixed strategy helps ensure comprehensive coverage and leverages specialized expertise. Adopting a multi-year plan can enhance program continuity and provide budget flexibility, allowing the utility to adapt to evolving cybersecurity needs while managing financial constraints effectively.



Would you prefer cybersecurity to be handled by your internal staff or prefer it to be handled by an external supplier?

(Select one)

Source: Black & Veatch 2025 Water Report survey



Unmet training needs could be impeding cybersecurity

In the most recent American Water Infrastructure Act (AWIA) assessment, when asked what progress respondents have made remediating cybersecurity risk, only 31% of respondents said theirs is 76 to 100% complete, while another one-third noted that they don't know. Combined with the expressed need for assessment (the first step in a cyber program), there seems to be confusion about the maturity of OT cyber programs. This is not surprising considering the ever-changing nature of the threat environment and the increasing risk to safety. Companies need guidance and support to protect their most sensitive operations.

Immediate investment in a robust program is crucial. This program should prioritize safety, ensure operational continuity, cultivate a strong cybersecurity training culture and refine processes to equip teams for potential cyberattacks. Respondents have highlighted safety and welfare as being at the top of their priority list, while training and education remain a major barrier to feeling secure in their practices. With companies such as Black & Veatch offering integrated cybersecurity services and solutions to the utility, the benefits of shared knowledge and best practice adoption are positively impacting the water industry. 💧

Identifying solutions

Knowing that respondents are looking for more training and have a desire for their internal teams to be well-equipped to handle cybersecurity practices, Black & Veatch offers a multi-pronged approach as a solution.

Note that all or some of these actions can be performed in parallel, depending on each utility's unique situation and future goals.

- 1 Enlist the help of an external cybersecurity subject matter expert to support short- to mid-term needs, including assessments, planning, governance, policy and implementation.
- 2 Identify training goals, plans and milestones for utility staff.
- 3 Take advantage of free training from Cybersecurity and Infrastructure Security Agency (CISA) and Idaho National Labs (INL).
- 4 Download free water sector cybersecurity guidance documents from the U.S. Environmental Protection Agency (EPA), CISA, Water ISAC, American Water Works Association (AWWA), National Security Agency (NSA) and Federal Bureau of Investigation (FBI).
- 5 Incentivize and reward cybersecurity certifications starting with CompTIA Security+, SANS Global Industrial Cyber Security Professional (GICSP) or similar entry- to mid-level certification.



Building a World of Difference.®

Thank you for taking the time to read the *Black & Veatch 2025 Water Report*. We hope this year's insights have been valuable to your organization. For further questions or to be put in touch with our experts, feel free to reach out to our team.

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About the Authors

About the Authors

Laura Adams is the Black & Veatch community and ecosystem solutions lead. A 17-year veteran of the company, Adams leads a multi-disciplinary team with deep experience in program development and planning, design and construction, and the maintenance of nature-based solutions. The team is creating innovative solutions to revitalize communities, restore natural resources and address climate resilience.

Christopher Biegun is an associate vice president who leads the federal integrated solutions department, responsible for threat reduction, international development, IT and cybersecurity, and advisory and assistance services growth and engagement within our client's federal market. Prior to joining Black & Veatch in 2019, he spent the previous 35 years of his career in the U.S. Air Force, federal civil service and industry, leading efforts spanning operations intelligence, program management, system engineering and test and evaluation, primarily focused on mission-critical IT Systems.

Ian Bramson is the vice president of the Black & Veatch global industrial cybersecurity practice, responsible for the strategy, commercialization and business growth of all the company's integrated cybersecurity solutions and capabilities. Bramson has more than 25 years of experience solving the business challenges of cybersecurity, risk management and digital transformation. Before joining Black & Veatch in early 2024, Bramson over the previous 10 years built two successful

cybersecurity consulting services backed by global sales organizations and cybersecurity programs across multiple industries.

Ann Bui is a senior managing director who leads the Black & Veatch global strategic advisory rates and regulatory market business. Besides providing clients with strategic financial management strategies, her responsibilities include driving growth and innovation to water, electric and gas utilities in financial and advisory planning sustainability issues, asset integrity, and energy resource planning and optimization services. Bui has more than 30 years of experience with clients in North and South America, Europe and Asia.

Amanda Canida is a process engineer who supports regional utilities in Ohio, Indiana, Michigan and Kentucky, as well as multiple national utilities. With 13 years of experience, she has assisted with projects related to taste and odor, enhanced coagulation, disinfection/disinfection byproduct formation, and emerging regulations such as cyanotoxins and PFAS, with project scopes ranging from regulatory compliance assessments to detailed engineering. Canida has been involved in desktop, bench-scale, pilot-scale and full-scale process optimization, in addition to process commissioning/startup efforts.

Andrew Chastain-Howley is the department head for the Black & Veatch specialized solutions group encompassing both information solutions and business intelligence focus areas. He has more

than 30 years of experience in data and asset management, advanced metering, and non-revenue water reduction across five continents.

Heather Cheslek is an associate vice president who leads the Black & Veatch global Industrial water solution. She works with a variety of private and industrial clients, including data centers, to provide sound advice and recommendations associated with planning, optimizing, designing and constructing water and wastewater infrastructure to support their business needs.

Martine Chlela is the global head of delivery in the Black & Veatch industrial cybersecurity practice. Throughout her career, she has delivered comprehensive cybersecurity services to critical national infrastructure stakeholders, including the development of governance programs, and the planning of incident response, recovery and business continuity procedures. Her expertise spans various industrial control system (ICS) and operational technology (OT) sectors including power, energy, transportation, manufacturing, smart buildings, water and wastewater, and mining. Chlela has successfully launched ICS/OT cybersecurity practices from the ground up and has developed and executed growth strategies. During her PhD, she collaborated with Hydro-Quebec's Research Institute, where she developed a digital twin of the smart power grid, conducted impact assessment studies, and proposed innovative mitigation strategies and post-attack recovery plans.

Ben Cownie is the digital solution lead within the Black & Veatch infrastructure advisory practice. With 19 years of experience in infrastructure consulting, he guides clients through digital transformation initiatives that improve operational efficiency, reduce risk, inform rehabilitation and replacement decisions, support capital improvement planning, and help meet regulatory requirements. Cownie leads the development and delivery of digital solutions for water and wastewater utilities, with expertise spanning data warehousing, business intelligence, artificial intelligence and machine learning. He specializes in helping utilities build trust in their data and transform it into clear, impactful and actionable insights through compelling data storytelling and intuitive visualizations to enable stakeholders at all levels to make informed, strategic and data-driven decisions.

Chris Demery is a cybersecurity program manager with the Black & Veatch federal integrated solutions team. He is an experienced cyber/IT professional with more than 20 years experience in cybersecurity, information technology, intelligence, strategic planning, project development, management and training. Prior to his private sector career, Demery served in several key leadership roles at the White House Communications Agency (WHCA) and the Defense Threat Reduction Agency (DTRA), where he led teams of technical professionals conducting mission assurance and risk/vulnerability assessments protecting critical cyber/IT infrastructure and national security information. Demery holds several TEMPEST certifications, is a Certified Ethical Hacker (C|EH), a credentialed technical surveillance countermeasures (TSCM) practitioner and Security+ certified.

Ufuk Erdal is the water reuse global practice and solutions director at Black & Veatch. With more than three decades of diverse experience, he has led or been directly involved in successfully implementing more than 50 water reuse projects in United States and seven countries around the world, creating innovative and sustainable water management solutions through water reuse for municipal and private clients. Erdal has contributed to the potable reuse framework development in Arizona, California and Georgia.

Zeynep Erdal is the director of integrated water solutions at Black & Veatch, overseeing the development and deployment of holistic solutions that include planning, asset management, treatment and digital transformation. With more than a quarter century of industry experience, she drives solutions to public and private sectors with a goal of achieving resilient and sustainable communities. Erdal serves on the Water Research Foundation's board of directors, working with utilities to set strategies and develop solutions for future-ready communities.

Adam Feffer has 20 years of drinking water experience focusing on surface water treatment optimization, disinfectant byproduct management, treatment of emerging contaminants (including PFAS), drinking water compliance and distribution system monitoring. He is skilled in process design and project management and is a proven leader of teams and champion of new ideas. Feffer has become one of the Black & Veatch subject-matter specialists for PFAS and is serving as the company's national drinking water PFAS practice leader.

Phil Fischer is a client executive in the data center and mission-critical segment of Black & Veatch, working with global hyperscale, collocation, real estate and other data center development and operation stakeholders. He brings a thorough, holistic understanding of development, design, construction and operation of data center and mission-critical facilities. That includes expertise in site due diligence and selection, master planning, permitting, data center design, power generation (thermal, renewables and nuclear), power transmission and distribution, electrical substations, water and cooling, and fiber planning.

Susan Herman is a strategic development lead for the Black & Veatch industrial cybersecurity practice. For more than 30 years, she has delivered digital solutions to clients across the government sector, including in the energy, water and education markets. Partnering with clients to drive best-fit digitalization efforts, Herman develops forward-looking solutions that enhance resilience, sustainability, quality, safety, security and transparency. She joined Black & Veatch in 2021 after decades of digital and automation product and service innovation at companies such as Schneider Electric, Invensys and Texas Instruments.

Ryan Hoyer is a water/wastewater instrumentation and controls engineer with a focus on cybersecurity. He regularly performs cybersecurity assessments for water utilities, providing guidance on maintaining operability while implementing cybersecurity protections. He trained at Idaho National Labs on Consequence-driven Cyber-informed Engineering (CCE) and participates in the Cyber Informed Engineering (CIE) Implementation Working Group. Hoyer believes the best way to reduce the consequence of a cyberattack is through engineering practice and the incorporation of cybersecurity into fundamental engineering design practices.

Gary Hunter is a global technology practice leader for the Black & Veatch water technology group and responsible for strategies to reduce the discharge of emerging contaminants into the wastewater collection system. He serves as the secretary of the International Ultraviolet Association (IUVA) and is a professional registered engineer in the state of Kansas. He is a board-certified environmental engineer (BCEE) and holds an ENVSP certification.

Jessica Lyman is a digital customer solution leader, focused on assisting utility clients to select and implement enterprise technology solutions that provide operational value and positively impact utility customer engagement. Over the last 10 years with Black & Veatch, she has delivered enterprise impacting solutions for electric, gas and water utilities. Prior to joining Black & Veatch, Lyman worked in the resource efficiency policy sector, crafting policy on behalf of states, the U.S. Environmental Protection Agency and U.S. Department of Energy to support consumer education and awareness of energy and water utilization and behavioral impacts.

Keon McEwen is the head of solutions development for the Black & Veatch industrial cybersecurity practice. His expertise includes cybersecurity, control systems, automation and data. McEwen brings a unique combination of technical expertise and market development acumen to help companies achieve success during pivotal moments of change. He has designed, built and managed industrial security operations centers (ISOC) with international reach across critical infrastructure industries such as power, oil and gas, transportation, and

manufacturing. McEwen has a strong knowledge in OT/ICS systems and related compliance requirements including NIST, IMO, ISO and NERC CIP.

Kimberly M. Miller is a planner with nearly 30 years of public and private sector experience. From New York City to the Rio Grande Valley of Texas, her plans have helped coastal and inland communities protect clean water while mitigating flooding and other hazards. She makes communities more resilient by incorporating their natural assets into solutions for growth and infrastructure challenges.

Lynne Moss is a board-certified environmental engineer (BCEE) and serves as the residuals and odor control practice leader for Black & Veatch. She has more than 40 years of experience focusing on biosolids management technologies and trends. Moss focuses on regulatory trends and market opportunities for biosolids to help clients develop reliable and sustainable biosolids programs.

Jim Riddle is a professionally licensed electrical engineer and certified information systems security professional within Black & Veatch's federal division. His 24 years of design expertise includes cybersecurity design for mission-critical Department of Defense facility-related control systems. His background in electrical and communication design ranges from diverse federal programs to utility-sized communication networks and public safety projects. His recent efforts have centered on utilizing the NIST 800-53 controls and 800-82 guidelines to leverage the risk management framework to secure operational technology applications.

Jim Oliver is a global director for Black & Veatch's industrial water business and works closely with data centers, data center developers and power providers. He is a company leader in understanding industrial water supply and cooling water blowdown disposal and advises customers on water source optimization, water treatment and water disposal options.

Ahmet Ozman is an asset management leader for the Black & Veatch water and wastewater infrastructure projects. A 30-year veteran of Black & Veatch, Ozman provides expertise in life cycle asset management, asset management programs, ISO 5500X standards, condition assessment, risk assessment, risk-based capital prioritization, optimization studies, resilience assessments and planning.

Deepa Poduval is a senior vice president and the Black & Veatch global sustainability leader. In this role as part of the company's leadership team, Poduval is responsible for building and implementing the company's sustainability strategy spanning corporate, client and community initiatives. She brings nearly 25 years of cross-industry strategic consulting experience advising clients on multi-billion-dollar sustainable infrastructure investments.

Ed Rectenwald is the director of supply and hydrogeology for the Black & Veatch water business. With over 29 years of technical and management experience, he has successfully managed projects and teams across the globe related to design, permitting, construction, expansion and operation for wellfields, Class V aquifer storage and recovery (ASR), managed aquifer recharge (MAR) and Class I injection well systems.

Brydon Ross is the director of government affairs for Black & Veatch and leads the company's advocacy, policy, and regulatory efforts in Washington, D.C. Ross has more than 20 years of experience serving in various advisory roles for U.S. senators and in the private sector as well as heading a state affairs lobbying practice for clients in the energy, utility and environmental space.

Jim Schultz is a principal consultant with Black & Veatch's industrial cybersecurity practice with over 30 years of experience with planning, design, implementation and support for operational technology (OT) and information technology (IT) projects in the water, wastewater, manufacturing and electric industries. He also has experience with federal and Department of Defense projects. Schultz is a registered professional engineer and holds several certifications including Certified Information Systems Security Professional (CISSP), Certified Information Systems Auditor (CISA), Cisco Certified Network Associate (CCNA), Certified Ethical Hacker (CEH) and Global Industrial Cyber Security Professional (GICSP).

Jeffrey Spivak is the director of the Black & Veatch market insights group, which is responsible for conducting market intelligence and research to help drive the company's strategic initiatives and business development. Spivak has more than 15 years of experience leading competitive intelligence practices to provide market, client and government policy insights across power, water and other industrials throughout the United States and countries across the world.

Mark Steichen is the water process group and treatment solutions leader at Black & Veatch. He has more than 30 years of experience in municipal wastewater treatment plant design and specializes in biological nutrient removal. He leads a highly specialized group of water and wastewater treatment process engineers that deliver tailored treatment solutions for clients throughout the United States and globally.

Melanie Tan currently serves as the west region resilience solutions director. In this role, she works with and builds integrated teams to address cross-cutting challenges including climate change mitigation and adaptation, water and energy security, decarbonization, sea level rise protection, and electrification. Tan brings a background that encompasses strategic planning, policy development, operations and risk management in both California and Singapore, including time in water utility operations and management.

Drew Thompson is an associate vice president of Black & Veatch's technology sector, which focuses on data center and mission-critical facilities and their required infrastructure (substations, on-site power, industrial water, fiber, etc.). He has experience in client management, facility design, project management and real estate portfolio strategy.

Emily Tummons is a senior process engineer and the national lead and copper practice leader at Black & Veatch. She has nine years of experience designing and managing corrosion control evaluations for municipal drinking water treatment facilities, including desktop water quality modeling, bench-

scale evaluations and pipe loop testing. Tummons is the technical leader for all lead and copper rule-related projects.

Will Williams is the global digital and asset lifecycle solutions portfolio leader at Black & Veatch. He has extensive experience in asset management planning, including asset failure analysis, risk assessment, performance benchmarking, maintenance optimization, business planning, serviceability assessment, whole life costing, operational efficiency, business change management and infrastructure rehabilitation. Before joining Black & Veatch, Williams was a vice president and global director of asset management for water and power for Halcrow. He previously served as director of asset management and planning at the UK Water Research Centre. He is a committee member of the International Water Association Asset Management Specialist Group.

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