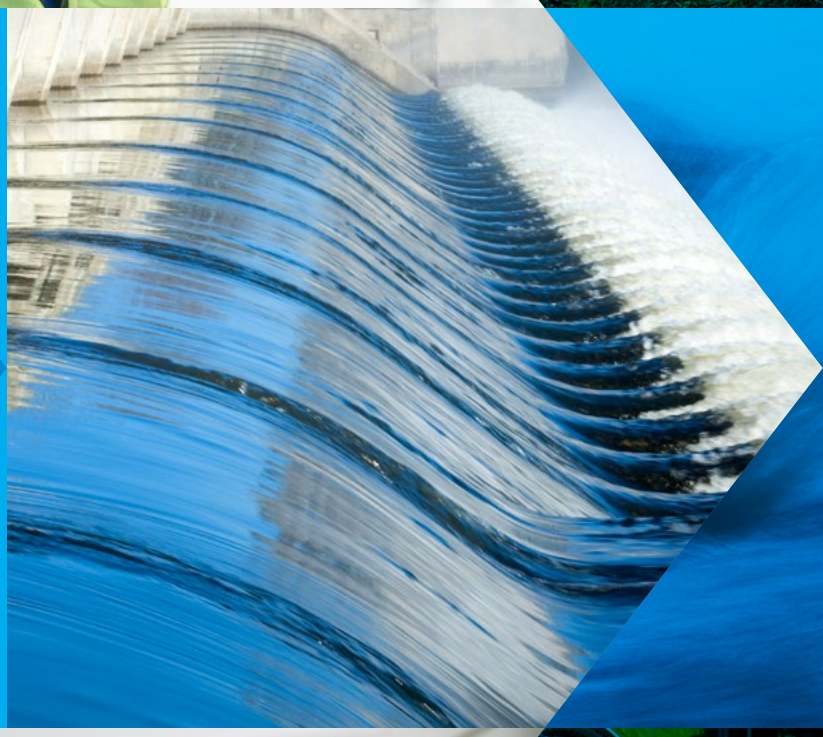
BRIDGING THE GAP:
THE POWER OF INVESTMENT IN WATER



Value of Water CAMPAIGN | ASCE AMERICAN SOCIETY OF CIVIL ENGINEERS

About this Report

The American Society of Civil Engineers (ASCE) partnered with the Value of Water Campaign to commission this study. It is part of ASCE's series of economic studies (Failure to Act and Bridging the Gap), which began in 2011. This report builds on the Value of Water Campaign's 2020 *The Economic Benefits of Investing in Water Infrastructure* study and considers the 20-year economic impacts of continuing infrastructure investment at Infrastructure Investment and Jobs Act (IIJA) spending levels or reverting to pre-IIJA funding once authorized spending is complete.

About the American Society of Civil Engineers

The American Society of Civil Engineers represents more than 150,000 members of the civil engineering profession in 177 countries. Founded in 1852, ASCE is the nation's oldest engineering society. ASCE stands at the forefront of a profession that plans, designs, constructs, and operates society's economic and social engine—the built environment—while protecting and restoring the natural environment. Learn more at www.asce.org.

About the Value of Water Campaign

The Value of Water Campaign is a coalition of leading organizations and individuals from across the US water sector who are working to educate and inspire Americans about how our water is essential, invaluable, and in need of investment. Since 2015, the Value of Water Campaign has been building public and political will for investment in America's water infrastructure by spreading messaging that unites diverse water advocates around this goal. Learn more at www.thevalueofwater.org.

About EBP

EBP, formally Economic Development Research (EDR) Group, is a firm dedicated to advancing the state-of-the-art in economic evaluation and analysis to support planning and policy in the areas of transportation, energy resources, urban development, and economic growth strategy. Learn more at www.ebp-us.com/en.

EXECUTIVE SUMMARY

Four years ago, the Value of Water Campaign and ASCE examined the economic impacts of completely closing the national water infrastructure investment gap. Our work showed what can be accomplished when we fully fund our nation's water infrastructure: we would see a $4.5 trillion gain in GDP, the creation of 800,000 new jobs, and a $2,000 annual increase in household earnings. While visionary and true to the fundamental goals of the Value of Water Campaign, closing the water infrastructure investment gap four years ago and today remains largely out of reach. Since our last report, Congress passed the Infrastructure Investment and Jobs Act of 2021—the single largest investment in our nation's water infrastructure in history. That legislation included approximately $55 billion in funding for capital projects intended to improve water quality and accessibility for the US communities that need it most.

Today, those funds are making a difference as they begin to flow into the local water systems and municipalities tasked with providing drinking water, wastewater, and stormwater services to residents. Yet in the face of decades of historic underinvestment combined with rapidly evolving cost drivers such as population growth, severe climate impacts, and regulatory changes, it is clear that the five years of federal funding provided under IIJA, while an impactful first step, should serve as the baseline for federal investment moving forward.

In this report, we examine the economic impact of federal water investment in two scenarios over 20 years: (1) continued federal funding at levels of appropriation established under IIJA (the Continue to Invest scenario), and (2) reversion to the minimal level of federal water infrastructure funding that was the norm prior to IIJA (the Fail to Act scenario). While both scenarios fail to fully close the water infrastructure investment gap within this timeframe, the data in favor of continuing to invest is compelling:

- In 2024 alone, the projected gap between water infrastructure needs and spending in the United States will be $91 billion; by 2043, the cumulative gap will be over $2 trillion.
- By continuing to invest at IIJA spending levels, the investment gap could be reduced by $125 billion in the next two decades.
- Continuing to invest will decrease service disruptions to water-reliant businesses, resulting in cost savings of 46 percent over 20 years.
- Investing in water will save more than 200,000 jobs by 2043.
- The cumulative savings achieved by continuing to invest amount to $6,745 per household.

These outcomes attest to the potential for significant impact across the country if we continue to invest in water at current rates. However, the Value of Water Campaign believes that we must fully close the water infrastructure funding gap to ensure a future where all Americans have reliable access to clean, safe drinking water and wastewater services. IIJA has been a strong first step toward that future. Yet as this report illustrates, even with the continuation of IIJA funding levels, our nation's water infrastructure gap will remain—revealing an increasingly urgent need to reimagine how we as a nation fund our water systems into the future.

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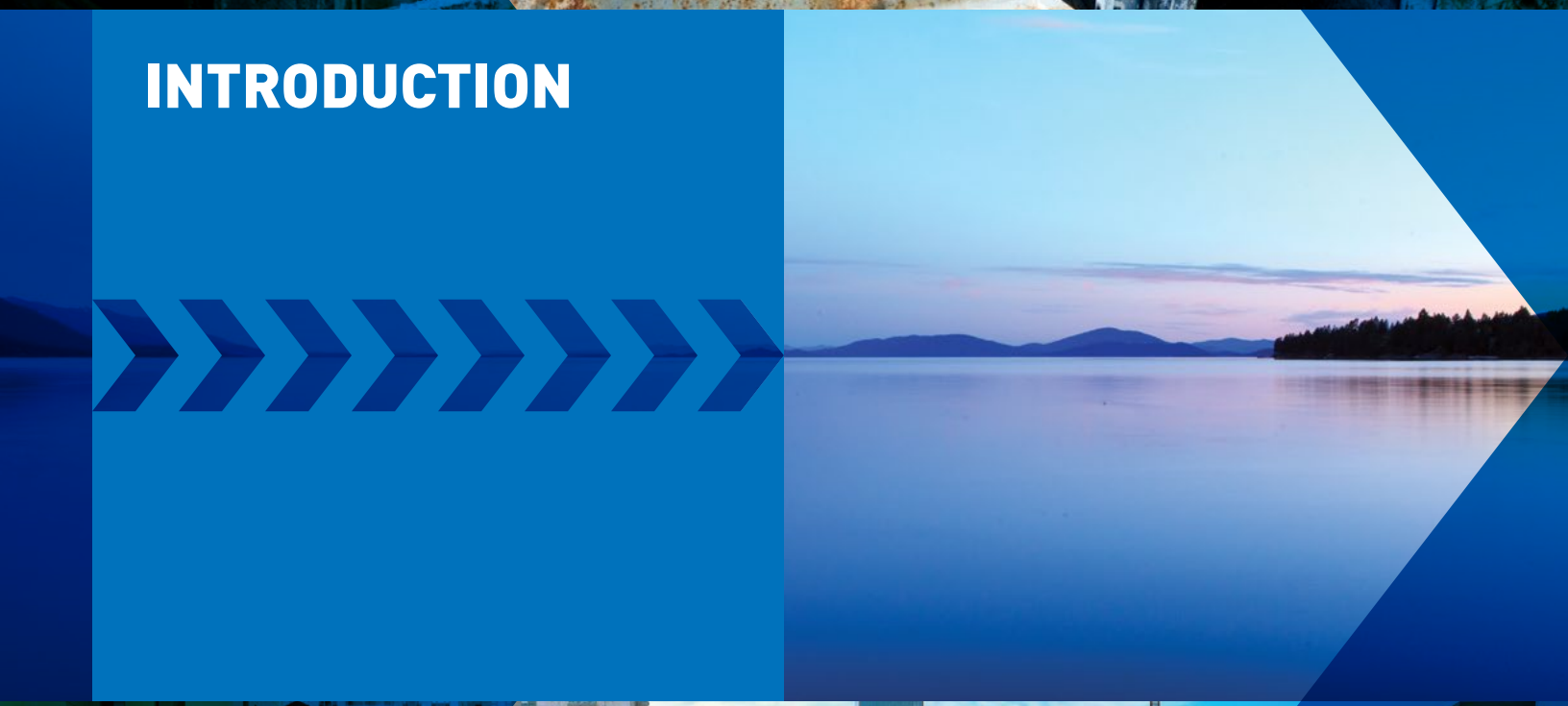


The Value of Water Campaign and the American Society of Engineers (ASCE) release this report at a time when the country is at a critical juncture—emerging from a years-long global pandemic and its associated economic fallout and poised to usher in an era of unprecedented investment in our nation's infrastructure.

Against this backdrop, water infrastructure in the US faces mounting challenges posed by aging and failing systems, population growth, climate change, emerging and legacy contaminants, growing income disparity, and decades of underinvestment. These challenges not only have jeopardized the availability and quality of water but also have imposed significant economic burdens on households, businesses, and municipalities. Without decisive action, the consequences of deteriorating water infrastructure will continue to manifest in compromised public health, environmental degradation, security risks, and economic decline.

The Infrastructure Investment and Jobs Act (IIJA) of 2021 represents a watershed moment in addressing these pressing issues by injecting significant federal funding into the nation's water systems. This landmark legislation recognizes the vital importance of modernizing and fortifying our water infrastructure. With an unprecedented allocation of resources, it has the potential to revitalize aging infrastructure, enhance resilience against climate impacts, and expand access to clean and reliable water services for all Americans.

But its passage also acknowledges a historical lack of meaningful federal investment in the nation's water infrastructure. According to the results of the latest assessment conducted by the US Environmental Protection Agency (EPA) in 2021, the financial needs of US water systems grew 33 percent over five years, in large part because of aging systems and a growing backlog of necessary repairs.[1] Yet in 2017, federal investment represented only four percent of total spending on water infrastructure across the country. By prioritizing projects that promote sustainability, equity, and innovation, IIJA lays the foundation for progress toward closing the water investment gap through increased federal investment; although it represents only a fraction of the current total need.

The national water infrastructure backlog has grown exponentially and will take several decades of massive investment to eradicate under our existing, outdated models of funding. IIJA was a powerful infusion of federal funding into water infrastructure—the largest single investment in history. It already is making a meaningful difference for people across the country, with more progress coming as the funding ramps up and makes its way through state revolving loan funds and into the communities that need it most. But IIJA alone is not enough to close an investment gap that has grown over nearly half a century. The Value of Water Campaign and ASCE examined the economic impacts of fully closing the water infrastructure investment gap in 2020, finding it would take an annual investment of $109 billion and would result in a transformative gain of $4.5 trillion to GDP.[2]

In this report, we examine the more modest impact of the recent federal investment in water through IIJA and what the consequences will be to our nation's water systems, communities, and economy if we do not—at a minimum—continue this investment in our water future.

The report is organized in the following manner:

The State of America's Water Infrastructure. An overview of the systems that provide water services to Americans, evolving cost drivers, and trends in federal, state, and local investment.

The Power of Investment. An analysis of the existing water investment gap and projected impacts in two scenarios: (1) continued federal funding at levels of appropriation established under IIJA (the Continue to Invest scenario), and (2) reversion to the minimal level of federal water infrastructure funding that was the norm prior to IIJA (the Fail to Act scenario).

The Economic Benefits of Investing in Water. The economic gains for industries and households that could be realized over the next generation if we closed the water infrastructure investment gap including job creation, economic growth, and other economic indicators.

STUDY METHODOLOGY

ASCE and the Value of Water Campaign worked with EBP, an economic research team, on this project. The researchers relied on a model called the Long-Term Interindustry Forecasting Tool (LIFT), housed at University of Maryland's Inforum Group. LIFT is a dynamic interindustry-macro (IM) model that uses macroeconomic data to examine how changes in one industry will affect other industries and the economy as a whole.

This study utilized the capital and operations and maintenance (O&M) needs of water utilities based on EPA needs surveys to generate 10- and 20-year economic projections of the potential consequences of two future scenarios: (1) continued federal funding at levels of appropriation established under IIJA (the Continue to Invest scenario), and (2) reversion to the minimal level of federal water infrastructure funding that was the norm prior to IIJA (the Fail to Act scenario). The focus of this report is on the pipes, treatment plants, pumping stations, and other infrastructure that make up the nation's drinking water, wastewater, and stormwater systems. This report does not address drinking water supply infrastructure beyond treatment plants and distribution systems such as source water structures like dams and levees or green infrastructure.

The economic analysis included two types of infrastructure needs:

1. Building new infrastructure to service increasing populations and expanded economic activity

2. Maintaining or rehabilitating existing infrastructure that needs repair or replacement

The data used for the economic modeling is based on the most recent EPA drinking water and wastewater needs surveys, as well as documented and projected federal spending through the Safe Drinking Water Act, Clean Water Act, and 2021 Infrastructure Investment and Jobs Act. All calculations are reflected in 2022 dollars. While acknowledging that there were significant other sources of funding passed in 2021 and 2022 that could be used to fund water infrastructure such as the American Rescue Plan Act (ARPA) and the Inflation Reduction Act (IRA), neither dedicated funding specifically for water and thus were not included as the new baseline in the Continuing to Act scenario.

For figures and tables reported in the context of Gross Domestic Product (GDP), Gross Output (GO), and job markets, the losses reflect impacts against national baseline projections and do not indicate declines from 2024 levels. These figures were calculated utilizing the LIFT/INFORUM model referenced above.

AMERICA'S WATER INFRASTRUCTURE

The vast majority of American homes and businesses receive drinking water, wastewater, and stormwater services through a network of treatment plants, pumps, pipes, and other assets operated by both public and investor-owned utilities. In this study, we refer to these structures and facilities as America's "water infrastructure."

Approximately 87 percent of the US population relies on drinking water provided by a public utility; the remainder are served by private water companies or rely on water from domestic wells.[3] In 2022, there were more than 152,000 publicly owned water systems responsible for distributing safe drinking water across the country. About two-thirds of residents receive drinking water sourced from surface water systems like rivers and lakes; the remainder rely on groundwater systems like aquifers.[4] The EPA and state agencies regulate the systems that treat and distribute drinking water through the Safe Drinking Water Act. This legislation, adopted 50 years ago, regulates contaminants, provides funding for drinking water infrastructure projects, and protects source water.

About 75 percent of the population relies on wastewater treatment services provided by public utilities; the remainder depend on private service or septic tanks. The 15,000 wastewater systems in the country collect and treat approximately 32 billion gallons of wastewater daily before returning it to the environment.[5] It is not uncommon for wastewater utilities to also manage stormwater systems. The EPA and state agencies regulate wastewater and stormwater systems under the Clean Water Act, which regulates wastewater quality and provides funding for clean water infrastructure projects. Over the last few decades, the reuse of wastewater through advanced treatment (rather than simply returning it to the environment) has become more common—particularly in areas of water scarcity.

Multiple drivers are increasing the cost of providing water services.

Large portions of America's water and wastewater systems were built over a century ago, and communities are increasingly feeling the impact of the aging infrastructure. A water main breaks somewhere in the country every two minutes, and an estimated 1.7 trillion gallons of drinking water are lost each year due to leaking pipes.[6] As more pipes, plants, and pumps reach or exceed the end of their expected lifespan, they need to be repaired or replaced, which comes at a significant cost. A growing share of aging infrastructure costs are related to the rising need for operations and maintenance (O&M) funding. While capital infrastructure needs at utilities are eligible for federal and state funding mechanisms, those funding sources typically do not cover O&M, shifting more O&M costs onto local ratepayers.

Water and wastewater utilities also face a variety of constraints and challenges that were unknown at the time most were designed and constructed. For example, there are an estimated six to 10 million lead service lines in communities across the country. Lead-related health crises like in Flint, Michigan, have increased public attention and calls to remove and replace lead service lines. Fully removing lead service lines is complicated and can be expensive, costing between $5,000 and $7,500 per household service line.[7] Treatment of legacy and emerging contaminants such as per- and polyfluoroalkyl substances (PFAS and PFOA) are additional evolving cost drivers for utilities. New and/or updated EPA regulations on both lead and PFAS are some of the most significant regulations on water utilities in decades and will require service line replacement and treatment system upgrades for years to come at a cost of billions of dollars to water ratepayers.

Over the years, population growth has strained existing water infrastructure, exacerbating the demand for clean water and efficient wastewater management. Rapid urbanization and suburban expansion have placed unprecedented stress on aging pipes, treatment plants, and distribution networks, leading to increased instances of leaks, breaks, and system failures. Some of our country's fastest growing cities are in the arid South and Western states and managing demand through conservation measures, water recycling, and addressing non-revenue water loss (leaks) have become necessary for utilities serving these places.[8]

Despite per capita residential water demand having decreased over the last two decades, many utilities still need to develop new water supplies and/or construct new storage facilities to meet and effectively manage future demand.

Finally, most of our nation's water systems were not designed for a changing climate. Yet as communities across the country grapple with the impacts of climate change including more frequent and severe droughts, floods, and storms, the resilience of our water systems is increasingly threatened. Rising temperatures alter precipitation patterns, leading to more frequent and intense droughts in some regions and increased precipitation and flooding in others. These shifts strain water supplies, exacerbate water scarcity, and heighten the risk of water stress in vulnerable communities. Additionally, extreme weather events such as hurricanes and storms can overwhelm aging infrastructure causing infrastructure damage, contaminating water sources, and disrupting water services. Addressing the impacts of climate change on water systems requires a comprehensive approach that integrates adaptation and resilience strategies, investments in climate-forward infrastructure upgrades, and sustainable water management practices to ensure the continued availability of water resources—all of which comes at an ever-increasing price.

Recent federal investment in water is a first step in strengthening America's water infrastructure.

In the United States, investment in water infrastructure is a shared responsibility between federal, state, and local governments. However, there exists a remarkable disparity in the level of investment between the federal government and local and state entities. Historically, local and state governments have borne the brunt of water infrastructure capital spending. At the end of 2017, local and state governments accounted for 97 percent of all water infrastructure spending; total local and state capital spending tallied close to $113 billion that year ($135 billion 2022 dollars) compared to federal investment of only $4.2 billion ($5.1 billion 2022 dollars).[9]

As a result, local and state governments play the primary role in funding water infrastructure projects for their communities. They generally are responsible for financing, planning, constructing, and maintaining water treatment plants, transmission and distribution networks, and wastewater collection systems and treatment facilities. Local and state governments often rely on a combination of revenue sources including water utility rates and fees, bonds, and local taxes to fund water infrastructure projects—placing the largest cost burden directly on ratepayers. The flexibility afforded to local and state governments allows them to address unique challenges and prioritize investments based on local needs but increasingly results in unaffordable water bills for residents.

Faced with rapidly deteriorating water infrastructure across the country and the resulting economic and societal costs, Congress passed the Infrastructure Investment and Jobs Act (IIJA) in 2021. The legislation included approximately $55 billion in new infrastructure funding targeted for potable water delivery, wastewater treatment, and stormwater management, broken down into the following categories shown in Figure 1.

Figure 1

Infrastructure Investment and Jobs Act Funding Broken Down by Category

Program	Funding (over five years)
Clean Water State Revolving Fund	**$11.7 billion**
Drinking Water State Revolving Fund	**$11.7 billion**
Lead Service Line Replacement	**$15 billion**
Emerging Contaminants in Wastewater	**$1 billion**
Emerging Contaminants in Small and Disadvantaged Communities	**$5 billion**
PFAS	**$4 billion**
Water Recycling/Reuse and Western Water Projects	**$8 billion**

Of the total appropriated funds, $43 billion are dollars funneled from the EPA through state revolving funds for infrastructure projects over five years, ending in 2026. Accordingly, that is the amount used in this report's methodology.

IIJA, along with the IRA and ARPA, reflects a recent commitment by the federal government to invest in the nation's infrastructure, signaling an understanding that high-functioning systems support economic growth and stability across many industries and in our communities. But while they are an encouraging step in the right direction, these efforts fall far short of closing the nation's water investment gap.

BRIDGING THE GAP: THE POWER OF INVESTMENT

For 2024 alone, the projected gap between water infrastructure needs and spending in the United States is $91 billion.

Using congressional spending and the most recent EPA needs surveys as baselines, total capital spending on water infrastructure (including O&M) at the local, state, and federal levels is projected at $179 billion in 2024 while investment needs are estimated at $270 billion, creating a $91 billion-dollar gap for 2024 alone.[10] The United States is underinvesting in critical water infrastructure, meeting only an estimated 66 percent of the nation's total infrastructure capital needs in 2024.

While most of the spending gap is attributed to underinvestment in new capital infrastructure, the O&M spending gap in 2024 is expected to grow and outpace available funding. The limited amount of federal and state funding assistance utilities receive is primarily used to help fund capital projects, so local utilities primarily cover O&M costs out of their own revenue streams. While utilities historically have been able to meet basic O&M requirements, there is a growing gap between O&M needs and available funding. These costs will rise as systems continue to age, placing an outsized burden on smaller and disadvantaged communities.

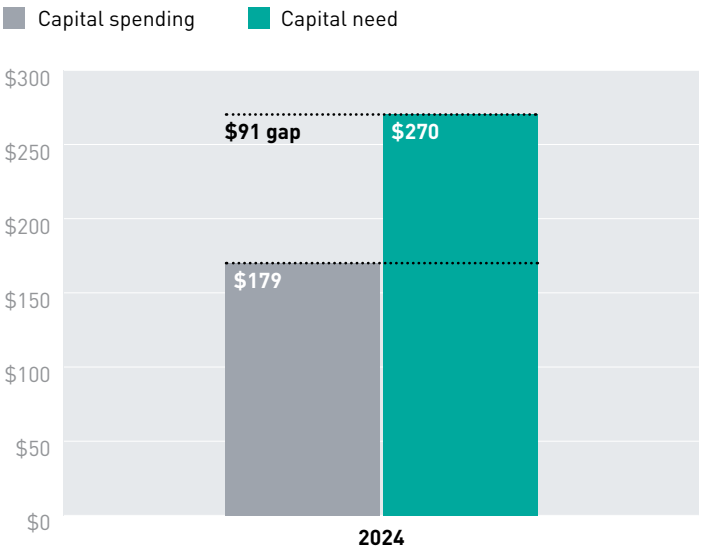
By continuing to invest at IIJA levels, the investment gap could be reduced by $125 billion over the next 20 years.

The subsequent sections of this report highlight the remarkably different effects on our nation's economy between two scenarios, defined as follows:

- **Scenario 1: Continue to Invest.** This scenario assumes that spending appropriated under IIJA from 2022–2026 becomes the new baseline for annual capital investment through 2043.
- **Scenario 2: Fail to Act.** This scenario assumes that IIJA spending continues through 2026 but starting in 2027, spending levels revert to the minimal federal spending trends seen prior to IIJA.

Figure 2

Projected Gap Between Water Infrastructure Needs and Spending, 2024
($ billions)



SCENARIO 1:
CONTINUE TO INVEST

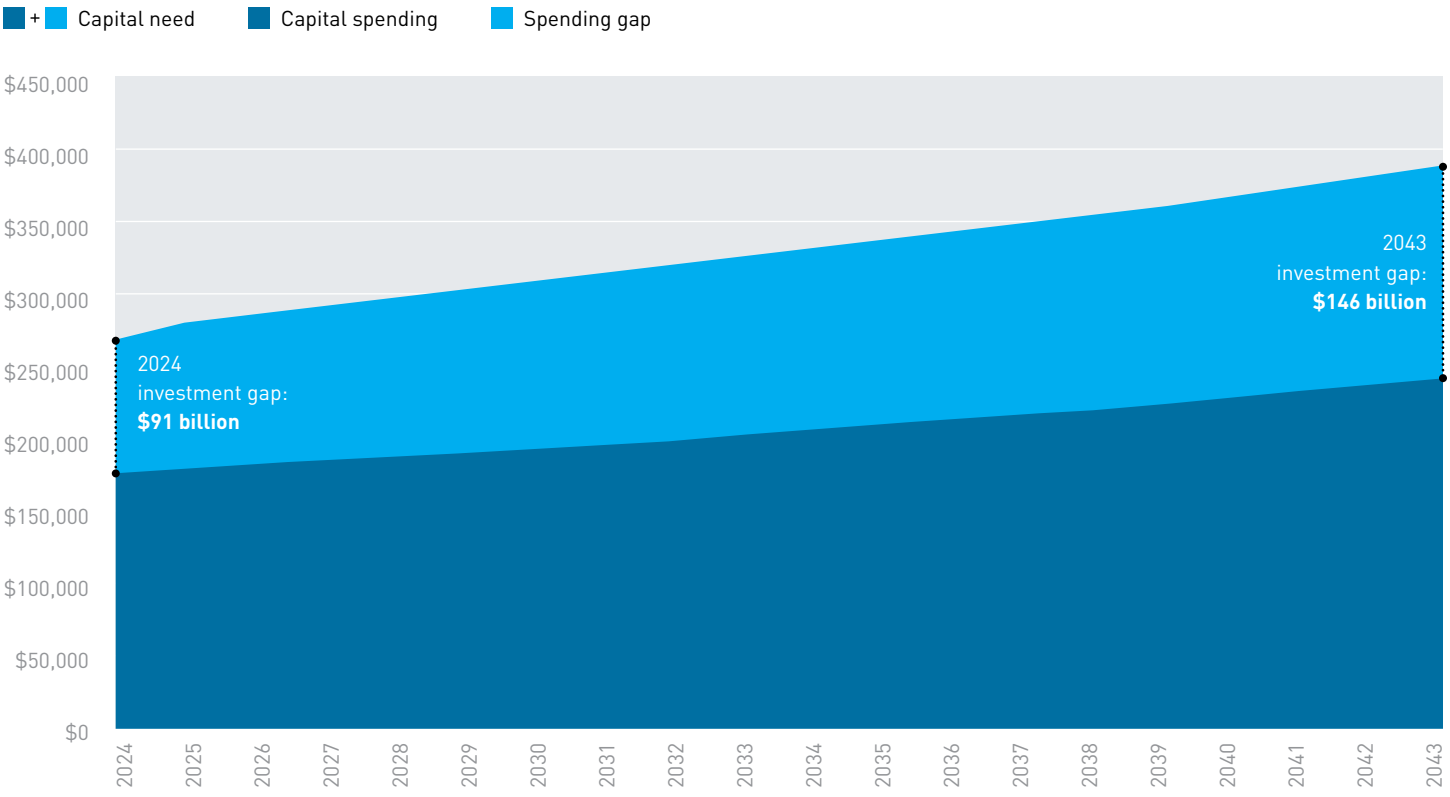
(IIJA Spending Levels Remain Constant)

In 2024, the national water infrastructure funding gap is an estimated $91 billion. Assuming the annual level of spending appropriated under IIJA becomes the new baseline for annual capital investment over the next 20 years, the annual investment gap will grow to $146 billion by 2043.

By 2033, the cumulative water and wastewater total capital investment need will be $2.99 trillion, and the cumulative total capital investment gap will be $1.09 trillion. And over 20 years, the cumulative water and wastewater total capital investment need will be $6.59 trillion, and the cumulative total capital investment gap will grow to $2.43 trillion.

Figure 3

Scenario 1: Continue to Invest—IIJA Spending Levels Remain Constant
($ millions)



SCENARIO 2:
FAIL TO ACT

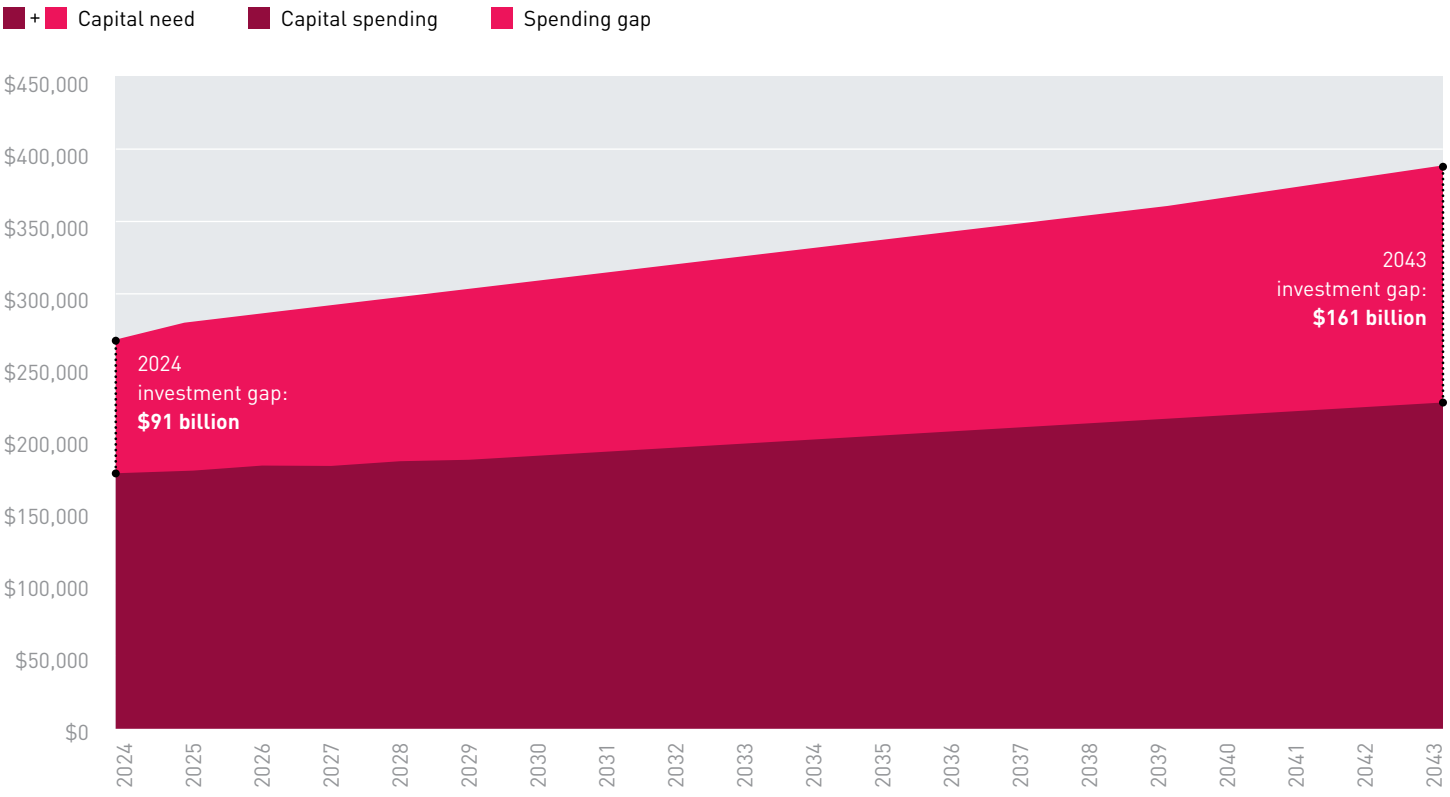
(Spending Reverts to Pre-IIJA Levels)

In contrast, under the Fail to Act scenario where IIJA spending continues only through 2026 with spending levels then reverting to the trend seen through 2019, the annual investment gap will grow to $161 billion by 2043.

By 2033, the cumulative water and wastewater total capital investment need will be $2.99 trillion, and the cumulative total capital investment gap will be $1.12 trillion. And over 20 years, the cumulative water and wastewater total capital investment need will reach $6.59 trillion, and the cumulative total capital investment gap will balloon to $2.56 trillion.

Figure 4

Scenario 2: Fail to Act—Spending Levels Revert to Pre-IIJA
($ millions)



In sum, continuing to invest in water at IIJA levels would reduce the US water infrastructure investment gap by $125 billion over 20 years. That difference is enough to:

Replace all lead service lines in the United States twofold

OR

Fully fund a permanent federal customer assistance program at the estimated need of $5 billion annually for 25 years

OR

Repair or replace more than 25 percent of the nation's two million aging water mains

THE ECONOMIC BENEFITS OF INVESTING IN WATER

The costs of failing to invest in water infrastructure are tremendous. But if America continues to invest in water infrastructure at a heightened level and begins to close the water infrastructure investment gap, the benefits to our economy, trade, and nationwide public health will increase exponentially over a generation.

A thriving economy depends on reliable water.

Water infrastructure plays a pivotal role in supporting major economic activity. A reliable water supply is essential for large water users to maintain uninterrupted production processes, ensure product quality, manage costs effectively, comply with regulations, and meet sustainability standards. For example, consistent water supply enables food manufacturers to maintain production efficiency and uphold food safety standards; is necessary for sustaining power generation operations, preventing equipment overheating, and ensuring continuous electricity supply to meet societal demands; and is a major component in various stages of textile manufacturing.

Moreover, water is a significant operational cost for many industries. Fluctuations in water supply or sudden interruptions in availability can lead to increased costs due to the need for alternative water sources or the implementation of emergency measures to maintain operations. A reliable water supply allows industries to better manage their costs and allocate resources more efficiently. For industries that must comply with environmental regulations regarding water usage, discharge, and pollution control, interruptions in water service can lead to violations, resulting in fines and legal costs.

Reliable water service also has enormous indirect impacts. Take the following example: wastewater service disruptions to the food processing industry will reduce productivity in that industry, leading to lower industry output. That will lead to fewer purchases of industrial machinery and trucking services. Over time, workers in food processing, trucking, and machinery sectors will face wage reductions or lose their jobs. They then make fewer household purchases of groceries, furniture, cars, clothing, restaurant meals, and other goods and services, further weakening the US economy. On the other hand, enhanced wastewater services would lead to a corresponding increase in food processing productivity and growth in these other industries, higher wages, and a stronger economy.

Figure 5 is a look at the top industrial users of freshwater resources in the United States today.

Figure 5

Water-Intensive Industrial Sectors, Gallons of Water Use per 2022 Dollar Output[11]

#1	#2
Food Manufacturing: **297** gallons per $ output	**Electric Power Generation:** **253** gallons per $ output
#3	**#4**
Textile Mills: **71** gallons per $ output	**Chemical Manufacturing:** **60** gallons per $ output
#5	**#6**
Primary Metal Manufacturing: **56** gallons per $ output	**Mining (except Oil and Gas):** **46** gallons per $ output
#7	**#8**
Beverage and Tobacco Product Manufacturing: **31** gallons per $ output	**Plastics and Rubber Products Manufacturing:** **30** gallons per $ output
#9	**#10**
Paper Manufacturing: **27** gallons per $ output	**Amusement, Gambling, and Recreation Industries:** **25** gallons per $ output

Without continued investment, service disruptions will cost water-reliant industries an estimated $287 billion by 2043.

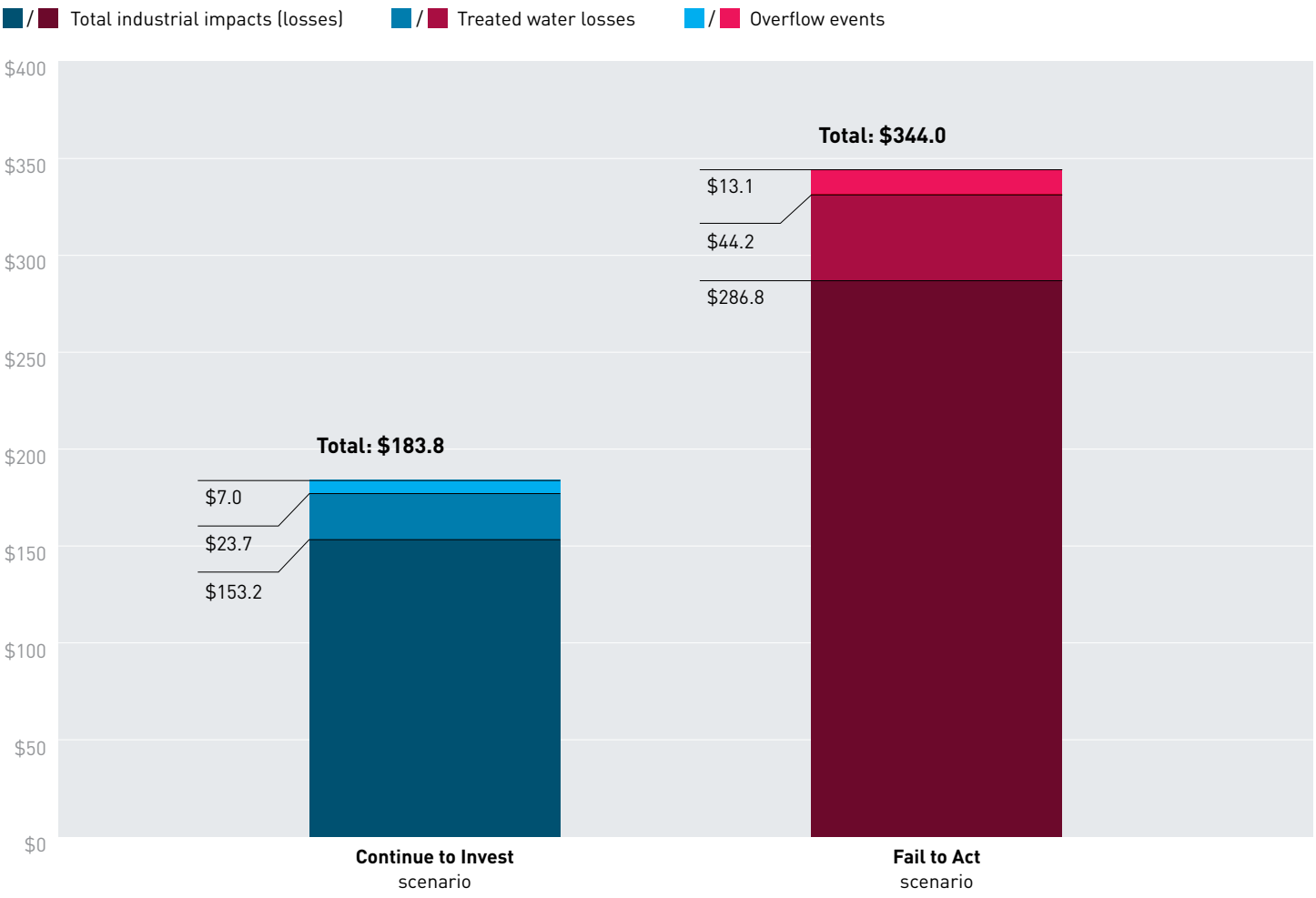
The costs of deteriorating water infrastructure will be particularly burdensome for these water-reliant industries. Water service disruptions will result in an estimated $63 billion economic loss for top water-reliant industries in 2024. If we continue on the current trajectory, service disruptions will cost water-reliant businesses a cumulative $287 billion by 2043. **But if we continue to invest at IIJA spending levels, that figure could be reduced by $134 billion—a 46 percent reduction in costs to businesses.**

The potential impacts of service disruptions on water-reliant industries are substantial:

- Water service disruptions will have led to an estimated $63 billion economic loss for water-reliant industries in 2024.
- **Water service disruption losses to water-reliant businesses would be reduced by $134 billion over the next 20 years under the Continue to Invest scenario.**
- Total losses due to underinvestment resulting in service disruptions to top industries over two decades would be almost twice as large under the Fail to Act scenario ($344 billion in losses) than under the Continue to Invest scenario ($183.8 billion in losses).

Figure 6

Cumulative 20-year Losses Due to Water Infrastructure Underinvestment—Scenarios Comparison
($ billions)



Funding water bolsters the national economy and job market.

Investment in water infrastructure can have significant positive impacts on both Gross Domestic Product (GDP) and Gross Output (GO) by enhancing economic efficiency, productivity, and resilience across various sectors.

GDP is the total value of all final goods and services produced within a country's borders during a specific period (here, over 20 years) and includes investment, personal consumption expenditures, government spending, and net exports. Investment in water infrastructure such as upgrading water treatment plants, replacing outdated water mains to reduce breaks, and expanding distribution networks can boost GDP growth by facilitating economic activity. Reliable water infrastructure ensures consistent access to clean water for households, businesses, and agriculture, supporting consumption, production, and investment.

Personal consumption expenditures (PCE) are the primary measure of consumer spending on goods and services in the US economy and comprise the largest component of the total US GDP. PCE accounts for about two-thirds of domestic final spending and thus is the primary engine that drives future economic growth. PCE shows how much of the income earned by households is being spent on current consumption and provides a comprehensive measure of types of goods and services that are purchased by households including money spent on services like utilities and healthcare.

Below is an overview using the LIFT model of the impact of continuing to invest in water on PCE (and as a result GDP) over the next 20 years:

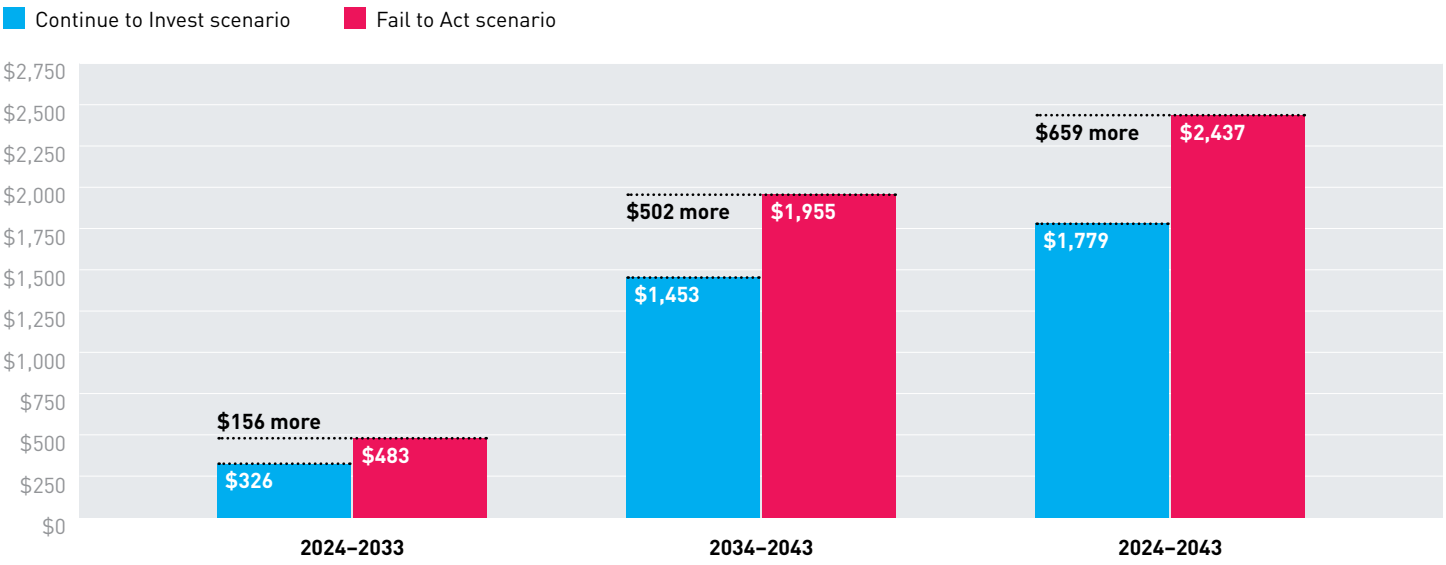
- Failing water infrastructure would result in close to a $1.75 trillion loss in personal consumption expenditures in the Fail to Act scenario versus $1.2 trillion in the Continue to Invest scenario. **By continuing to invest at IIJA spending levels, the US economy's losses from personal consumption expenditures would be reduced by close to $531 billion between now and 2043.**

- Failing infrastructure would lead to decreased access to clean water resulting in health issues such as waterborne diseases. The services sector, particularly healthcare, would bear the greatest losses. **By continuing to invest, losses in the healthcare services sector could be reduced by $136 billion over the 20-year period.**

- By 2043, GDP losses are expected to tally $1.8 trillion under the Continue to Invest scenario, compared to $2.4 trillion in the Fail to Act scenario. **Continuing to invest in water at IIJA levels will reduce GDP losses by $659 billion over 20 years.**

Figure 7

Comparison of GDP Losses in Two Scenarios Due to Failing Water Infrastructure
($ billions)

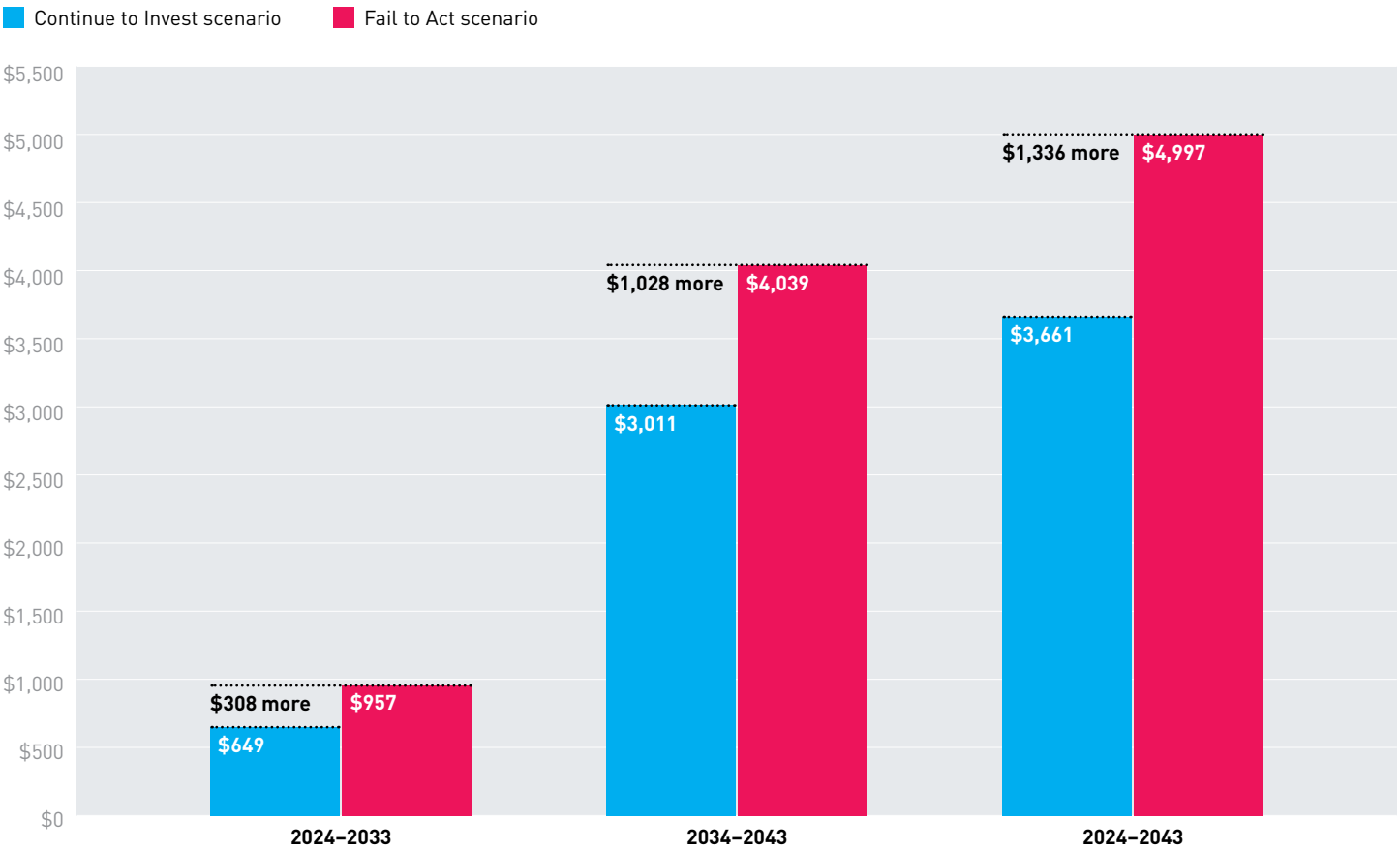


GO measures the total value of all goods and services produced by an industry or sector within an economy, regardless of whether those goods and services are used for final consumption, intermediate production, or investment. In other words, GO captures the total value of all stages of production—from raw materials to final products. Investment in water infrastructure can also lead to an increase in GO by optimizing the efficiency of production processes across industries. Upgraded water infrastructure allows for the adoption of advanced water management technologies such as water recycling and reuse systems, which can reduce water consumption, lower production costs, and enhance productivity. Modernizing water infrastructure often involves the implementation of smart technologies and data analytics, enabling industries to monitor and manage water resources more effectively. By improving resource allocation and minimizing waste, investment in water infrastructure can lead to higher levels of GO across sectors, contributing to overall economic expansion.

Because GO is a broader measure than GDP, the impacts of continuing to invest in water at IIJA levels are even more remarkable: GO losses would tally $3.7 trillion in the Continue to Invest scenario as compared to $5 trillion in the Fail to Act scenario. **Continuing to invest is expected to reduce GO losses by $1.3 trillion over a 20-year period.**

Figure 8

Comparison of Output Losses in Two Scenarios Due to Failing Water Infrastructure
($ billions)



Underinvestment in water infrastructure increases production costs for businesses, most significantly impacting the manufacturing sector. US manufacturing businesses alone would stand to lose $158 billion more in business sales in the Fail to Act scenario than in the Continue to Invest scenario over the 20-year period. Here is a breakdown of GO impacts by sector:

Figure 9

Estimated Business Output Losses Due to Failing Water Infrastructure, 2024–2043
($ billions)

Sector	Continue to Invest	Fail to Act	Positive Impact by Investing
Manufacturing	$952	$1,232	**$281**
Finance, Insurance, and Real Estate	$554	$771	**$218**
Professional Services	$448	$598	**$150**
Healthcare	$281	$406	**$125**
Logistics	$317	$428	**$111**
Information	$235	$321	**$86**
Retail Trade	$186	$267	**$81**
Other Services	$147	$220	**$74**
Accommodation and Restaurants	$116	$170	**$53**
Mining, Utilities, and Agriculture	$154	$206	**$53**
Transportation Services (excluding Trucking)	$101	$138	**$38**
Construction	$82	$115	**$33**
Entertainment	$43	$59	**$16**
Educational Services	$25	$36	**$10**
Social Assistance	$20	$29	**$9**
Total	**$3,661**	**$4,997**	**$1,336**

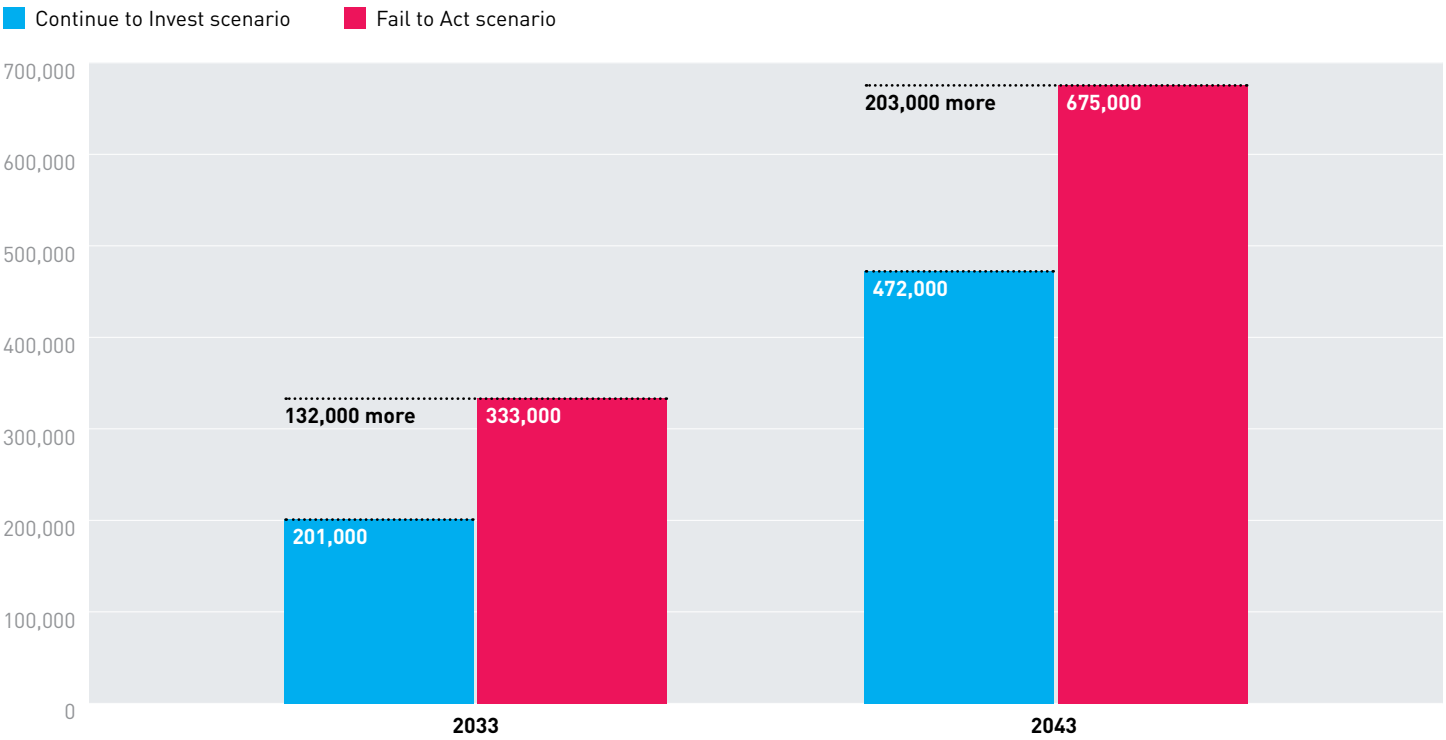
When businesses reduce their output due to unreliable water infrastructure, employment will inevitably decline. In short, interruptions and quality decline in water services would strain production resources and cause disruptions in operations, increased costs, and regulatory compliance issues. **But continuing to invest would reduce the negative impacts of failing water infrastructure by protecting more than 200,000 jobs in 2043, as shown in Figure 10.**

In 2043, the most significant decline in employment due to failing water infrastructure likely would occur in the healthcare sector with 38,000 more annual job losses in the Fail to Act scenario than in the Continue to Invest scenario. Unreliable water access can compromise water quality, leading to an increase in waterborne diseases and other health issues and resulting in higher demand for healthcare services. This increased demand can strain existing healthcare resources and workforce and lead to job losses due to overwork. Additionally, inadequate access to clean water can hinder the ability of healthcare facilities to provide quality care, leading to a decline in patient outcomes and satisfaction and ultimately in sector employment.

Employment in the manufacturing sector would be the second hardest hit with 24,000 more annual job losses under the Fail to Act scenario. When water infrastructure fails, interruptions in water supply or poor water quality can disrupt manufacturing operations, leading to decreased productivity and output. This can negatively impact the sector workforce through layoffs and hiring freezes as companies adjust to the inability to meet production targets. Failing water infrastructure could also lead to increased operational costs when manufacturers seek alternative water sources or water treatment facilities to maintain production, which could ultimately result in workforce reductions.

Figure 10

Comparison of Annual Job Losses in Two Scenarios Due to Failing Water Infrastructure
($ billions)



Investing in water helps households and communities thrive.

Economy-wide losses in employment due to chronic underfunding in water infrastructure would lead to losses in household income. As water quality and availability decline, efficiency and productivity in the industrial sector would reduce available jobs, which would have a negative impact on household income.

Personal income is the income earned by households from wages and salaries as well as other sources of income such as transfer payments from the government and income from investment projects. Labor income represents the total value of all forms of employment income paid in the economy and includes employee compensation (salaries, benefits, and payroll taxes) and proprietor income (self-employed individuals and unincorporated business owners). Disposable income is the amount of money that a person or household has at their disposal to spend or save after taxes are deducted.

Over a generation, continuing to invest at IIJA spending levels would substantially bolster all forms of household income:

- Total personal income would see savings of $452 billion, as total loss in household personal income would amount to $1.8 trillion instead of $2.3 trillion.
- Labor income savings would amount to $137 billion, as total loss in household labor income would amount to $1 trillion instead of $1.1 trillion.
- Household savings would reach $362 billion, as cumulative losses in household disposable income would amount to $1.2 trillion instead of $1.6 trillion.

The cumulative savings achieved by continuing to invest amount to $6,745 per household.

Figure 11

Losses in Two Scenarios Due to Failure in Water Infrastructure
($ billions)

	Continue to Invest	Fail to Act	Savings by Investing
Personal Income Losses			
2024–2033	$330	$454	$124
2034–2043	$1,507	$1,835	$328
2024–2043	**$1,837**	**$2,289**	**$452**
Labor Income Losses			
2024–2033	$172	$213	$40
2034–2043	$839	$936	$97
2024–2043	**$1,011**	**$1,148**	**$137**
Disposable Income Losses			
2024–2033	$269	$368	$98
2034–2043	$950	$1,214	$264
2024–2043	**$1,219**	**$1,581**	**$362**
Total Cumulative Losses	**$4,067**	**$5,018**	**$951**

CONCLUSION

Investment in water and wastewater infrastructure is essential for sustaining public health, quality of life, economic prosperity, and environmental integrity in the United States. Historic underinvestment has resulted in significant gaps between infrastructure needs and actual spending, posing risks to households, communities, and businesses.

The recent influx of federal investment through IIJA signals a needed sea change in the level and impact of funding for water infrastructure across the nation. This report considers the impact of continuing to invest in water at the increased levels established under IIJA versus reverting to the pre-IIJA trend of severe underinvestment. And while neither scenario comes close to fully funding our nation's water infrastructure needs in this 20-year timeframe, continuing the increased level of federal spending under IIJA is the only viable option for supporting healthy households and a strong economy in this country.

Sustaining IIJA funding levels for the next two decades will yield substantial benefits including reduced economic losses, reduced healthcare costs, improved resilience for water-reliant industries, more savings for households, and long-term economic growth. But if there is one enduring takeaway from the analyses presented here, it is the compelling need to recognize the value of water in every aspect of our daily lives and begin to reimagine our nation's approach to funding water.

NOTES

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11 As derived from the EPA's industry model, using IMPLAN.

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